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# Final pricing review determination for Chorus' unbundled copper local loop service

[2015] NZCC 37

Pursuant to section 51 of the Telecommunications Act 2001

## Final determination

**Date:** 15 December 2015

**The Commission:** Dr Stephen Gale

Pat Duignan

Elisabeth Welson

***Embargoed until 8.30 am Tuesday 15 December 2015***

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## Acronyms and initialisms

| | |
|---|---|
| **ACCC** | Australian Competition and Consumer Commission |
| **Act** | Telecommunications Act 2001 |
| **ADSL** | Asynchronous digital subscriber line |
| **Amendment Act** | Telecommunications (TSO, Broadband, and Other Matters) Amendment Act 2011 |
| **ATM** | Asynchronous transfer mode |
| **BAU** | Business as usual |
| **BBM** | Building block model |
| **BEREC** | Body of European Regulators for Electronic Communications |
| **BSS** | Business support system |
| **BUBA** | Basic UBA<br>(as described in section 3 of Schedule 1 (UBA service description) of the UBA STD General Terms) |
| **CAGR** | Compound Annual Growth Rate |
| **Capex** | Capital expenditure |
| **CEG** | Competition Economists Group |
| **CERA** | Canterbury Earthquake Recovery Authority |
| **CGPI** | Capital Goods Price Index |
| **CI** | Confidential information |
| **CNVCs** | Commercially non-viable customers |
| **CPE** | Customer premises equipment |
| **CPI** | Consumer Price Index |
| **CPP** | Customised price-quality path |
| **DBA** | Danish Business Authority |
| **DORC** | Depreciated optimised replacement cost |
| **DPP** | Default price-quality path |
| **DSL** | Digital subscriber line |
| **DSLAM** | Digital subscriber line access multiplexer |
| **EC** | European Commission |
| **EDB** | Electricity distribution business |
| **EPMU** | Equi-proportional mark-up |
| **ESA** | Exchange service area |
| **ESP** | Efficient service provider |
| **ETP** | External termination point |
| **EUBA** | Enhanced UBA |

| | |
|---|---|
| **FCC** | Federal Communications Commission |
| **FDS** | First data switch |
| **FPP** | Final pricing principle<br>(as set out in Schedule1 of the Act) |
| **FTTH** | Fibre-to-the-home |
| **FTTN** | Fibre-to-the-node |
| **FWA** | Fixed wireless access |
| **GigE** | Gigabit Ethernet |
| **GPON** | Gigabit Passive Optical Network |
| **HFC** | Hybrid fibre-coaxial |
| **HSNS** | High Speed Network Service |
| **ILEC** | Incumbent local exchange carrier |
| **IM** | Input methodologies |
| **IP** | Internet protocol |
| **IPP** | Initial pricing principle<br>(as set out in Schedule 1 of the Act) |
| **IRD** | Inland Revenue Department |
| **ITU** | International Telecommunication Union |
| **KSO** | Kiwi Share obligations |
| **LAN** | Local area network |
| **LAP** | Local aggregation path |
| **LCI** | Labour Cost Index<br>(as produced by Statistics New Zealand) |
| **LFC** | Local fibre company |
| **LFI** | Line Fault Index |
| **LME** | London Metals Exchange |
| **LRIC** | Long run incremental cost |
| **LTE** | Long-term evolution |
| **MBIE** | Ministry of Business, Innovation and Employment |
| **MDF** | Main distribution frame |
| **MEA** | Modern equivalent asset |
| **MED** | Ministry of Economic Development |
| **MPF** | Metallic path facility |
| **NESTF** | National Environmental Standards for Telecommunication Facilities |
| **NGA** | Next generation access |
| **NPV** | Net present value |
| **NRA** | National Regulatory Authority |

| | |
|---|---|
| **NRC** | Non-recurring charges |
| **NZIER** | New Zealand Institute of Economic Research |
| **ODF** | Optical distribution frame |
| **ODV** | Optimal deprival value |
| **OFDF** | Optical fibre distribution frame |
| **OFM** | Online fault management |
| **OLT** | Optical line terminal |
| **OO&T** | Online order and tracking |
| **Opex** | Operating expenditure |
| **ORC** | Optimised replacement cost |
| **POA** | Price on application |
| **P2P** | Point-to-point |
| **PPI** | Producers Price Index |
| **PPP** | Purchasing power parity |
| **PSTN** | Public switched telephone network |
| **RAB** | Regulatory asset base |
| **RBI** | Rural Broadband Initiative |
| **RBNZ** | Reserve Bank of New Zealand |
| **RFP** | Request for proposals |
| **RI** | Restricted information |
| **RMA** | Resource Management Act |
| **RSP** | Retail service provider |
| **SLES** | Sub-loop extension service |
| **SLU** | Sub-loop UCLL |
| **STD** | Standard terms determination |
| **STM** | Synchronous transport module |
| **TAMRP** | Tax-adjusted market risk premium |
| **TEA** | Telstra Efficient Access |
| **TELRIC** | Total element long run incremental cost |
| **TSLRIC** | Total service long run incremental cost<br>(see meaning in Schedule 1 of the Act) |
| **TSO** | Telecommunications Service Obligations<br>(see Part 3 of the Act) |
| **UBA** | Unbundled bitstream access<br>(as described in in Schedule 1 of the Act) |
| **UBA STD** | UBA standard terms determination |
| **UBS** | Unbundled bitstream service |

| | |
|---|---|
| **UCLFS** | Unbundled copper low frequency service<br>(as described in Schedule 1 of the Act |
| **UCLL** | Unbundled copper local loop<br>(as described in Schedule 1 of the Act) |
| **UCLL STD** | UCLL standard terms determination |
| **UFB** | Ultra Fast Broadband |
| **ULL** | Unbundled local loop |
| **ULLS** | Unconditioned local loop service |
| **USO** | Universal service obligation |
| **VoIP** | Voice over internet protocol |
| **WACC** | Weighted average cost of capital |

# Executive summary

X1 This final determination sets prices for Chorus' unbundled copper local loop (UCLL) service. The UCLL service enables telecommunications retailers to access Chorus' copper telephone lines to provide fixed line voice and broadband services to customers throughout New Zealand.

X2 The UCLL monthly rental prices we have set are noted in Table X1 below.[1] These prices are the outcome of detailed modelling of the efficient costs of providing the UCLL service, under an approach referred to in the Telecommunications Act 2001 (Act) as total service long run incremental cost (TSLRIC). Prices have been determined for the next five years (starting on 16 December 2015).[2]

**Table X1: UCLL monthly rental prices**

| Service | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 |
|---|---|---|---|---|---|
| UCLL | \$29.75 | \$30.22 | \$30.70 | \$31.19 | \$31.68 |

X3 The UCLL prices we have determined are higher than the previous price of $23.52. The previous UCLL price was determined by international benchmarking under the initial pricing principle (IPP), rather than detailed TSLRIC modelling of the costs of providing the service in New Zealand.

X4 We have also determined prices for Chorus' unbundled bitstream access (UBA) service in parallel with this UCLL pricing review determination. Our decision about UBA prices is explained in a separate determination also published today.[3] UCLL is an input to the UBA service.[4]

X5 UCLL represents a significant part of the costs that make up the retail price of fixed line broadband packages in New Zealand. The combined UCLL and UBA price of $41.19 in the first year of the regulatory period would represent more than half the cost of a $75 retail service.[5] UCLL is the main component, at $29.75.

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1 As well as setting prices for the UCLL service, this determination sets prices for the sub-loop UCLL service – which provides access to the copper telephone lines between Chorus' roadside distribution cabinets and consumers' premises. As few are taking up the sub-loop UCLL service, this executive summary does not discuss that service in any detail. The price for the sub-loop UCLL service is about 50% of the UCLL price for each year of the regulatory period.

2 However, Commissioner Duignan disagrees with this start date, and considers that the new TSLRIC prices should apply from 1 December 2014. This is discussed in paragraphs X38 to X40 below.

3 Commerce Commission "Pricing review determination for Chorus' unbundled bitstream access service – Final determination" 15 December 2015.

4 The UCLL prices we have determined also apply to Chorus' unbundled copper low frequency (UCLF) service. The UCLF Service is similar to the UCLL service, but allows access only to the low-frequency band of the Chorus' copper lines (which can be used to deliver voice services).

5 For more details, see Commerce Commission "Price trends in retail fixed-line broadband services, 2011 to 2014, and the impact of wholesale price changes" June 2015.

X6 This determination ends the UCLL pricing review process. We have made our final determination taking into account the views of stakeholders, with assistance from independent expert advisors. We thank all stakeholders for their input throughout this process.

**The UCLL service provides access to Chorus' copper telephone lines**

X7 The UCLL network refers to the copper telephone lines that connect consumers' homes and workplaces to Chorus' local telephone exchange buildings. These copper telephone lines are used to provide fixed line voice and broadband services. UCLL is known as the "last mile" of the network, because it is at the edge of the network which reaches the end-user.

X8 A telecommunications retailer using the UCLL service can install its own electronic equipment in Chorus' local telephone exchange buildings, to deliver services to its customers over the copper lines. This is commonly referred to as "unbundling".

X9 Alternatively, a telecommunications retailer can use the UBA service to deliver broadband services to its customers. The UBA service provides access to Chorus' electronic equipment and software, in addition to the copper lines. From the perspective of a retail telecommunications provider, the UBA service requires less up-front investment to deliver services to consumers.

X10 Although next generation infrastructure is being rolled out via the Ultra Fast Broadband (UFB) initiative, Chorus' copper network will remain, for some time, the main infrastructure over which fixed line telecommunications services are provided to New Zealanders. UCLL comprises a significant part of Chorus' business, with regulated copper services (including UCLL and UBA) representing more than half of its revenues.[6]

**We have determined UCLL prices using TSLRIC**

X11 We have determined UCLL prices using TSLRIC. The Act requires us to use TSLRIC when setting prices in this review, under the final pricing principle (FPP) for the UCLL service. The Act provides us with a particular definition of TSLRIC, which requires us to determine the forward-looking costs over the long run of the UCLL service.

X12 We have also been guided by economic theory in interpreting TSLRIC. The TSLRIC concept is an economic approach commonly used to set regulated prices for access to telecommunications infrastructure. Under the conventional approach to the TSLRIC concept, prices are based on the costs that a hypothetical efficient operator would incur in supplying the service in the future, using modern technologies, and valuing inputs using current prices. Prices set using the TSLRIC concept allow recovery of the capital costs incurred in building the network, plus the ongoing operating costs.

[6] Chorus Annual Report 2015, Appendix One.

X13 When determining TSLRIC prices for UCLL, we have been guided by the purpose of the Act (“to promote competition in telecommunications markets for the long-term benefit of end-users of telecommunications services within New Zealand…”) and benefits that TSLRIC prices may deliver in the New Zealand context. Potential benefits from setting prices using the TSLRIC concept include encouraging efficient investment, preventing monopoly pricing, and creating incentives to minimise costs.

X14 We had previously set UCLL prices by international benchmarking under the IPP. Benchmarking under the IPP is intended to be a relatively quick and low-cost approach to setting regulated prices, compared to the detailed TSLRIC cost modelling required under the FPP. We first set UCLL prices under the IPP in 2007, and then updated these prices in 2012 following a review of the benchmarking data that we initiated.[7]

X15 Affected parties are able to apply for a pricing review under the FPP, if they are not satisfied with the outcome of the IPP. We started the UCLL FPP process after receiving five applications for a pricing review, following our December 2012 UCLL benchmarking determination.

**Our approach to TSLRIC modelling for the UCLL service**

X16 We engaged TERA, a French-based economic cost modelling consultancy firm, to build a TSLRIC model for UCLL. The TSLRIC model that TERA built reflects decisions we made about the design and costing of the network used to determine UCLL prices.

X17 At the high level, the cost modelling process had three key stages.

X17.1 We determined the design of the hypothetical network, including the location of the customers to be served, the network technologies to be modelled, and the location/quantity of assets required.

X17.2 We calculated the costs incurred in supplying the UCLL service based on this network design, to derive a central TSLRIC estimate.

X17.3 We considered whether we should adjust our central TSLRIC estimate to best promote competition for the long-term benefit of end-users of telecommunications services.

X18 When we did the modelling, we used inputs from objective sources where possible. We used geospatial specialists to map the optimal path of the network; obtained trenching costs from local civil engineering specialists Beca; and received expert advice from Dr Martin Lally and UK-based consultancy Oxera about the cost of capital for the assets involved. To build the TSLRIC model, we used TERA’s

[7] Commerce Commission “Standard Terms Determination for the designated service Telecom’s unbundled copper local loop network – Decision 609” 7 November 2007; and Commerce Commission “Final determination on the benchmarking review for the unbundled copper local loop service – Decision No. NZCC 37” 3 December 2012.

international engineering and modelling expertise for costing the equipment and combining all the inputs.

*We have designed a new network that we consider a hypothetical efficient operator would build*

X19 When doing our modelling, we determined the “core functionality” of the UCLL service Chorus is required to provide – to allow access seekers to provide voice and broadband services. We adopted the conventional approach of modelling a hypothetical efficient operator building a new network to deliver this functionality using modern equivalent assets.[8] We have assumed that the hypothetical efficient operator, when delivering this service, is unconstrained by the choices made when Chorus’ existing copper network was built.

X20 Modelling a hypothetical efficient network, built using modern equivalent assets, meets the TSLRIC definition, which requires us to determine forward-looking costs over the long run. Prices set using this approach promote efficient “build-or-buy” investment decisions by telecommunications companies, incentivising them to bypass Chorus’ existing copper network only where this is cost-effective. Most stakeholders agreed we should model a hypothetical efficient network, but they provided a range of views about the characteristics of the network (including the role of real-world constraints and the appropriate cost data).

X21 Based on our analysis, we made the following decisions about the design of the hypothetical efficient network.

X21.1 The network connects every building and dwelling along New Zealand’s road network. The number of paying end-users (ie, demand) equals all active fixed line copper and fibre subscribers as reported by Chorus and the other local fibre companies (LFCs).[9] We have based demand on all copper and fibre subscriptions given that UFB is a government-sponsored overbuild of the existing nationwide copper network. Modelling a hypothetical replacement for the copper network implies that it is the combined demand of the existing copper network and the real-world replacement for that network (ie, UFB) that is relevant.[10]

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8 To ensure sufficient equivalence to Chorus’ network, we have required the modelled network to be unbundleable where demand from telecommunications retailers is likely, and to match the broadband performance of Chorus’ UCLL network in other areas.

9 In addition to Chorus, other LFCs building the UFB network in certain regions of New Zealand are Northpower Fibre, UltraFast fibre, and Enable Networks.

10 Including demand for both copper and fibre connections also avoids the UCLL price increasing as end-users migrate from copper to fibre. If only copper demand was included, the number of connections over which the fixed costs of building the UCLL network are spread would decrease over time as end-users migrate to fibre, leading to a higher price per line. Escalating prices would likely drive further migration away from UCLL, potentially distorting telecommunications companies’ decisions about whether to buy access to Chorus’ network or invest in their own infrastructure. Escalating prices would be particularly harmful to consumers in areas where limited substitutes are available (eg, areas where UFB is not being deployed).

X21.2 We excluded demand for networks that are ongoing alternative competitors to the copper and UFB networks. In particular, we have excluded demand for hybrid fibre-coaxial connections (commonly referred to as "cable" connections), because cable is a long-standing alternative, entirely privately-funded, network that will continue to compete with (rather than replace) both Chorus' copper network and UFB.[11]

X21.3 Fibre is used to connect every building and dwelling, except for the edges of the network where fixed wireless technology is used. A point-to-point fibre network is the most future proof and cost-effective technology currently available that meets the core functionality of the UCLL service.

X21.4 The network uses the current number and location of Chorus' local telephone exchange buildings. However, we have optimised the routes of cables that link customers' buildings to Chorus' exchanges. This is a practical approach to TSLRIC pricing that is used widely by regulators internationally.

X21.5 We have not incorporated re-use of Chorus' existing copper network assets when designing the modelled network. This is to help avoid the risk of suppressing or undermining efficient network investment from new entrant network service providers such as the non-Chorus LFCs (which would not have access to these assets). This approach is consistent with our framework of modelling the forward-looking costs incurred over the long run by a hypothetical efficient operator building and operating a new telecommunications network from scratch. Consistent with this framework, we have allowed for some infrastructure sharing with other utilities, such as electricity companies, where these assets can be accessed.

X21.6 We have assumed that a large number of fibre cables will be deployed aerially, making use of electricity distribution poles which are shared. Although aerial deployment is cheaper than burying cables underground, getting consent may not always be possible. We have used real real-world evidence from electricity distribution networks as a guide for determining the extent of aerial deployment the hypothetical efficient operator would use.

*We estimated a hypothetical efficient operator's costs to supply UCLL*

X22 Having designed a hypothetical efficient network to supply the UCLL service, we then determined the costs for each network element.

X23 When determining these costs, we have valued assets at their current (or replacement) cost, which reflects the cost of replacing an asset at today's prices. This is in contrast to an historic cost approach, which reflects the actual cost of an asset when originally installed.

11 Vodafone has a cable network in Wellington, Kapiti, and Christchurch.

X24 Valuing assets at their replacement cost is consistent with forward-looking costs incurred over the long run, as required by TSLRIC. This is also consistent with the conventional approach to TSLRIC modelling, and the objectives of TSLRIC-based prices more generally. As noted above, conceptually this approach is intended to promote efficient investment decisions by telecommunications companies considering whether to buy access to existing infrastructure, or to build their own alternative infrastructure.

X25 While factors such as the mandatory national averaging of UCLL prices may compromise the direct link to efficiency, we consider it important to respect the conceptual basis of the TSLRIC methodology. This is particularly important for confidence in the New Zealand telecommunications regulatory framework, given the scale of investment involved in the UFB initiative (including further investment being sought to extend the UFB coverage area), likely future regulatory processes, and the corresponding investment by retail telecommunications providers.

X26 We made the following key decisions when estimating the costs the hypothetical efficient operator would incur in supplying the UCLL service.

X26.1 Trenching costs were based on independent estimates from a local civil engineering expert, Beca. Beca's analysis, based on a range of data sources, is broadly consistent with information on UFB trenching costs provided by Chorus. Trenching is one of the biggest cost-drivers for UCLL, given the substantial earthworks involved in deploying a fixed line telecommunications network.

X26.2 A post-tax allowed rate of return on capital of 5.56% was used. This was estimated using the simplified Brennan-Lally version of the capital asset pricing model, which reflects New Zealand's taxation system. We received independent expert advice from Dr Martin Lally and Oxera to assist us when estimating the allowed rate of return. As discussed below, we considered adjusting the allowed rate of return, but determined that this was not warranted in the circumstances.

X26.3 We excluded network costs that the hypothetical efficient operator would likely recover directly from customers or third parties (outside the regulated UCLL prices we have set). The financial contributions we have excluded relate to elements of the UCLL service, such as trenches and lead-in cables from the road to the customers' premises.

X26.4 To determine ongoing operating costs associated with the day-to-day running of the hypothetical efficient operator's fibre network, we started with Chorus' copper network operating expenditure. However, we applied an upward adjustment to reflect the higher proportion of aerial deployment assumed in our modelling, and a downward adjustment to reflect the likely lower costs of maintaining a new fibre access network (compared to Chorus' existing copper network).

*We have not adjusted our central TSLRIC estimate*

X27 Some uncertainty is inherent in TSLRIC modelling, because of the many judgements involved when building the model. We considered whether to adjust our central TSLRIC estimate due to this uncertainty. Specifically, an adjustment may be warranted where the costs are asymmetric – that is, where the costs to consumers from setting the price too low are likely to be significantly greater than the costs from setting the price too high (or vice versa).

X28 We have not adjusted our central TSLRIC estimate up or down. We found no basis for making an adjustment to better promote competition for the long-term benefit of end-users, ensure appropriate pricing relativity between UCLL and UBA, or address any potential bias about inputs into the TSLRIC model.

X29 In reaching this view, we carefully considered submissions that questioned whether we should make an adjustment to signal sufficient returns to investment (through the allowed rate of return on capital), or encourage benefits associated with faster migration to UFB. We took into account independent expert advice from Professor Ingo Vogelsang, Professor Carlo Cambini, Professor Ian Dobbs, and Oxera.

X30 We followed the same approach as used in the energy sector when we considered adjusting the allowed rate of return on capital for UCLL.[12] However, we reached a different conclusion due to the different context and evidence in this case.

**We made several changes to the TSLRIC model following the July draft determination**

X31 The UCLL prices we have determined are between $3.01 and $3.12 higher than in our July 2015 draft determination (depending on the year of the regulatory period). We made several changes to the model and its inputs after considering stakeholders' views. Some of these changes caused the price to go up, and some caused the price to go down, but overall they led to this price increase.

X32 The most significant changes since the July 2015 draft determination are briefly described below.

X32.1 We made several changes which led to an overall increase in trenching costs. Specifically:

X32.1.1 the width of the trenches required decreased (because the duct size was reduced from 110 mm to 50 mm) and sub-ducts were removed;

X32.1.2 the weightings applied to different trenching methods were updated; and

X32.1.3 lateral trenching costs were included.[13]

[12] We currently apply an uplift to our best estimate of the cost of capital for energy businesses regulated under Part 4 of the Commerce Act, to help minimise the risk of significant costs to consumers associated with outages on energy networks.

X32.2 The cost of capital decreased, largely due to a fall in interest rates since the July draft determination.

X32.3 The proportion of fibre-to-the-home (FTTH) and fixed wireless connections changed. This was due to a decrease in the number of fixed wireless connections, reflecting a requirement that fixed wireless connections at least meet the performance of existing copper lines. We also did more detailed modelling of fixed wireless, based on a more focussed geographic deployment.[14]

X32.4 Demand for cable connections was excluded, as explained in paragraph X21.2 above.

X32.5 We removed vacant address points from the hypothetical efficient operator's network footprint. The model for the July draft determination had incorrectly included address points where no connection is currently required, because there are no buildings.

X32.6 We included "in-fill" address points within the hypothetical efficient operator's network boundary.[15] This correction reflects a decision we made before the July draft determination, which was not previously incorporated in the TSLRIC model.

X32.7 We also made several other technical improvements and corrections to the model, as suggested by stakeholders.

X33 An indicative breakdown of the impact of these changes to the TSLRIC model for UCLL is shown in Figure X1 below.[16] This breakdown is indicative only because, due to the complexity of the TSLRIC model, it is difficult to isolate the precise impact of individual changes.

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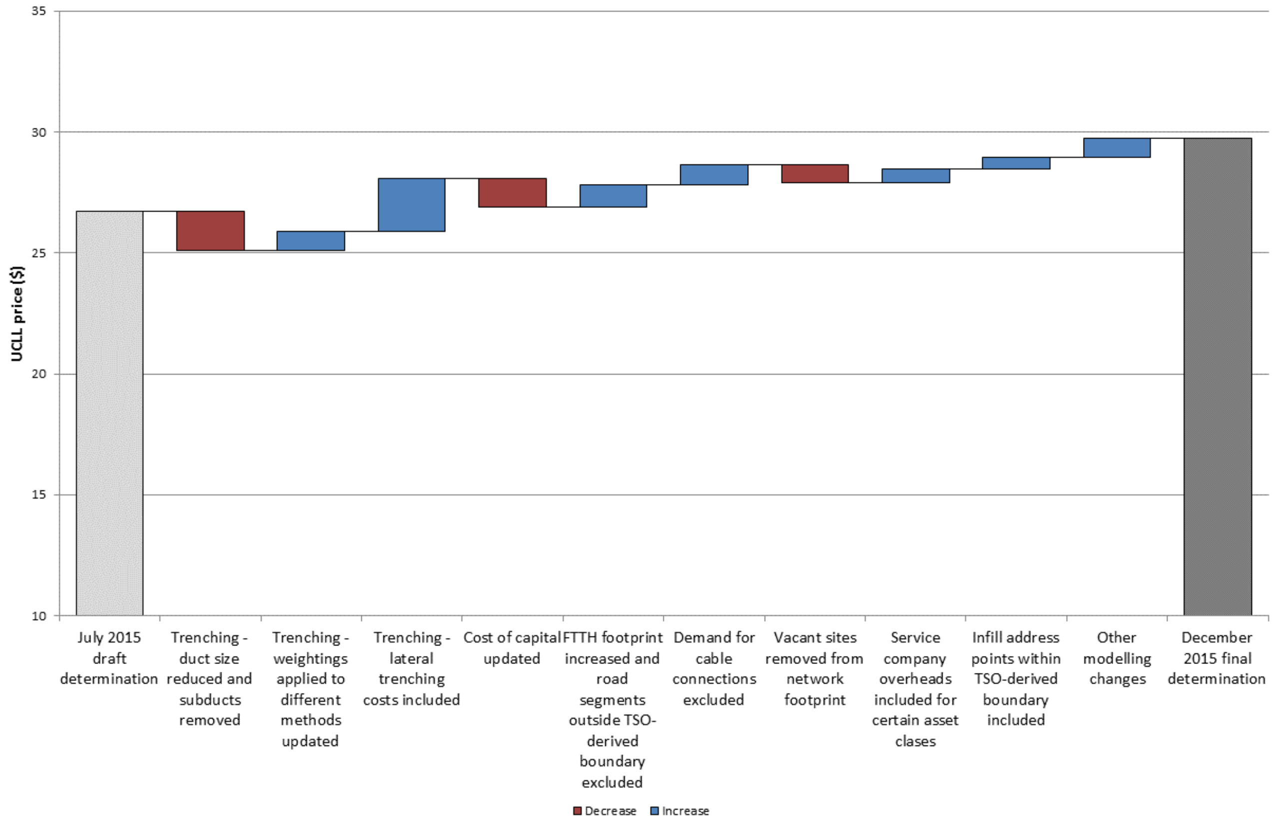
13 Laterals refer to the trenches, ducts, or cables that connect the lead-in at the property boundary to the telecommunications network running along the road. Lateral trenching costs were omitted from the July 2015 draft determination in error. We have included laterals for the final determination, in response to submissions which noted these had previously been incorrectly omitted.

14 Network costs associated with road segments outside hypothetical efficient operator's network boundary were also excluded based on more detailed modelling.

15 The hypothetical efficient operator's network boundary has been derived from the lines required to be served under the telecommunications service obligations (TSO). TSO lines were based on Telecom New Zealand's network footprint as at December 2001. In-fill address points are individual premises within the TSO-derived boundary that have been built since December 2001. Groups of new premises are treated separately, as sub-divisions.

16 Figure X1 is based on changes from the year 1 UCLL price in the July 2015 draft determination ($26.74), to the year 1 UCLL price in this final determination ($29.75).

**Figure X1: Indicative impact of changes to UCLL TSLRIC model since July 2015 draft**




X34 We recognise that the aggregate UCLL and UBA price for 2016 is $41.19, which is $3.69 higher than the current entry level UFB wholesale price of $37.50.[17] The UFB price covers largely urban areas comprising 75% of New Zealand, whereas the aggregate UCLL and UBA price that we have set in this pricing review determination is a geographically-averaged price covering both urban and non-urban areas.

X35 Our model allows us to calculate the equivalent TSLRIC derived price for urban areas which relates to 72% of lines. The combined UCLL urban and UBA price is $31.60 in 2016, below the current UFB price.

**We have also determined non-recurring charges for UCLL**

X36 This determination also sets non-recurring charges for UCLL. These non-recurring charges enable Chorus to recover costs associated with one-off events (or events that occur irregularly), such as new connections.

X37 In determining the non-recurring charges, we started with current rates from Chorus' service companies, and applied adjustments based on both international task times and national labour rates (where possible). Overall, these adjustments have reduced the forecast non-recurring charges.

17 From the 1st July 2016 the price increases by $1 and the consequential price differential to the equivalent wholesale regulated product reduces by $1 for the remainder of 2016.

**We have not backdated prices**

X38 The UCLL prices we have determined will take effect from 16 December 2015, and will not be backdated. If implemented, backdating would have compensated Chorus for the difference between the previous UCLL price ($23.52, set under the IPP) and the higher TSLRIC prices set in this determination.[18]

X39 Having considered the likely impact on Chorus, investors, retail telecommunications providers and end-users, the majority view (of Commissioners Gale and Welson) is to not backdate prices. On balance, we consider that backdating would not promote competition for the long-term benefit of end-users in this case.

X40 Commissioner Duignan disagrees with this assessment, and considers that the TSLRIC prices should take effect from 1 December 2014. This would have resulted in access seekers compensating Chorus for the difference between IPP and FPP prices over the past year.

[18] However, if the FPP price was lower than the IPP, backdating would have involved Chorus compensating its customers (telecommunications retailers) for the price difference.

# Chapter 1: Introduction and process

**Purpose of this determination**

1. This determination sets prices for the unbundled copper local loop (UCLL) and sub-loop unbundled copper local loop (SLU) services provided by Chorus, using the final pricing principle (FPP) as set out in the Telecommunications Act 2001 (Act).

2. For UCLL the FPP is "TSLRIC" (or Total Service Long Run Incremental Cost), which we discuss in Chapter 2.

3. After having conducted a number of consultation rounds throughout the UCLL pricing review determination processes, we have determined:

   3.1 the TSLRIC prices for monthly recurring charges for the UCLL and SLU services;[19]

   3.2 the TSLRIC prices for non-recurring charges (NRC) for the UCLL and SLU; and

   3.3 our decision on backdating.

4. We have determined the following monthly recurring charges for the UCLL and SLU services:

**Table 1.1: Monthly recurring charges for the UCLL and SLU services**

| National (geographically averaged) | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 |
|---|---|---|---|---|---|
| UCLL | $29.75 | $30.22 | $30.70 | $31.19 | $31.68 |
| SLU | $15.52 | $15.70 | $15.89 | $16.07 | $16.26 |

5. NRC are charges levied on access seekers to recover time and material costs incurred outside of the UCLL monthly recurring charges. They apply to one-off transactions which are used to instigate, modify or cancel either an individual UCLL service or a common component of the UCLL service. NRC are listed in the UCLL STD. Examples of NRC include new connections, service transfers, and relinquishments.

6. In determining TSLRIC-based NRC we took into account Chorus' service company costs with an efficiency adjustment based on task times seen in other jurisdictions. We have also had regard to differences in labour productivity in the jurisdictions considered. Overall these adjustments have resulted in a 26% reduction in forecast NRC costs. Chapter 6 explains the scope, approach, and modelling choices we used to set prices for NRC.

[19] The unbundled copper low frequency (UCLF) prices automatically follow the prices for equivalent UCLL (Commerce Commission "Review of the Standard Terms Determination for Chorus's Unbundled Copper Low Frequency Service under section 30R of the Telecommunications Act 2001" 24 April 2014, Decision [2014] NZCC 9, at [11] and [51]).

7. The final prices that we have set in this pricing review determination are not to be backdated.[20] Although we have discretion to implement backdating, we consider that backdating would not best give effect, or be likely to best give effect, to section 18. Commissioner Duignan considers backdating to 1 December 2014 should apply. Chapter 7 explains our approach to backdating.

8. As explained further below, we consulted on issues for the UCLL and UBA services at the same time.

**Background**

*The UCLL service*

9. The UCLL service is a designated access service described in the Act as follows:[21]

**Chorus's unbundled copper local loop network**

| | |
|---|---|
| Description of service: | A service (and its associated functions, including the associated functions of operational support systems) that enables access to, and interconnection with, Chorus's copper local loop network (including any relevant line in Chorus's local telephone exchange or distribution cabinet) |

10. The UCLL service, as described by the Act, includes local loops connecting end-users to local exchanges (on non-cabinetised lines) and local loops connecting end-users to distribution cabinets (on cabinetised lines).

11. We made two separate standard terms determinations (STD) for the UCLL service: the UCLL STD for non-cabinetised lines; and the SLU STD for cabinetised lines.

    11.1 In November 2007, we published a STD for Telecom's unbundled copper local loop network (the UCLL STD).[22] In the UCLL STD, following consultation with interested parties, we specifically excluded local loops connecting end-users to distribution cabinets.

    11.2 In June 2009, we published a further STD for Telecom's unbundled copper local loop (the SLU STD).[23] The SLU STD includes three services: the sub-loop UCLL service, the SLU co-location service, and the SLU backhaul service.

12. In this determination we refer to the SLU STD only in relation to the sub-loop UCLL service, which we call SLU. The SLU STD sets the SLU service for local loops connecting end-users to distribution cabinets.

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[20] Backdate means to set an earlier start date for the FPPs than the date of this final determination.

[21] Schedule 1, Part 2, Subpart 1.

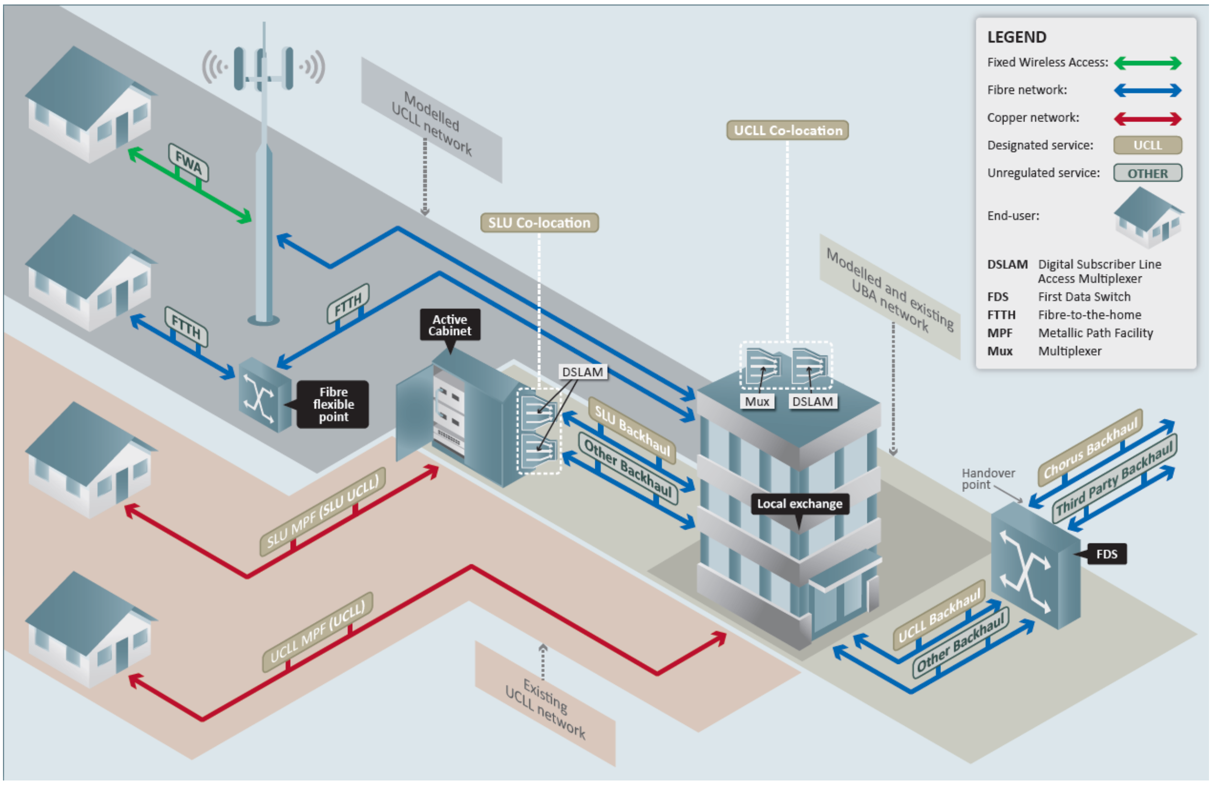
[22] Commerce Commission "Standard Terms Determination for the designated service Telecom's unbundled copper local loop network" 7 November 2007, Decision 609.

[23] Commerce Commission "Standard Terms Determination for the designated services of Telecom's unbundled copper local loop network service (Sub-loop UCLL), Telecom's unbundled copper local loop network colocation service (Sub-loop Co-location) and Telecom's unbundled copper local loop network backhaul service (Sub-loop Backhaul)" 18 June 2009, Decision 672.

13. When we refer to UCLL or the UCLL service in this document, we refer to both the UCLL and SLU (sub-loop UCLL) services as described by their respective STDs, unless otherwise specified.

14. Figure 1.1 below illustrates the UCLL and SLU services:[24]

**Figure 1.1: UCLL and SLU services**




*The Act links the price of the UCLF service to the prices we set in this pricing review determination*

15. The unbundled copper low frequency (UCLF) service is also affected by this determination. The UCLF service allows access seekers to lease the low frequency portion of Chorus' local loop network.[25] The UCLF service is available on both cabinetised and non-cabinetised lines. In November 2011 we set the initial terms and prices for the UCLF service in the UCLF STD, which were amended in April 2014.[26]

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24 The diagram is intended to assist the interested parties (particularly those not familiar with telecommunications networks) to understand the UCLL and UBA services (actual network, ie, Chorus' network and the hypothetical efficient operator's network, ie, the modelled network). The diagram does not purport to be comprehensive. Also, we make no representation as to its completeness.

25 As introduced by the Telecommunications (TSO, Broadband, and Other Matters) Amendment Act 2011.

26 Commerce Commission "Standard terms determination for the designated service of Chorus's unbundled copper low frequency service" 24 November 2011, Decision 738; and Commerce Commission "Review of the Standard Terms Determination for Chorus's Unbundled Copper Low Frequency Service under section 30R of the Telecommunications Act 2001" 24 April 2014, Decision [2014] NZCC 9.

The UCLF service's prices automatically follow the prices for equivalent UCLL service.[27] We discuss the UCLF service's prices further in Chapter 2.

*Developments since the Telecom-Chorus separation date*

16. Since December 2011 (the "Telecom-Chorus separation date"), Chorus has operated the fixed line access network that carries voice and data traffic between local exchanges and end-user premises in New Zealand. This is sometimes referred to as the "copper network", with each individual link referred to as a "local loop".

17. Access seekers who wish to offer broadband (internet) services using the copper network may do so by purchasing UCLL, SLU, or the unbundled bitstream access (UBA) service from Chorus. These services are regulated under the Act.

18. An access seeker may take the UCLL or SLU service and install its own equipment in the exchange (UCLL) or cabinet (SLU). This is often called "unbundling". Alternatively, they may take the UBA service, which allows access seekers to offer a broadband service to end-users without needing to install their own equipment in the exchange or cabinet. The UBA charge has two components: the UCLL component (which is set in this determination); and the additional cost components of UBA which we refer to as the UBA increment (which is set in the UBA determination).

19. In 2011 the Government implemented the Ultrafast Broadband (UFB) initiative, which aims at expanding and developing New Zealand's broadband services. The UFB initiative resulted in changes to the Act (as explained below).

20. At that time, the UFB initiative involved the deployment of a fibre-to-the-home (FTTH) network, covering 75% of New Zealand's population.[28] Partial Government funding for the period between construction of the new network and migration of end-users to it assisted the deployment. Depending on the region, Chorus or one of the three local fibre companies (LFC) is deploying the FTTH network.

21. Following Telecom's decision to participate in the UFB initiative, the Act was amended:[29,30,31]

    21.1 Chorus was structurally separated from Telecom on the Telecom-Chorus separation date.

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27 Commerce Commission "Review of the Standard Terms Determination for Chorus's Unbundled Copper Low Frequency Service under section 30R of the Telecommunications Act 2001" 24 April 2014, Decision [2014] NZCC 9, at [11] and [51].

28 In late 2014 the Government announced its intention to expand the UFB project to reach at least a further 5% of the population (being 80% in total) (http://www.crownfibre.govt.nz/ufb-initiative/ultra-fast-broadband-extension/).

29 *Chorus* v *Commerce Commission* [2014] NZCA 440 at [16].

30 Telecommunications (TSO, Broadband, and Other Matters) Amendment Bill 2010 (250-2) (select committee) at 1–2.

31 Telecommunications (TSO, Broadband, and Other Matters) Amendment Act 2011 (the 2011 Act).

21.2 Chorus was prohibited from providing retail services, and entered into undertakings to provide wholesale services on a non-discriminatory basis.[32]

21.3 The structural separation meant a retail-minus approach could no longer be used to determine the price for the UBA service. This is because under a retail-minus pricing principle, the wholesale price that Chorus could charge for the UBA service would be derived from prices of retail services which Chorus was prevented from supplying. As a result, Chorus' revenue would be determined by the retail prices of independent operators.[33]

21.4 Chorus' UBA price temporarily would continue to apply to existing lines until three years from the separation date (that is, until 1 December 2014).[34] From the end of that period, the price set by the new IPP or FPP (as applicable) for the UBA service would apply,[35] and for this purpose we were required to review the UBA STD under section 30R of the Telecommunications Act in order to implement the new cost-based pricing principles.[36] The purpose of the UBA price freeze was to insulate Chorus and access seekers (particularly unbundlers who may have made investment decisions based on the level of the UBA price) from an immediate potential price drop and provide them with time to enable them to adapt to the new pricing principle.[37]

21.5 In the 2011 amendments, Parliament created the new UCLF service. The UCLF service enabled access seekers including Telecom (now Spark) to supply a voice service to end-users, in circumstances where Telecom was prevented from purchasing the UCLL service until 1 December 2014.[38]

21.6 Parliament also introduced two new clauses to Schedule 1 to the Act. Clause 4A required the Commission to determine a geographically averaged price for the UBA, UCLL, and UCLF services. Geographically averaged prices took effect from separation date for the UBA and UCLF services, but not until

32 Section 51 of the 2011 Act, inserting new part 2A into the 2001 Act, including new subpart 3 (line of business restrictions).

33 The 2011 Act specified that Chorus' UBA price set in Telecom's standard terms determination of 12 December 2007 was to continue to apply to existing lines until three years from the 30 November 2011 separation of Chorus and Telecom (1 December 2014) – section 79(2) of the 2011 Act.

34 Telecommunications (TSO, Broadband and Other Matters) Amendment Act 2011, section 79(2).

35 Section 79(3).

36 Section 77 of the Telecommunications (TSO, Broadband and Other Matters) Amendment Act 2011. We were required to make reasonable efforts to complete the section 30R review before the expiry of 1 year from separation day (ie, 1 December 2012) and any FPP price review, if sought, by 1 December 2014. In the result, we completed the section 30R review on 5 November 2013, and this decision completes the FPP price review that was sought.

37 Ministry of Economic Development "Regulatory impact statement: regulatory issues resulting if Telecom becomes a partner in the ultra-fast broadband initiative" 11 April 2011, paragraphs [45]-[52].

38 See the description of the UCLL service in schedule 1, part 2, sub-part 1 of the Act.

1 December 2014 for the UCLL service.[39] Clause 4B concerns double recovery, and is discussed elsewhere in this determination.

21.7 Section 18(2A) was inserted,[40] in particular in connection with the UFB initiative, providing that consideration must be given to the "incentives to innovate that exist for, and the risks faced by, investors in new telecommunications services that involve significant capital investment and that offer capabilities not available from established services."

*Review of the Act*

22. The Ministry of Business, Innovation and Employment (MBIE) is currently conducting a review of the Act to assess "whether the current regulatory framework for telecommunications in New Zealand is the optimal one for competition, investment and innovation after 2020".[41]

23. Some submitters suggested that we should take into account this review (and its possible outcomes) when making our determination.[42] However, we are required to apply the law as it currently stands. Our assumptions or decisions cannot be influenced by a policy process that may result in amendments to the Act yet to be decided or enacted.

**Process to date**

*We determined an updated benchmarked price for the UCLL service*

24. Following the 2011 amendments to the Act, we initiated an UCLL benchmarking review.[43] The purpose of the UCLL benchmarking review was to update the benchmarking data to determine monthly rental and connection charges for the UCLL service.[44] The updated prices were determined in accordance with the IPP in the Act and involved benchmarking against similar services in other countries.[45]

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39 Commerce Commission, Decision No. 739: "Final decision in relation to the review of the UCLL, UBA and Sub-loop Services standard terms determinations (STDs) for the purpose of implementing clause 4A of the Telecommunications Amendment Act 2011" 24 November 2011, paragraph [52]; sections 73 and 74 of the Telecommunications (TSO, Broadband and Other Matters) Amendment Act 2011.

40 Section 19 requires us to consider "the purpose set out in section 18". That purpose is found in section 18(1). Section 18(2) and (2A) identify particular matters that we must take into account when making the overall consideration of what promotes competition for the long-term benefit of end-users.

41 MBIE "Telecommunications Act review: Public Questions and Answers", p. 1.

42 Chorus "Cross-submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services (2 July 2015)" 24 September 2015, p. 5; and Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" 24 September 2015 at [2.c], [133] and [134].

43 This was our initiative under section 30R of the Act and in accordance with the standard terms determination sections of the Act at sections 30K-30Q.

44 Commerce Commission "Final determination on the benchmarking review of the unbundled copper local loop service" (3 December 2012), NZCC 37, paragraph [32].

45 We had earlier released a decision on 24 November 2011 determining the geographically averaged price for the UCLL service (that is, a price which applies to all lines in the country instead of separate prices for urban and rural lines), as required by clause 4A of the Telecommunications Amendment Act 2011:

25. Our 3 December 2012 price determination for the UCLL service:[46]

  25.1 determined a new geographically averaged price for the UCLL STD of $23.52 a line per month, with the new geographically averaged price to come into effect on 1 December 2014. This new geographically averaged UCLL price fed through immediately into the UBA price, but did not take effect in relation to the UCLL service (and thus the price paid by unbundlers) until 1 December 2014;[47]

  25.2 determined a new geographically averaged price for the SLU STD of $14.21 a line per month, with the new geographically averaged price to come into effect on 1 December 2014;

  25.3 updated the geographically averaged price for the UCLF STD to $23.52 a line per month, with the new price to come into effect immediately (that is, from 3 December 2012);

  25.4 updated the non-urban and urban monthly rental prices in the UCLL STD to $35.20 and $19.08 respectively, with the prices coming into effect immediately and applying until 30 November 2014; and

  25.5 updated the non-urban and urban monthly rental prices in the SLU STD to $21.26 and $11.52 respectively, with the prices coming into effect immediately and applying until 30 November 2014.

*Applications for a pricing review determination*

26. In February 2013 we received five applications for a pricing review determination of the prices we set for the UCLL service.[48]

27. In November 2013 we set a new IPP price for the UBA service which, as noted below, resulted in applications for a pricing review determination for the UBA service.

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Commerce Commission, Decision No. 739: "Final decision in relation to the review of the UCLL, UBA and Sub-loop Services standard terms determinations (STDs) for the purpose of implementing clause 4A of the Telecommunications Amendment Act 2011" 24 November 2011.

46 Pursuant to section 73 of the 2011 Amendment Act, the geographically averaged price for the UCLL and SLU services would not come into effect until the expiry of three years from separation day, but this limitation did not apply to the UCLF and UBA services. In the meantime, the updated urban and non-urban prices for the UCLL and SLU services would apply from the date of the determination until the date before the expiry of three years from separation day.

47 Telecommunications (TSO, Broadband, and Other Matters) Amendment Act 2011, section 73, and see Commerce Commission, Decision No. 739: "Final decision in relation to the review of the UCLL, UBA and Sub-loop Services standard terms determinations (STDs) for the purpose of implementing clause 4A of the Telecommunications Amendment Act 2011" 24 November 2011, paragraph [52].

48 Applications were received from Chorus New Zealand Ltd, Telecom New Zealand Ltd (now Spark New Zealand Ltd), Vodafone New Zealand Ltd, CallPlus Ltd and Kordia Ltd. Kordia Ltd has since withdrawn its application. This has not affected the scope of our pricing review determination.

*Our consultations during the process to determine TSLRIC cost-based prices for the UCLL services*

28. This is the first time we have been required to conduct a complete FPP determination process based on TSLRIC cost modelling.[49] We considered that it was important to consult widely and from an early stage, and we would like to thank all those who participated in the process, including the regulated entity, its customers, consumer group representatives and wider stakeholders. Those submissions were an essential part of our process.

29. On a number of issues our thinking has evolved over the course of the determination process in response to those contributions. So although this determination explains all of the reasons for our decisions, it should be understood in the context of the evolving consultation and determination process that preceded it.

30. We published a number of consultation papers early in the process as we developed our thinking around the framework for our determinations.

31. Our consultation process as outlined below was a critical factor in developing our thinking and conclusions.

32. In December 2013 we published a UCLL process and issues paper, which set out and sought views on:[50]

    32.1 our proposed process and framework for the cost modelling and pricing review determination of the UCLL service; and

    32.2 a number of conceptual issues associated with the TSLRIC methodology.[51]

33. In January 2014 we published a supplementary paper to the UCLL process and issues paper, seeking views from interested parties on what happens at the expiry of the UCLL pricing review determination and how the STD prices can be updated in future.[52]

34. We also received applications for a pricing review determination for the UBA service in January 2014 (following the final UBA IPP decision in November 2013).[53] Given the

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49 We have previously undertaken TSLRIC cost modelling in the context of an application for a pricing review in respect of designated interconnection services, and issued a draft determination on 11 April 2005. We were not required to issue a final determination in this case, as the initial application for a pricing review was withdrawn following a commercial agreement between the parties.

50 Commerce Commission "Process and issues paper for determining a TSLRIC price for Chorus' unbundled copper local loop service in accordance with the Final Pricing Principle" 6 December 2013.

51 These included: (i) the range of approaches to TSLRIC cost modelling; (ii) the features and functionality of the UCLL service, and their relevance to selecting the modern equivalent asset (MEA) for our modelling of the service; and (iii) a range of approaches to key modelling decisions including depreciation, demand, cost allocation, cost of capital and operating expenditure (opex).

52 Commerce Commission "Process and issues for determining a TSLRIC price for Chorus' unbundled copper local loop service - supplementary paper on expiry date" 13 January 2014.

53 Commerce Commission "Unbundled bitstream access service price review" [2013] NZCC 20, 5 November 2013.

strong links between the two determination processes, we undertook both processes in tandem and consulted on them at the same time.[54]

35. In February 2014 we released a UBA process and issues paper.[55]

36. Following our consideration of submissions and cross submissions, in March 2014 we published further consultation papers which sought views on:[56]

    36.1 the role of relativity in our price setting process;[57] and

    36.2 the preliminary legal views of our external legal counsel Dr James Every-Palmer on: (i) the relevant considerations for determining the modern equivalent asset (MEA) for the UCLL service; and (ii) considerations relevant to backdating the FPP prices.

37. Also in March 2014 we published a technical consultation paper on our proposed framework for estimating the weighted average cost of capital (WACC) for the UCLL and UBA pricing reviews.[58]

38. Following submissions and cross submissions on our WACC technical consultation paper, we published advice we had received from:

    38.1 Dr Martin Lally, reviewing submissions on our proposed approach to estimating the cost of debt;[59] and

    38.2 Oxera Consulting (Oxera), reviewing the company-specific components of the WACC for the UCLL and UBA services, such as the asset beta and leverage components.[60]

39. Two workshops were held by Commission staff, on 19 December 2013 and 28 March 2014, to help interested parties to understand TSLRIC better.

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54 See Commerce Commission “Determining a TSLRIC price for Chorus’ unbundled bitstream access service under the final pricing principle – Process and issues paper” 7 February 2014.

55 Commerce Commission “Determining a TSLRIC price for Chorus’ unbundled bitstream access service under the final pricing principle – Process and issues paper” 7 February 2014.

56 Commerce Commission “Further consultation paper on issues relating to determining a price for Chorus' UCLL and UBA services under the final pricing principle” 14 March 2014; and Commerce Commission “Further consultation paper on issues relating to determining a price for Chorus' UCLL and UBA services under the final pricing principle – supplementary paper” 25 March 2014.

57 Section 19(b) of the Telecommunications Act 2001, together with Schedule 1, requires us to consider the relativity between the UCLL service and the UBA service regarding the application of section 18.

58 Specifically, the paper: (i) sought views on the approach to estimating certain WACC parameters for the UCLL and UBA services; (ii) discussed the linkages with the cost of capital input methodologies (IMs) we determined under Part 4 of the Commerce Act 1986; and (iii) highlighted issues on which we would be seeking independent expert advice.

59 Dr Martin Lally - Capital Financial Consultants Ltd “Review of Submissions on the Cost of Debt and the TAMRP for UCLL and UBA services” 13 June 2014.

60 Oxera “Review of the beta and gearing for UCLL and UBA services” June 2014.

40. In April 2014 we held a modelling methodology presentation for interested parties with our external consultants, TERA Consultants (TERA). At that presentation, TERA shared its knowledge and experience about TSLRIC cost modelling processes.[61]

41. In June 2014 we published a TSLRIC literature review on UBA and UCLL costing, prepared by TERA.[62]

42. In July 2014 we published a regulatory framework and modelling approach paper, seeking views on the following:[63]

    42.1 our preliminary view of the regulatory framework for our UCLL and UBA TSLRIC cost modelling exercise; [64]

    42.2 our preliminary views on a number of fundamental assumptions for the development of a TSLRIC cost model for the UCLL and UBA services; [65]

    42.3 our preliminary views on backdating and the length of the regulatory period;

    42.4 our revised process, which we updated in response to: (i) concerns raised by parties during the March 2014 consultation; and (ii) requests to consider additional matters as part of the TSLRIC cost modelling exercise; and

    42.5 expert papers prepared by Professor Ingo Vogelsang and TERA.

43. After our consultation on the July 2014 regulatory framework and modelling approach paper, we began modelling the TSLRIC cost of the UCLL and UBA services.

44. In September 2014 we published an open letter to parties in response to concerns expressed in submissions and cross submissions on our July 2014 regulatory framework and modelling approach paper.[66] We highlighted that:

    44.1 we were consulting more extensively than we were legally obliged;

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61 Building a TSLRIC model is a significant undertaking. We appointed TERA to develop our TSLRIC models given its recent experience in building TSLRIC models in other jurisdictions. TERA were selected for the role after the following process: we issued a request for proposals (RFP) for modelling consultants on 22 January 2014, asking for proposals by 14 February 2014. Commission staff reviewed the proposals with input from a co-opted Australian Competition and Consumer Commission (ACCC) staff member. We identified a shortlist of consultants to interview in Wellington in the week of 10 March 2014. Based on these interviews and the review of proposals, we identified TERA as our preferred consultant.

62 TERA Consultants “TSLRIC literature review on UBA and UCLL costing approaches” June 2014.

63 Commerce Commission, "Consultation paper outlining our proposed view on regulatory framework and modelling approach for UBA and UCLL services" 9 July 2014.

64 These included the role of section 18, our TSLRIC objectives, our requirement to set forward-looking costs and the implications of this on the potential re-use of Chorus’ assets, as well as additional legal requirements.

65 Including the choice of the MEA, demand, depreciation, tax, price profiles, and cost allocation.

66 Commerce Commission "Open letter to parties regarding process" 5 September 2014, p. 2.

44.2 we had shared aspects of our framework as those emerged and developed, and shared a more complete picture as some of our views crystallised; and

44.3 our approach to consultation was adopted to help parties develop their understanding and keep them engaged throughout the process, rather than working in isolation and only sharing our fully developed thinking at the final stages of the process.

45. Also in September 2014 we released a consultation paper on our proposed approach to setting prices for non-recurring charges in the UCLL STD.[67]

46. In December 2014 we published our draft determination paper for the UCLL service.[68] Our draft decisions were:

46.1 the proposed monthly rental price for the UCLL service was $28.22; and

46.2 the proposed monthly rental price for the SLU service was $14.45.

47. In December 2014 we also published our draft determination paper for the UBA service. The draft total monthly price for the Basic UBA service was $38.39 (this price included the UCLL component ($28.22) and the UBA increment ($10.17).[69]

48. We emphasised that these prices were not final, and that the purpose of these drafts was to seek input from stakeholders. Matters that might impact on the final price that we still needed to work through with industry were identified. In particular, these draft determinations did not contain our decisions on the proposed pricing of non-recurring charges or whether we proposed to backdate the recurring prices.

49. At the same time, we published two reports submitted by Chorus on its own cost model prepared by its experts Analysys Mason.

50. On 19 December 2014, we published a process and issues update paper for the UCLL and UBA pricing review determinations where we: [70]

50.1 provided an update on the process, including granting an extension of one month for submissions on the UCLL and UBA draft determination papers, to allow interested parties to make considered submissions; and

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67 Commerce Commission "Consultation on setting prices for service transaction charges for UBA and UCLL services" 25 September 2014. The paper set out our preliminary views, and sought submissions, on (i) the non-recurring charges; (ii) the appropriate approach to setting prices for the non-recurring charges; and (iii) whether we can merge some non-recurring charges into other charges.

68 Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014. This draft determination paper did not include our draft decisions on non-recurring charges or our approach to backdating.

69 Commerce Commission "Draft pricing review determination for Chorus' unbundled bitstream access service" 2 December 2014. This draft determination paper did not include our draft decisions on non-recurring charges or our approach to backdating.

70 Commerce Commission "Process and issues update paper for UCLL and UBA pricing review determinations" 19 December 2014.

50.2 shared our emerging views in favour of backdating and sought submissions.

51. We received submissions and cross submissions on the draft determination papers for the UBA and UCLL services between February and May 2015.[71,72]

52. On 2 April 2015 we published a paper:[73]

52.1 outlining the process and agenda for the upcoming conference; and

52.2 updating parties on our proposed approach to testing and quantifying the need for any potential uplifts to the TSLRIC price for UCLL and/or the mid-point WACC estimate for UCLL and UBA. This was accompanied by a paper from Professor Carlo Cambini.[74]

53. On 14 April 2015 we published:

53.1 a report from TERA with questions regarding Chorus' model;[75] and

53.2 a report from Analysys Mason on Chorus' UCLL and UBA models.[76]

54. From 15 April 2015 to 17 April 2015 we held a conference, the purpose of which was to clarify and test matters that arose during the submissions process. The conference transcript is available on our website.

55. In May 2015 we received submissions on our proposed analytical frameworks for considering an uplift to the TSLRIC price and/or WACC.

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71 In 3 February 2015 Vodafone requested an extension to the deadline for cross submissions on geospatial modelling, which we allowed (Vodafone "Deadline for submissions on UBA and UCLL FPP draft determinations – request for extension to deadline for cross submissions" 3 February 2015 and Commerce Commission "Request for extension to deadline for cross submissions: UBA and UCLL FPP draft determinations" 5 March 2015).

72 We received letters from Vodafone and Spark expressing concern that the CEG cross submission introduced new material, and about being unable to respond to CEG's evidence (Spark "UBA and UCLL Draft FPP Review Cross submission – CEG Uplift report" 31 March 2015; and Vodafone "Admission on CEG Report in Cross submission Process" 31 March 2015). We accepted that not allowing other parties to this process the opportunity to cross submit on CEG's evidence before releasing our further draft determinations might create fairness issues. Therefore, we decided to allow time for parties to cross submit on CEG's evidence (Commerce Commission "Agenda and topics for the conference on the UCLL and UBA pricing reviews" 2 April 2015, paragraphs [18]-[22]).

73 Commerce Commission "Agenda and topics for the conference on the UCLL and UBA pricing reviews" 5 March 2015" 2 April 2015.

74 Prof. Carlo Cambini "Economics aspects of migration to fibre and potential welfare gains and losses from an uplift to copper prices" 15 March 2015.

75 TERA "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services - Questions regarding Chorus model" January 2015.

76 Analysys Mason "Report for Chorus to provide to the Commerce Commission - Response to TERA questions regarding the Chorus UCLL and UBA models" 29 January 2015.

56. On 5 July 2015 we published our further draft determination paper for the UCLL service,[77] which is our statutory draft determination.[78] Our further draft decisions were:

**Table 1.2: Further draft monthly recurring charges for the UCLL and SLU services**

| National (geographically averaged) | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 |
|---|---|---|---|---|---|
| UCLL | $26.74 | $27.18 | $27.63 | $28.09 | $28.56 |
| SLU | $11.66 | $11.79 | $11.92 | $12.05 | $12.19 |

57. The UCLL charges in the further draft decision also included NRC.[79]

58. Attached to the July 2015 UCLL further draft paper we also published a number of papers prepared by our expert consultants, including:

58.1 a model reference paper, a model specification paper (public and confidential versions), and model documentation paper (public and confidential version) for the recurring charges cost model prepared by TERA;

58.2 a paper summarising changes made to the recurring charges cost model since the December 2014 UCLL draft determination prepared by TERA;

58.3 a methodology paper prepared by TERA for the non-recurring charges cost model;

58.4 a paper reviewing submissions on the December 2014 UBA draft determination paper prepared by TERA;

58.5 a paper prepared by TERA reviewing the Analysys Mason cost models;

58.6 a paper prepared by TERA on international comparators;

58.7 a paper prepared by Beca that responded to submissions on the corridor cost analysis;

58.8 a report on the corridor cost analysis new rates and general recommendations prepared by Beca;

58.9 a paper outlining the corridor cost analysis of trenching and ducting rates in New Zealand prepared by Beca;

77 Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 5 July 2015.

78 Section 47(a) of the Act.

79 Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 5 July 2015, Chapter 5.

58.10 a paper prepared by Professor Ingo Vogelsang responding to comments on his 25 November 2014 paper, “Current academic thinking about how best to implement TSLRIC in pricing telecommunications network services and the implications for pricing UCLL in New Zealand”, published with our December 2014 draft determination;

58.11 a paper on potential welfare gains and losses from an uplift to copper prices prepared by Professor Carlo Cambini;

58.12 a paper prepared by Professor Ian Dobbs, commenting on the application of the Dobbs 2011 model;

58.13 a paper prepared by Oxera, reviewing submissions on WACC;

58.14 a paper prepared by Oxera, providing advice on whether a WACC uplift might be appropriate;

58.15 a paper prepared by Professor Ingo Vogelsang, reviewing the Oxera advice on a WACC uplift;

58.16 a paper prepared by New Zealand Institute of Economic Research (NZIER), providing advice in response to submissions about price trends; and

58.17 a model prepared by NZIER that outlines historical series and data trends.

59. In July 2015 we also published our further draft determination paper for the UBA service. The further draft total monthly prices for the Basic UBA service were the following:[80]

**Table 1.3: Further draft monthly recurring charges for the Basic UBA service**

| Service | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 |
|---|---|---|---|---|---|
| Basic UBA additional costs (“UBA increment”) | $11.15 | $10.97 | $10.80 | $10.65 | $10.52 |
| UCLL (as set in the July 2015 further draft determination, subject to the final determination) | $26.74 | $27.18 | $27.63 | $28.09 | $28.56 |
| Basic UBA (total) | $37.89 | $38.15 | $38.43 | $38.74 | $39.08 |

60. We received submissions and cross submissions on the further draft determination papers for UBA and UCLL services between August and September 2015.

80 Commerce Commission “Further draft pricing review determination for Chorus’ unbundled bitstream access service” 5 July 2015.

61. On 21 September 2015 we published a paper asking submitters some specific questions on the UCLL network footprint.[81] We received submissions on this paper on 9 October 2015.

62. We received about 50,000 emails prompted by a campaign launched by Spark. We welcomed greater consumer participation in the determination process. We have reviewed these emails and considered the relevant ones in our decision-making process. We note that:

    62.1 nearly all of the 50,000 emails seemed to be automatically generated in May, June and July 2015, after submitters entered an e-mail address into a form on the Spark website;[82]

    62.2 we acknowledged receipt of these emails,[83] following which we received approximately 20 emails in response;

    62.3 we reviewed these emails. We did not publish them. We believe that some people might not have had the expectations that their views would become public. Also, some of the emails contain offensive language[84] and/or were submitted by consumers who did not fully understand the task we were given by Parliament;[85]

    62.4 we also received approximately 30 submissions using another template letter which seemed to have been provided by Spark;[86]

    62.5 from July 2015 (ie, after the further draft papers were published) to November 2015, we received about 2,200 emails. Again, we believe the

81 Commerce Commission "Consultation paper – Network footprint and demand UCLL and UBA pricing review determinations" 21 September 2015.

82 The content of the emails was "To Whom It May Concern. I wish to voice my disapproval of the proposed Chorus copper network price increase. This move would make the price Chorus charge 80% higher than that of comparable countries. I believe internet access in New Zealand should be available to as many people as possible, and I think the proposed increase of prices by Chorus will have a negative effect on accessibility. Please take my view into account when weighing this very important decision. Sincerely, [name of the person]".

83 The content of these emails was: "Thank you for your email. The Commission welcomes submissions on its review of the prices that Chorus charges for its local copper lines and broadband service. The next window for receiving submissions is following the release of the further draft determinations on 2 July 2015. We will have regard to your email at that time. Further information on the pricing review, including the process to date, and our future timetable, can be found at http://www.comcom.govt.nz/unbundled-copper-local-loop-and-unbundled-bitstream-access-services-final-pricing-principle/. Regards, Commerce Commission"

84 Unpublishable.

85 eg, emails (i) asking "Why are you setting prices the of broadband, since when did you become a price regulator?" (sic) and (ii) arguing that "their are some countries that give concessions to Pensioners. If New Zealand did this. then perhaps the Providers would retain more of their customers instead of losing them" (sic).

86 Submissions available at http://www.comcom.govt.nz/regulated-industries/telecommunications/regulated-services/standard-terms-determinations/unbundled-copper-local-loop-and-unbundled-bitstream-access-services-final-pricing-principle/.

emails were automatically generated when Spark customers added their e-mail addresses to a form on the Spark website.[87]

62.6 Nearly 2,000 of these emails appeared to be made-up or incorrect e-mail addresses, as our acknowledgements of these either bounced back as undeliverable or prompted queries along the lines of "how did you get my e-mail address?"

*Criticisms regarding our process*

63. Some submitters criticised our decision-making process.

64. We were conscious of the need to strike a balance between giving parties an adequate opportunity to contribute and the need to make a decision promptly in the interests of giving market participants certainty. We approached the determination process with an open mind, and adjusted our process, decisions, and reasons in response to submitters' contributions.

65. We therefore disagree with criticisms from some participants about our process. We respond to some particular criticisms below.

Speed of the decision-making process

66. Some submitters criticised the speed of our decision-making process. We responded to these criticisms in the July 2015 further draft determinations.[88]

67. We reconsidered our process again before this making this final determination. For transparency, we explain below the reasons why we consider our process was sound and appropriate.

68. Chorus favoured a speedier decision-making process.[89] Wigley and Company argued that our process was conducted too quickly. [90,91] Spark recognised the balance that

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87 The content of these emails was: "Dear Commissioners YOU HAVE A CHANCE TO MAKE NEW ZEALAND'S INTERNET FAIRER. Thanks for highlighting the Be Counted campaign in your recent update – it's great to be part of a campaign that is having a real impact on New Zealand's future. It's also great that you've taken back-dating off the table. Spark has said it'll pass that value back to its customers in a fair and transparent way if you confirm your decision. I understand the Commission says our country's geography means it costs more to provide broadband here, but there is still more you can do to better protect the interest of customers in your final decision. Your proposed broadband line charges are still around $4 a month per line above current charges – making our line charges much higher than comparable countries. The outcome of having higher line charges simply harms New Zealand internet and phone users and transfers benefits to Chorus. These charges put our country at a significant disadvantage and cannot be the right outcome for New Zealand. Prices for internet services have been coming down in recent years – and these reductions have been matched by increases in data allowances and increased services. This has been great for customers like me. I hope you'll continue to defend the interests of ordinary internet and phone users and reduce the line charges we pay to connect to the world. Thank you. [name of the person]"

88 Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 5 July 2015 at [62]-[66].

89 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and Process and Issues Update Paper for the UCLL and UBA Pricing Review Determinations", 20 February 2015, paragraph [72].

we attempted to strike, submitting that the "Commission has been right to permit time to properly consider the issues as this is an important decision".[92]

69. Wigley and Company also submitted that we were required to hold a conference after the July 2015 further draft determinations because the December 2014 draft determinations did not qualify as the "statutory draft determination" required by the Act. [93]

70. As explained in the July 2015 further draft determinations:

70.1 we believe that our timetable and consultation process has been appropriate;

70.2 we have conducted a number of consultation rounds throughout this pricing review determination process. We have consulted more extensively than we were legally required. We have consulted to the extent we considered to be necessary for the development of our thinking;[94] and

70.3 we were not required to hold a conference after the July 2015 further draft determinations.[95] We accepted that in many previous processes we held conferences after the statutory drafts. However, in this process we considered it appropriate to hold the 15 April 2015 to 17 April 2015 conference after the detailed December 2014 draft determinations but before the further draft determinations published in July 2015.[96]

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90 Mr Wigley confirmed to us towards the end of the consultation process that Wigley and Company submissions were presented on behalf of InternetNZ, Consumer, TUANZ and CallPlus.

91 eg, Wigley and Company "Cross-submission in relation to UCLL and UBA draft pricing review determinations" 24 September 2015 at [10.9].

92 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" 24 September 2015 at [1].

93 ie, Letter from Wigley and Company to Stephen Gale (Telecommunications Commissioner) enquiring if we will revisit our timetable (13 March 2015) and "Commentary on behalf of consumer interests on Commerce Commission paper dated 2 April 2015 as to TSLRIC and WACC uplifts" 13 April 2015.

94 This is consistent with the views expressed by us during the process (eg, Commerce Commission "Open letter to parties regarding process" 5 September 2014, p. 2).

95 As previously explained by us to Wigley and Company (Commerce Commission "RE: FPPs" 24 September 2014).

96 We note that the conference is an additional consultation step not required by the Act. That is because we have, in terms of section 50 of the Act, consulted with persons other than parties to the determinations by inviting written submissions on our papers from all persons Section 50 of the Act: "If the Commission considers that persons, other than the parties to the determination, have a material interest in the matter to be determined, the Commission must, before preparing a determination under section 51, either consult those persons or hold conferences in relation to the matter" (emphasis added).

<u>Engagement in writing with "substantive submissions"</u>

71. Wigley and Company also submitted that:[97,98,99]

    71.1 we are legally obliged to engage in writing with "substantive" submissions;

    71.2 as a consequence of the alleged failure to address all matters and adequately engage with submissions we had not produced "statutory draft determinations" that complied with the Act; and

    71.3 in the absence of statutory draft determinations the "purported final determinations would not be lawful either and the Commission would need to start over with statutory draft determinations".

72. Wigley and Company submitted in particular that its April/May submission had not "been dealt with" in the July 2015 further draft determinations,[100,101] and that we had pre-determined the outcome of the process.[102]

73. We received and reviewed about 240 submissions and cross submissions during our consultation process. These submissions and cross submissions contained more than 6,000 pages. We published two comprehensive drafts addressing relevant submissions and cross submissions. Our UBA and UCLL final determinations (which contain our decisions and reasons) have more than 850 pages.

74. We have taken our consultation obligations seriously, and carefully considered all submissions. In many cases our decisions and reasons evolved in response to them.

75. However, we do not consider that we are obliged by the Act or the general law to expressly address every point in every submission in either our draft or our final determinations.

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97 ie, Letter from Wigley and Company to Stephen Gale (Telecommunications Commissioner) enquiring if we will revisit our timetable (13 March 2015) and "Commentary on behalf of consumer interests on Commerce Commission paper dated 2 April 2015 as to TSLRIC and WACC uplifts" 13 April 2015.

98 Wigley and Company "Submission on Further Draft Pricing Review UCLL and UBA Determinations", 13 August 2015 at paragraphs [3.4] and [3.11]).

99 Wigley and Company "Cross-submission in relation to UCLL and UBA draft pricing review determinations" 24 September 2015 at [1.28] and [4.9].

100 Wigley and Company referred to the "11 April submission" and to the "11 May submission" in different parts of his August 2015 submission ("Submission on Further Draft Pricing Review UCLL and UBA Determinations", 13 August 2015 at paragraphs [1.2], [2.7] and others). We note that Wigley and Company did not present any submission dated 11 April 2015, but rather dated 13 April 2015. We understand that Wigley and Company was referring to his "Supplementary Submission on Commission's "Analytical Frameworks for Considering an Uplift to the TSLRIC Price and/or WACC"" dated 11 May 2015.

101 Wigley and Company "Submission on Further Draft Pricing Review UCLL and UBA Determinations", 13 August 2015 at paragraphs [1.2]).

102 Wigley and Company "Cross-submission in relation to UCLL and UBA draft pricing review determinations" 24 September 2015 at section 10.

Quantification of the impact of our decisions

76. Wigley and Company argued that we must quantify the impact of our decisions.[103,104] In particular, Wigley and Company argued that that we were required to conduct a "real world evidence based quantitative" cost-benefit analysis of the impact of our decisions, including whenever we applied section 18.[105]

77. Our view is that quantifying the benefits and detriments of our decisions can be a valuable part of our analysis where doing so is feasible and useful.

78. For instance, a number of sensitivity analyses in TERA's model specification report show how varying certain inputs can impact on the resulting TSLRIC price.[106]

79. However, we do not consider a quantitative cost-benefit analysis of every decision is helpful or necessary. Many of the choices we have been required to make cannot be reduced to quantitative terms, and therefore could not be meaningfully quantified in isolation.

80. Further, we are often required to balance disparate or abstract considerations that cannot be directly compared. These include, for example, the section 18 purpose statement, and the benefits of adopting an internally consistent model.

81. Even so, we have considered in particular the impact of the final TSLRIC price on the promotion of the section 18 purpose statement, and have undertaken quantitative analysis of whether an adjustment to the TSLRIC price and/or WACC was appropriate.

Criticisms on the transparency of our models

82. WIK and Analysys Mason submitted that parts of our July 2015 model were not transparent.[107,108] We disagree.

83. We have provided the relevant information to interested parties to comment on our modelling decisions. TERA conducted workshops with industry participants early in

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103 Wigley and Company "Submission on draft pricing review determination for UBA and UCLL services" 20 February 2015, paragraphs [6.8] to [6.16] and letter from Wigley and Company to Stephen Gale (Telecommunications Commissioner) enquiring if we will revisit our timetable (13 March 2015).

104 Wigley and Company "Submission on Further Draft Pricing Review UCLL and UBA Determinations", 13 August 2015 at paragraphs [4.9]).

105 eg, Wigley and Company "Commentary on behalf of consumer interests on Commerce Commission paper dated 2 April 2015 as to TSLRIC and WACC uplifts" 13 April 2015; Wigley and Company "Supplementary Submission on Commission's "Analytical Frameworks for Considering an Uplift to the TSLRIC Price and/or WACC" 11 May 2015 at item 4.

106 TERA "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services *Model Specification*" December 2015, section 10.5.

107 eg, WIK "Submission In response to the Commerce Commission's "Further draft pricing review determination for Chorus' unbundled bitstream access service" and "Further draft pricing review determination for Chorus' unbundled copper local loop service" including the revised cost model and its reference documents" at [234].

108 Analysis Mason "Report for Chorus - UCLL and UBA FPP further draft determination submission" 11 August 2015 at item 2.3, p. 8.

the process, when TERA explained how the first draft of the model was constructed. This was intended to help interested parties to interact with the model.[109]

84. Our December 2014 drafts and July 2015 further drafts included the reasons for our modelling decisions,[110] and a TERA report outlining the modelling changes made between our December 2014 drafts and our July 2015 further drafts. TERA's report highlighted changes made to the model in response to submissions.[111]

85. We have carefully considered all alleged errors that parties identified in TERA's model. Even so, as Chorus and Analysys Mason have pointed out, "a number of what WIK calls modelling "errors", such as fibre cabling costs and alleged double counting of joint costs, are in fact valid modelling assumptions".[112]

86. On WIK's specific criticism on the lack of transparency of the geospatial work,[113] we note that all relevant underlying data was supplied to the interested parties.

86.1 We gave interested parties the opportunity to ask modelling questions outside of submissions, and we provided answers to all queries.[114]

86.2 We published a document describing the production environment used to create the road and building network model.[115]

86.3 Nominated counsel of interested parties were supplied with a geospatial dataset that contained the spatial definition of the road segments and the buildings.

86.4 At least one submitter, Analysys Mason, commented extensively on the geospatial work.[116]

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109 At the Industry Kickoff workshop on 9 April 2014 TERA presented an overview of the intended modelling approach. On 2 December 2014 TERA presented the modelling approach and assumptions used for the December 2014 draft determination.

110 Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014, Commerce Commission "Draft pricing review determination for Chorus' unbundled bitstream access service" 2 December 2014, Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 5 July 2015, Commerce Commission "Further draft pricing review determination for Chorus' unbundled bitstream access service" 5 July 2015.

111 TERA "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services *Implemented modelling changes*" June 2015.

112 Chorus "Cross-submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services (2 July 2015)" 24 September 2015 at [41].

113 eg, WIK "Submission In response to the Commerce Commission's "Further draft pricing review determination for Chorus' unbundled bitstream access service" and "Further draft pricing review determination for Chorus' unbundled copper local loop service" including the revised cost model and its reference documents" at [15].

114 Commerce Commission "FPP further draft model questions" 4 August 2015.

115 Commerce Commission "The Geographic Information System modelling environment for the Unbundled Copper Local Loop and Unbundled Bitstream Access services final pricing principle" 24 July 2015.

87. Finally, TERA has advised us that we were very transparent compared to other countries. In its experience, we are the only regulator that shares source data (obtained through section 98 notices) with the nominated counsel of interested parties. TERA also informed us that in some countries interested parties cannot access the models (eg, Luxembourg). In other countries, only the incumbent can access the regulator's model (eg, Romania and Croatia), and in other countries interested parties are only given access to high level figures of the regulator's models on request (eg, Ireland).

88. Transparency and openness are very important aspects of our decision-making process. We appreciated the extensive submissions from interested parties and their experts about our models. These submissions were a key element in the developing of our reasoning and decisions.

**Other data and expert advice used as part of our pricing review**

89. As noted above, we contracted TERA Consultants to assist in developing a cost model that has informed our determination of a TSLRIC price for the relevant services, and to advise on some other technical aspects of our determination. Although we relied on TERA's technical expertise in constructing the model, we maintained close oversight of that process. TERA's cost model was ultimately a tool which we used to help us in making our decisions.

90. We also sought specialised expert views on specific topics from Professor Ingo Vogelsang, Dr Martin Lally, Professor Carlo Cambini, Professor Ian Dobbs, and Oxera Consulting (Oxera).

91. We sourced information from a number of experts to provide inputs for our TSLRIC model. These included:

  91.1 geospatial data from Corelogic and Landcare Research;

  91.2 trenching and duct cost data from Beca; and

  91.3 price trend data from Statistics New Zealand, World Bank, NZIER, and Bloomberg.

92. As part of our modelling, we also sourced data on Telecommunications Service Obligation (TSO) areas from earlier internal analysis that we carried out.[117]

93. In addition, we sourced extensive information from certain parties (including Chorus, Vodafone, and LFCs) to help us with modelling. We used compulsory information

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116 Analysis Mason "Report for Chorus UCLL and UBA FPP further draft determination submission – PUBLIC" 11 August 2015, pp. 5-11.

117 See Commerce Commission "Determination for TSO Instrument for Local Residential Service for period between 1 July 2002 and 30 June 2003" (24 March 2005).

notices issued under section 98 of the Commerce Act 1986.[118] We also note that interested parties supplied their own data and models.

**Structure of this document**

94. This determination has seven Chapters:

    94.1 This Chapter 1 contains an introduction and explains the process which has culminated in this final determination.

    94.2 Chapter 2 outlines the regulatory framework under which we are required to set a TSLRIC price for the UCLL service.

    94.3 Chapter 3 explains our approach to determining the cost of providing the UCLL service. We describe the steps we have taken to determine the annualised TSLRIC cost, and summarise the decisions we have made at each step.

    94.4 Chapter 4 explains how we have converted TSLRIC costs into a monthly unit price, and set the prices for the UCLL STD and SLU STD services.

    94.5 Chapter 5 explains our approach to price adjustments that we consider best give, or are likely to best give, effect to the section 18 purpose statement, having considered matters including relativity.

    94.6 Chapter 6 explains our approach, reasons and decisions about the determination of non-recurring charges for the UCLL service.

    94.7 Chapter 7 explains our approach, reasons and decisions about backdating.

95. The Attachments to this determination then discuss our approach in more detail, including the reasons for individual decisions on key inputs to our TSLRIC model.

96. With this paper we are publishing some papers prepared by our expert consultants. These papers include:

    96.1 a model reference paper (public version only), model specification paper (public and confidential versions), and model documentation paper (public and confidential versions) for the recurring charges TSLRIC model prepared by TERA;

    96.2 a list summarising changes made to the TSLRIC models since the July 2015 UCLL further draft determination prepared by TERA;

    96.3 a methodology paper for the non-recurring charges TSLRIC model (public and confidential version) prepared by TERA;

[118] Section 98 of the Commerce Act 1986 applies under section 15(f) of the Telecommunications Act 2001.

96.4 a paper reviewing and responding to submissions on the July 2015 UCLL further draft determination paper (public and confidential versions) prepared by TERA;

96.5 a paper reviewing and responding to submissions on the July 2015 report “International comparison of TSLRIC UCLL and UBA costs and prices” (public version only), prepared by TERA;

96.6 a paper responding to submissions on the corridor cost analysis (public version only), prepared by Beca;

96.7 analysis outlining the corridor cost analysis of trenching and ducting rates in NZ (public version only) prepared by Beca;

96.8 a paper prepared by Professor Ingo Vogelsang reviewing submissions on the July 2015 UCLL further draft determination paper; and

96.9 a paper providing advice in response to submissions regarding price trends prepared by NZIER.

97. A separate paper explaining how we have calculated the WACC for the UCLL and UBA services has been published alongside this final determination. Attached to this paper, we have also published papers prepared by our expert consultants, including:

97.1 a review of submissions on the WACC parameters for UCLL and UBA prepared by Oxera;

97.2 a paper reviewing submissions on whether a WACC uplift is appropriate for UCLL and UBA prepared by Oxera; and

97.3 a review of submissions on the appropriate risk-free rate and tax-adjusted market risk premium (TAMRP) for UCLL and UBA prepared by Dr Martin Lally.

98. We will issue consolidated and updated STDs for UCLL, UCLFS and SLU (and any other affected STD) so as to ensure they are consistent with this determination. For the avoidance of doubt, the FPP prices and any relevant conditions that update these STDs will be in place from 16 December 2015.

# Chapter 2: Our regulatory framework for carrying out the UCLL pricing review determination

99. This Chapter outlines our regulatory framework under which we are setting a price for the UCLL service using TSLRIC ("our regulatory framework").[119,120] In this Chapter we address:

    99.1 the Act's definition of TSLRIC ("definition of TSLRIC" or "TSLRIC");

    99.2 section 18 considerations;

    99.3 the TSLRIC objectives/outcomes that we considered when exercising our judgement;

    99.4 our approach to implementing TSLRIC, including:

        99.4.1 the characteristics of the hypothetical efficient operator and the hypothetical efficient operator environment; and

        99.4.2 the concept of a modern equivalent asset (MEA);

    99.5 evidential matters;

    99.6 other relevant considerations;

    99.7 additional legal requirements under the Act; and

    99.8 the Vodafone TSO case.[121]

100. In the following paragraphs we provide a high level summary of our regulatory framework.

101. Our regulatory framework is based on the legal requirements of the Act.

    101.1 The Act requires us to apply the final pricing principle of TSLRIC; unlike the regulatory context in some other jurisdictions, we do not have discretion to select a different pricing principle during the course of a pricing review. The definition of TSLRIC refers to forward-looking costs over the long run of the total quantity of facilities and functions that are incremental to the UCLL service, plus a reasonable allocation of forward-looking common costs. We are required to implement the form of TSLRIC defined in the Act, and we discuss its particular requirements, including that it be forward-looking and over the long run, in this Chapter.

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119 Unless otherwise stated, "TSLRIC" in this determination means the Act's definition of TSLRIC.

120 There are some aspects of this framework which are more nuanced in respect of NRC. This is further explained in Chapter 6.

121 *Vodafone New Zealand Limited v Telecom New Zealand Limited* [2011] NZSC 138, [2012] 3 NZLR 153.

101.2 The Act also requires us to make the determination that, in our view, best gives or is likely to give effect to the section 18 purpose statement. As the Court of Appeal has explained, it is reasonable to assume that Parliament has chosen the pricing principle (in this case, TSLRIC) because it is consistent with, and will implement, the purpose statement in section 18, and determination of the FPP in accordance with the statutory definition of TSLRIC will itself involve implementation of the section 18 purpose.[122] In other words, setting a price based on TSLRIC will generally promote competition for the long-term benefit of end-users. We considered section 18 throughout in respect of our individual modelling decisions. In some cases, we have found that the primary effect of an individual modelling decision on the section 18 purpose was its impact on the final price, since it is generally the price itself that will promote competition for the long-term benefit of end-users.

102. The definition of TSLRIC provides some guidance on the various choices that needed to be made in determining TSLRIC in the modelling environment (eg, through the reference to terms such as “forward-looking” and “long run”). Nevertheless, the definition is not prescriptive in respect of many of the decisions that we need to make, and requires us to exercise our judgement in relation to a considerable number of modelling decisions. Therefore, we also looked to other relevant considerations to guide our modelling decisions.

103. Since many of the terms contained in the definition of TSLRIC are terms of economic theory, this economic theory helped us to interpret TSLRIC. Economic theory related to the TSLRIC concept shows that there are a range of efficiency-enhancing objectives/outcomes that this pricing principle can achieve. In making individual modelling choices to determine TSLRIC we considered these objectives/outcomes.

104. Taking into account the economic theory of the TSLRIC concept, and its implementation by regulators elsewhere, we considered the various approaches to implementing TSLRIC. Our approach estimates forward-looking, long run, efficiently incurred, incremental costs by postulating a hypothetical efficient operator building and operating a new network using a MEA to provide the relevant regulated services. Use of the hypothetical efficient operator and MEA concepts is a conventional approach to the implementation of TSLRIC, and we considered that these concepts would assist us to create a model that would implement the section 18 purpose statement. These concepts were helpful as a guiding principle to inform our modelling decisions, although we remained open to revisiting our approach in the context of individual modelling decisions and overall.

105. In some cases, we have also taken into account real-world evidence as a guide to our implementation of TSLRIC in relation to modelling decisions on matters that were, to some extent, objectively measurable. In these instances we exercised our judgement as to what provided the best objectively measurable data.

122 *Chorus Ltd v Commerce Commission* [2014] NZCA 440 at [153].

106. We were also informed by additional legal requirements of the Act, such as (among others) the requirement to avoid double recovery, the requirement to set a national geographically averaged price, and the requirement to consider relativity between the UCLL and UBA services.

107. Finally, we consider that our approach to determining TSLRIC is consistent with the principles to be derived from the Supreme Court's judgment in the *Vodafone TSO* case. In particular, we followed the approach laid down by the Court in relation to network optimisation by incorporating new technologies into our model where appropriate, and in the statutory context of this determination we are satisfied that our decision on asset valuation will best promote the section 18 purpose statement.

**The definition of TSLRIC**

*We must determine a price in accordance with TSLRIC*

108. In this pricing review determination we must apply the final pricing principle (FPP) as set out in Schedule 1 of the Act. More specifically, section 52(a) of the Act requires that:

> A pricing review determination must include—
>
> (a) the price payable for the designated access service, which, in the opinion of the Commission, is determined *in accordance with*—
>
>> (i) the applicable *final pricing principle* (as affected, if at all, by clause 2 or clause 3[123] of Schedule 1).[124] (emphasis added)

109. The FPP for the UCLL service is TSLRIC.[125]

110. TSLRIC is an acronym for an economic concept: "total service long run incremental costs". The Act provides us with a particular definition of "TSLRIC":

> TSLRIC, in relation to a telecommunications service,—
>
> (a) means the forward-looking costs over the long run of the total quantity of the facilities and functions that are directly attributable to, or reasonably identifiable as incremental to, the service, taking into account the service provider's provision of other telecommunications services; and
>
> (b) includes a reasonable allocation of forward-looking common costs.

*TSLRIC contains several elements*

111. The definition of TSLRIC contains several elements:

111.1 forward-looking costs;

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[123] Clauses 2 and 3 are not relevant for this FPP.

[124] The provision also mentions "any regulations that relate to the applicable final pricing principle or, if there are no regulations, any requirements of the Commission". There are no such regulations and no requirements of the Commission other than those set in this determination.

[125] Telecommunications Act 2001, Schedule 1, Part 2, Subpart 1.

111.2 over the long run;

111.3 of the total quantity of the facilities and functions;

111.4 that are directly attributable to, or reasonably identifiable as incremental to, the service, taking into account the service provider's provision of other telecommunications services; and

111.5 a reasonable allocation of forward-looking common costs.

112. We discuss each of those elements further below.

*Forward-looking costs*

113. The TSLRIC acronym (total service long run incremental costs) does not specifically refer to "forward-looking" costs. As we discuss later, forward-looking costs are typically considered to be an implicit component of the economic interpretation of the TSLRIC concept. However, the Act does not leave this implicit, but rather explicitly includes the concept of forward-looking costs in TSLRIC.

114. In 2002, we defined forward-looking costs as:[126]

> … costs that will be incurred in the future in providing the service. This involves estimating costs on the basis of current and future prices of inputs and given the availability of modern technologies and assets. The aim is to estimate the cost of providing the services in the future rather than the past.

115. In the December 2013 UCLL process and issues paper, we defined the concept of forward-looking costs as follows:[127]

> Forward-looking costs reflect the costs that a network operator would incur if it built a new network today using assets collectively referred to as the modern equivalent asset, which we discuss further below. The costs of these assets are the costs of currently available equipment as opposed to the costs of older equipment that may actually still be in use.

116. In our July 2015 further draft determination we used what we considered to be an ordinary economic understanding of the forward-looking costs concept. That is, we considered that forward-looking costs reflected "the current and ongoing future costs of providing the service".[128]

117. Spark submitted a different interpretation of the term "forward-looking". Spark submitted that forward-looking costs will be "the incremental investment required by the access provider to extend the lifetime of existing assets in order to support

[126] Commerce Commission "Application of a TSLRIC Pricing Methodology - Discussion Paper" 2 July 2002, paragraph [32].

[127] Commerce Commission "Process and issues paper for determining a TSLRIC price for Chorus' unbundled copper local loop service in accordance with the Final Pricing Principle" 6 December 2013, paragraph [68].

[128] Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 2 July 2015, paragraph [101]; and Commerce Commission "Further draft pricing review determination for Chorus' unbundled bitstream service" 2 July 2015, paragraph [100]. "

continued use".[129] Spark seems to be suggesting that forward-looking costs relate to Chorus investing in its existing assets.

118. Spark also submitted that the distinction between forward-looking and historical costs does not address the treatment of costs that can be avoided through prudent asset management.[130] In our view, such costs that are avoided through prudent asset management are inefficiently incurred costs. Assessing costs on a forward-looking basis, and TSLRIC more generally, is consistent with the exclusion of inefficient costs.

119. In contrast to Spark's submission, we consider that the term "forward-looking costs" does not presuppose that the costs are those associated with investment by Chorus. As the Court of Appeal noted, forward-looking costs can be read as reflecting the notional cost to an operator if it built a new network, not the costs of any particular entity or the costs of the incumbent:[131]

> The TSLRIC model provides an estimate of the costs of an efficient access provider over a sufficient period of time (long run), on a "forward-looking" basis (reflecting the notional costs to an operator if it built a new network) rather than of Chorus's actual costs.

120. We also note that the definition of TSLRIC refers to the costs of the "service provider" and not the "access provider". The term "access provider" is used in the Act's descriptions of the regulated services, where for many services Chorus is identified as the "access provider". The use of "service provider" and not "access provider" in the definition of TSLRIC reinforces the view that we are not required to model Chorus' costs.

121. Overall we remain of the view that forward-looking costs reflect the current and ongoing future costs of providing the regulated service. Historic costs that have already been incurred, and the accounting costs that are recorded in a business' financial accounts, are not necessarily the same as forward-looking costs (although they may be informative in some circumstances). Businesses and households make decisions (eg, regarding pricing, output, entry, investment, and consumption) based on present and future costs and benefits.

122. We also remain of the view that this definition of forward-looking costs is an ordinary economic understanding of the concept. We do not consider that the concept of forward-looking costs determines the sort of entity we should be modelling. In particular, we do not agree with Spark's submission that forward-looking costs must relate to Chorus investing in its existing assets.

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129 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" 13 August 2015, paragraph [41].

130 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" 13 August 2015, paragraph [46].

*Over the long run*

123. In previous papers we defined the “long run” to mean a timeframe over which all factors of production including capital equipment are variable in response to changing demand.[132,133] This is also our final view.

124. This definition of “long run” takes account of its “context and purpose” and is “to give effect to real-world outcomes that achieve real-world efficiencies”, to use Spark’s words.[134] Also, as we explain below, our definition is consistent with how the long run is defined in economic theory and in regards to the conventional understanding of the TSLRIC concept. Later in this Chapter we consider the efficiencies and outcomes that the conventional approach is typically said to promote (ie, TSLRIC objectives/outcomes). It follows that the definition of “long run” in the conventional TSLRIC concept is consistent with achieving these real-world outcomes and efficiencies.

125. Our definition of “long run” is also consistent with how the concept of the long run is considered in microeconomic theory.[135] Microeconomists define the long run as the period of time sufficiently long enough such that all costs are considered variable in response to changes in demand.[136] This is also how the definition of the long run is considered in regards to the TSLRIC concept, as shown by the following examples.

    125.1 The Australian Competition and Consumer Commission (ACCC) defined the long run in the context of TSLRIC as “a period long enough such that all of a firm’s costs (*including sunk costs)* become variable or avoidable”,[137] which

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132 Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014, paragraph [79]; and Commerce Commission "Draft pricing review determination for Chorus' unbundled bitstream service" 2 December 2014, paragraph [79].

133 Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 2 July 2015, paragraph [103]; and Commerce Commission "Further draft pricing review determination for Chorus' unbundled bitstream service" 2 July 2015, paragraph [102].

134 Spark “Further draft pricing review determination for Chorus’ UBA and UCLL services” 13 August 2015, paragraph [56].

135 We note that Spark referred to a *New Palgrave Dictionary of Economics* article which found that the concept of the long run does not have a uniform meaning (Spark “Further draft pricing review determination for Chorus’ UBA and UCLL services” 13 August 2015 at [54], citing Carlo Panico and Fabio Petri “Long run and short run” *The New Palgrave Dictionary of Economics,* Second edition, Steven N. Durlauf and Lawrence E. Blume (eds.), 2008). The article in question relates to the use of the term “long run” in analysing equilibrium concepts in macroeconomics, and we do not consider it is relevant to a discussion of the term “long run” as a TSLRIC concept.

136 See, for example, Ingo Vogelsang “Current academic thinking about how best to implement TSLRIC in pricing telecommunications network services and the implications for pricing UCLL in New Zealand” 25 November 2014, paragraph [38]; and William Baumol, *Economic Theory and Operations Analysis*, Fourth edition, Prentice Hall, New Jersey, 1977, p.290. Baumol refers to “the very long run” as “a period so long that all of the firm’s present contracts will have run out, its present plant and equipment will have been worn out or rendered obsolete and will therefore need replacement, etc”.

137 ACCC “Access Pricing Principles – Telecommunications: a guide” July 1997, p.37, emphasis added.

contrasts with Spark's submission that the long run concept does not focus on sunk costs.[138]

125.2 Spark refers to the meaning of "long run" used by the US Federal Communications Commission (FCC) in 1996 in regards to a variant of the TSLRIC concept, total element long run incremental cost (TELRIC),[139] as a period long enough that all of the firm's costs become variable.[140]

125.3 Spark's submission also refers to William Baumol's definition of the long run (referred to above, and which is consistent with taking a period of time in which all costs are variable) as being "arguably more consistent with the definition of TSLRIC".[141]

126. Spark submitted that "it seems that there is a risk that the Commission's approach to the long run has tended to result in costs being included that should not be – particularly sunk and reusable assets. Assets which in the long run would not, on a forward-looking basis be replaced, do not warrant a value".[142]

127. We disagree with Spark. As Analysys Mason explained, "'the length of time in which all factors of production are variable' is exactly the interpretation required".[143] We also agree with Sapere. As Sapere submitted, Spark's approach "does not fall under the auspices of TSLRIC", and is "confusing TSLRIC with other costing concepts".[144]

128. Further, in contrast to Spark's point that certain assets "do not warrant a value", we agree also with the point made by CEG, that "[i]f an asset is still being used it has a forward-looking economic value".[145]

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138 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" 13 August 2015, paragraph [55].

139 TELRIC is a variant of the TSLRIC concept that was applied in the United States by the Federal Communications Commission. The TELRIC and TSLRIC concepts do not differ in how they treat the hypothetical network build; rather the difference relates only to the extent of the increment considered. Doane, Sibley and Williams (1999) have noted that "[t]he concept behind TELRIC is the same as that of TSLRIC but is specific to a particular network element." (Michael J. Doane, David S. Sibley and Michael A. Williams (1999) "Having Your Cake – How to Preserve Universal-Service Cross Subsidies While Facilitating Competitive Entry" *Yale Journal on Regulation*, 16, 311-326, footnote 12 at 313).

140 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" 13 August 2015, paragraph [55]; FCC "In the matter of implementation of the Local Competition Provisions in the Telecommunications Act 1996" CC Docket No. 96-98, August 1996, paragraph [677].

141 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" 13 August 2015, paragraph [50].

142 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" 13 August 2015, paragraph [51].

143 Analysys Mason "Report for Chorus UCLL and UBA FPP draft determination cross-submission" 22 September 2015 at p. 10.

144 Sapere "Report for Chorus Limited - Cross-submission on UCLL and UBA Price Determination Issues" 22 September 2015, paragraphs [75] and [82].

145 Competition Economists Group "Non-replicable assets and forward-looking cost" August 2014, paragraph [35].

129. As with the forward-looking concept discussed above, the term “long run” does not pre-suppose a particular entity making an investment (while Spark assumes it is Chorus).

130. Professor Vogelsang has also highlighted inconsistencies in Spark’s interpretation of the “long run”. He states that Spark mixes the conventional approach (which “assumes that all these assets are replaced now by MEAs and run efficiently”) with an actual cost approach, and chooses “the properties of each to come up with the lowest possible cost”.[146]

131. Therefore, we remain of the view and our final decision is that it is appropriate to consider the “long run” as a time period over which all costs, including sunk costs, are variable.

*Total service, incremental costs*

132. The Act refers to costs that are “directly attributable to, or reasonably identifiable as incremental to, the service”. We refer to these costs collectively as “incremental costs”. In this context, incremental costs are the costs that are extra or variable to an additional service that a business provides. That is, if a business were to add an additional service to the existing set of services that it provides, then the costs it incurs in doing so would be considered the costs that are incremental to that service.

133. In regards to the relevant service over which costs are considered incremental, the definition of TSLRIC refers to the “total quantity of the facilities and functions”. We consider that the “total quantity of the facilities and functions” refers to the total inputs required to supply all the quantity of the network operator’s services. This means that TSLRIC is different from the incremental cost the network operator incurs in supplying the last unit of the service, or the incremental cost of providing the service to one particular access seeker.[147]

134. The definition of TSLRIC also requires that “the service provider's provision of other telecommunications services” should be considered when determining what costs are directly attributable to, or reasonably identifiable as incremental to, the service we model. This leads us to assume that the service provider that we use for cost modelling will provide other telecommunications services, in addition to the UCLL service for which we are modelling TSLRIC. This affects how we identify incremental costs, and how we allocate shared costs and common costs (discussed under the next heading below).

135. As discussed in more detail below, we have used the concept of a hypothetical efficient operator as a guiding principle in modelling TSLRIC. We looked at the mix of services that Chorus provides as the best evidence of services required by New Zealanders that would likely be offered by a hypothetical efficient operator.

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146 Ingo Vogelsang, “Review of some Submissions on the Commerce Commission’s July 2, 2015 draft determination on UCLL/UBA pricing” 26 November 2015, paragraphs [75] and [78].

147 Commerce Commission “Process and issues paper for determining a TSLRIC price for Chorus' unbundled copper local loop service in accordance with the Final Pricing Principle” 6 December 2013, paragraph [65].

136. Accordingly, we assume that a hypothetical efficient operator would use its network infrastructure assets (eg, trenches and ducts) to provide other telecommunications services, including leased line services with dedicated capacity for commercial end-users, High Speed Network Service (HSNS) and mobile site backhaul.

137. In addition to costs that are directly attributable to the service, the definition of TSLRIC refers to an allocation of forward-looking common costs (as discussed next).

138. Together, paragraphs (a) and (b) of the definition of TSLRIC capture all relevant forward-looking costs.

*Reasonable allocation of forward-looking common costs*

139. The definition of TSLRIC covers both:

139.1 costs that are "directly attributable to, or reasonably identifiable as incremental to, the service" (as described in paragraph (a) of the definition and as described above); and

139.2 a reasonable allocation of forward-looking common costs (paragraph (b) of the definition).

140. The Act also provides a definition of forward-looking common costs:

> **forward-looking common costs—**
>
> (a) means those costs efficiently incurred by the service provider in providing the service that are not directly attributable to providing an additional unit to that service; but
>
> (b) does not include any costs incurred by the service provider in relation to a TSO instrument

141. In this section we explain the requirements to be met in allocating forward-looking common costs. The details of the approach we have taken to allocating forward-looking common costs are discussed later in this determination (in Attachment N – Cost allocation).

142. We use the following terminology when talking about forward-looking common costs.[148]

142.1 We generally use the term "common costs" to refer to costs not directly attributable to any individual service or subgroup of services; they are attributed to all services. These may be "non-network" common costs, that are not directly incurred in providing services associated with the telecommunications network itself (an example is corporate overheads), or "network" common costs, which are directly incurred in providing all services associated with the network.

142.2 We generally use the term "shared costs" to refer to costs not directly attributable to any individual service, but that can be attributed to a

[148] For further detail see Attachment N – Cost allocation.

subgroup of services (rather than to all services).[149] These are also typically "network shared costs", as they are directly incurred in providing a subgroup of services associated with the network. An example is the cost of an active cabinet, as not all services will use the active cabinet.

143. For clarity, we note that both "common costs" and "shared costs" are included in the definition of "forward-looking common costs".

144. Accordingly, under paragraph (a) of that definition we must include a reasonable allocation of costs:

144.1 efficiently incurred in providing the service; but

144.2 not directly attributable to providing an additional unit to that service.

145. First, we are only required to allocate forward-looking common costs efficiently incurred by the service provider. Second, we must include only those costs that are not directly attributable to providing an additional unit to the service. We will allocate the likely forward-looking common costs associated with the hypothetical network that a hypothetical efficient operator would build. As noted above, this includes the operator providing a mix of other telecommunications services using its infrastructure. These forward-looking common costs include the cost of network infrastructure assets used for multiple services.

146. It is open to us to look to Chorus' actual network and actual costs to guide us in assessing the likely forward-looking common costs efficiently incurred by the hypothetical efficient operator, and in a number of instances we do. However, we are not required to set a price based on Chorus' actual costs (though we discuss clause 4B of schedule 1 of the Act in more detail later in this Chapter).

147. Limb (b) of the Act's definition of "forward-looking common costs" provides that they do not include "any costs incurred by the service provider in relation to a TSO instrument". We address this in more detail below when we discuss "additional legal requirements".

### Role of section 18 in TSLRIC

*Our overall consideration was what promotes competition in telecommunications markets for the long-term benefit of end-users, and in doing so we considered section 18(2) and (2A)*

148. Section 19 requires us to consider "the purpose set out in section 18" and make the determination that, in our view, best gives or is likely to give effect to that purpose. That purpose is found in section 18(1), which is:

> … to promote competition in telecommunications markets for the long-term benefit of end-users of telecommunications services within New Zealand by regulating, and providing for the regulation of, the supply of certain telecommunications services between service providers.

[149] Another term for these costs is "joint costs".

149. Section 18(2) and (2A) identify particular matters that we are required to consider when determining what promotes competition in telecommunications markets for the long-term benefit of end-users:

> (2) In determining whether or not, or the extent to which, any act or omission will result, or will be likely to result, in competition in telecommunications markets for the long-term benefit of end-users of telecommunications services within New Zealand, the efficiencies that will result, or will be likely to result, from that act or omission must be considered.
>
> (2A) To avoid doubt, in determining whether or not, or the extent to which, competition in telecommunications markets for the long-term benefit of end-users of telecommunications services within New Zealand is promoted, consideration must be given to the incentives to innovate that exist for, and the risks faced by, investors in new telecommunications services that involve significant capital investment and that offer capabilities not available from established services.

*Section 18(1) is the "dominant" provision in section 18*

150. As the High Court has observed, section 18(1) is the "dominant" provision in section 18, and subsections (2) and (2A) "are specified for the purpose of assisting analysis under section 18(1)".[150] In this sense, subsections (2) and (2A) are not isolated considerations on their own. Rather, they help us consider whether competition is promoted to the long-term benefit of end-users. In other words, all analysis around the relevant considerations that feed into section 18(1) should then be considered in the round and we will make a decision that we consider best promotes competition in telecommunications markets for the long-term benefit of end-users.

*Efficiencies, incentives to innovate, and the appropriate welfare standard*

151. We have treated "efficiencies" in section 18(2) as referring to static and dynamic efficiencies. This is consistent with the High Court's comments regarding our IPP determination, where Kós J stated that it was "common ground that "efficiencies" refer to both static and dynamic efficiencies".[151]

152. Static efficiencies are allocative and productive efficiencies: they reflect efficient use of resources and efficiency in internal firm production respectively. By contrast, dynamic efficiencies are concerned with new and innovative products and services, or supplying existing ones at better quality, which lead to greater consumer choices and benefits over the long-term.

153. Section 18(2A) requires us to consider the "incentives to innovate that exist for, and the risks faced by, investors in new telecommunications services that involve significant capital investment and that offer capabilities not available from established services." A determination that undermines incentives to invest would deter future investment and so would be likely to undermine competition over the long-term.

[150] *Chorus v Commerce Commission* [2014] NZHC 690 at [34].

[151] *Chorus v Commerce Commission* [2014] NZHC 690 at [34].

154. Consideration of efficiencies is also related to the appropriate welfare standard implied by section 18. We note that Sapere argued that a total welfare standard is required by the legislative history, case law and economics of section 18.[152] We do not agree that there is an absolute rule as to how wealth transfers should be treated. Rather, the appropriate approach to consumer welfare, total welfare, wealth transfers and efficiencies will depend on the circumstances. We explain in Chapter 5 that, in this context, our chief concern is to reach a decision that promotes competition for the long-term benefit of end-users.

155. Static and dynamic efficiencies are also relevant to the TSLRIC objectives/outcomes, which are explained in the next section.[153] For example, the objectives of efficient use of infrastructure and providing incentives to minimise costs relate to allocative and productive efficiencies, while incentives for efficient investment relate to dynamic efficiencies.

*The relationship between TSLRIC and section 18*

156. As we explain below, we see TSLRIC and section 18 working in tandem. That is, our immediate task is to apply TSLRIC, but in doing so we must make the determination that best gives effect to section 18. Accordingly, our application of TSLRIC is informed by section 18 considerations.

157. In this pricing review determination we must apply the FPP as set out in Schedule 1 of the Act. The FPP for the UCLL service is TSLRIC. Section 19 requires us to consider "the purpose set out in section 18" and make the determination that, in our view, best gives or is likely to give effect to that purpose. However, section 19 does not cause section 18 to override the statutory task (ie, apply TSLRIC).

158. The Court of Appeal has confirmed that we should read the specific requirements of the Act as being consistent with the section 18 purpose statement. It stated:[154]

> …it is reasonable to assume that Parliament will have settled on that particular definition because it is consistent with and implements the requirements of the statutory purpose.

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152 Sapere "Report for Chorus Limited – Economic Comment on UCLL and UBA Pricing Issues" 11 August 2015, paragraphs [33]-[64].

153 TSLRIC objectives/outcomes are a number of outcomes that are typically considered to be outcomes that arise from an appropriate application of the TSLRIC concept.

154 *Chorus v Commerce Commission* [2014] NZCA 440 at [153].

159. In the context of the IPP determination, it also stated (footnotes omitted):[155]

> [44] It is also reasonable to assume, on the basis of the principle of statutory interpretation that the provisions of a statute are likely to be internally consistent, that the statutory definition of the UBA price reflects the requirements of s 18, including in particular subs (2A) which was enacted at the same time. In other words, the mandatory requirement for the Commission to carry out the "benchmarking" exercise for the IPP by reference to appropriate "comparable countries" is itself designed to implement the statutory purpose, not to contradict or undermine it.

160. We agree with Russell McVeagh's, Spark's, and Vodafone's submissions on the relationship between TSLRIC and section 18.

161. As Russell McVeagh submitted, "Parliament has chosen TSLRIC as the methodology that will best give effect to section 18" (in the context of the FPP).[156]

162. As Spark submitted, "a properly applied TSLRIC methodology is entirely compatible with section 18".[157] Spark further submitted that "s18 does not override the obligation to first focus on the technical task of determining and modelling the best estimate of efficient forward-looking costs when applying a TSLRIC methodology."[158] Similarly, Vodafone has submitted that "s 18 considerations cannot displace a proper analytical approach to determining TSLRIC." [159]

163. Our final view is that TSLRIC and section 18 operate in tandem, and, as explained below, section 18 may provide guidance at a number of decision points.

*We applied section 18 to cost modelling decisions throughout the process*

164. Section 19(c) requires that, when making a determination, we consider what best gives, or is likely to best give, effect to the section 18 purpose statement. To ensure that the determination as a whole best meets the section 18 purpose statement, we considered section 18 throughout the process and in respect of each individual modelling decision.

165. Submitters generally agreed that we should consider section 18 in regards to individual modelling choices.

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155 *Chorus v Commerce Commission* [2014] NZCA 440.

156 Russell McVeagh "Chorus submission on further draft UCLL and UBA pricing reviews" paragraph [28(a)].

157 See, for example, Spark "UBA and UCLL FPP pricing review draft decision" 20 February 2015, paragraph [136]; Vodafone "Submission to the New Zealand Commerce Commission on Process Paper and Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and Comments on Analysys-Mason TSLRIC Models" 20 February 2015, paragraph [B2.1].

158 Telecom "UCLL and UBA FPP: consultation on regulatory framework and modelling approach - Submission Commerce Commission" 6 August 2014, paragraphs [36] and [43].

159 Vodafone "Comments on process and issues paper for the unbundled copper local loop (UCLL) final pricing principle" 14 February 2014, paragraphs [C2.12]-[C2.13]. Vodafone "Submission to the New Zealand Commerce Commission - Comments on Consultation paper outlining Commission's proposed view on regulatory framework and modelling approach for UBA and UCLL services" 6 August 2014, paragraph [D1.7]. Vodafone "Submission to the New Zealand Commerce Commission - Cross submission on Consultation paper outlining Commission's proposed view on regulatory framework and modelling approach for UBA and UCLL services" 20 August 2014, paragraph [B1.6].

166. Spark stated that "…where choices are required when implementing TSLRIC, [the Commission is required to] make choices that enable it to give best effect to the purpose set out in section 18".[160] At the conference, Chorus stated that section 18 is a mandatory requirement in respect of "all discretions that the Commission is exercising",[161] while Vodafone noted that section 18 applies "to a range of functions that [we] perform", including in determining TSLRIC.[162]

167. In contrast with these views, Wigley and Company submitted that we can apply section 18 to our modelling decisions only to resolve an "impasse" where no modelling choices lead to "true TSLRIC".[163] Wigley and Company further stated that many modelling decisions can be determined "without regard to section 18".[164]

168. We disagree with Wigley and Company. Our view is that section 18 does not have a limited role of only resolving an "impasse" in assessing efficient costs. In our view it should guide our entire approach to the exercise. That is, we should consider section 18 in regards to individual modelling choices, regardless of whether or not there is an "impasse" for those modelling choices.

169. Having said that, the section 18 purpose statement may not necessarily be helpful in respect of each and every modelling decision (for example, regarding technical details or where certain approaches are prescribed by the Act).[165] We agree with the submissions of Spark and Vodafone that section 18 may not necessarily have a "separate discernible", or "separate observable", effect at every decision point during the modelling process.[166,167]

170. As will be further explained in this determination, we have found that the section 18 purpose statement was a particularly important factor in relation to the following

160 Spark "UBA and UCLL FPP pricing review draft decision" 20 February 2015, paragraph [124].

161 Commerce Commission "UBA and UCLL pricing review determination conference transcript" 15-17 April 2015, p.34.

162 Commerce Commission "UBA and UCLL pricing review determination conference transcript" 15-17 April 2015, p.39.

163 Wigley and Company "Submission on draft pricing review determination for UBA and UCLL services" 20 February 2015, paragraph [5.13].

164 Commerce Commission "UBA and UCLL pricing review determination conference transcript" 15-17 April 2015, p.34.

165 Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 2 July 2015, paragraph [160]; and Commerce Commission "Further draft pricing review determination for Chorus' unbundled bitstream service" 2 July 2015, paragraph [159].

166 Telecom "UCLL and UBA FPP: consultation on regulatory framework and modelling approach - Submission Commerce Commission " 6 August 2014, paragraph [46].

167 Vodafone "Comments on process and issues paper for the unbundled copper local loop (UCLL) final pricing principle" 14 February 2014, paragraphs [C2.12]-[C2.13]. Vodafone "Submission to the New Zealand Commerce Commission - Comments on Consultation paper outlining Commission's proposed view on regulatory framework and modelling approach for UBA and UCLL services" 6 August 2014, paragraph [D1.7]. Vodafone "Submission to the New Zealand Commerce Commission - Cross submission on Consultation paper outlining Commission's proposed view on regulatory framework and modelling approach for UBA and UCLL services" 20 August 2014, paragraph [B1.6].

decisions: to model a hypothetical efficient operator, on asset valuation, not to make a TSLRIC or WACC uplift, and whether or not to backdate.

*The predominant effect of individual modelling choices was generally reduced to an impact on the resulting modelled price*

171. As we explained in our draft decisions, there did not appear to be any strong and unequivocal ways that many of our individual modelling choices (particularly in relation to technical issues such as the size of cables used in our TSLRIC model, or the opex efficiency adjustment) could, taken in isolation, influence competition for the long-term benefit of end-users. Rather, the main effect of such choices is to contribute to the overall level of the price determined using TSLRIC.[168]

172. Chorus and Vodafone agreed with us. Chorus stated that in some modelling decisions section 18 may not "bite directly", and Vodafone stated that section 18 may not have a role where judgements can be made on the best available evidence.[169, 170]

173. Although Spark submitted that section 18 would not always have a "separate observable" effect at every stage, it submitted that "prices being set to allow the recovery of efficient costs [should be] the over-riding common objective".[171]

174. We disagree with Spark. The purpose of the present exercise is to determine a price in accordance with the FPP, and it is that determination which must give effect to the section 18 purpose statement.

175. Spark also submitted that "there is a very clear efficiency focus in both section 18, and TSLRIC, which is also supported by the relevant definitions in the Act" and "this efficiency objective should be the key determinant of the Commission's individual modelling choices".[172] Russell McVeagh stated that "the Commission must promote competition (under section 18) by setting a price based on efficient forward-looking costs of providing the regulated service".[173]

176. Section 18 and/or efficiency considerations should not lead us away from the statutory task of determining a price in accordance with TSLRIC. Spark's approach appeared to mix some aspects of TSLRIC with aspects of an approach based on actual

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168 Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 2 July 2015, paragraph [161]; and Commerce Commission "Further draft pricing review determination for Chorus' unbundled bitstream service" 2 July 2015, paragraph [162].

169 Commerce Commission "UBA and UCLL pricing review determination conference transcript" 15-17 April 2015, p.35.

170 Commerce Commission "UBA and UCLL pricing review determination conference transcript" 15-17 April 2015, p.41.

171 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" 13 August 2015, paragraph [24a].

173 Russell McVeagh "Chorus submission on further draft UCLL and UBA pricing reviews" paragraph [29].

costs and Chorus' legacy assets. Professor Vogelsang made a similar observation regarding Spark's approach:[174]

> … my sense is that it mixes the TSLRIC approach with a path dependence approach, choosing the properties of each to come up with the lowest possible costs.

177. Overall, we believe that we should consider section 18 throughout in respect of our individual modelling decisions within our regulatory framework.

178. Regardless of whether section 18 is directly instructive in respect of particular modelling choices, the price that results from those decisions will be important to the promotion of competition for the long-term benefit of end-users. Here it is the aggregate price, rather than the price effect from individual modelling choices, that is important. Accordingly, we consider that the relationship between the price level and section 18 and the analysis of the risks of under- or over-estimating TSLRIC can be addressed in light of the cumulative effect of all our modelling choices. It is therefore desirable to undertake this analysis after all modelling decisions have been made and we have determined our central estimate of TSLRIC.

*How we considered section 18 purpose statement before making our overall price decision*

179. Our modelling choices taken together determine our central estimate of TSLRIC, which represents our best estimate of the efficient forward-looking costs of supplying the UCLL service.

180. However, because of the uncertainty in this estimate, and because it could conceptually lie within a plausible range of modelled estimates of TSLRIC, we can consider the costs of an error in our central TSLRIC estimate. To the extent these costs are asymmetric, we can consider whether we can better meet the section 18 purpose statement by considering an increase or decrease from the central estimate of TSLRIC.[175]

181. Such an approach is based on the costs of erring from the best estimate of the forward-looking efficient costs of supplying the UCLL service. As a result, it is desirable to undertake this analysis once all our modelling decisions have been made, rather than in respect of each individual modelling decision.

182. How we consider section 18 and exercise our judgement in making our overall price decision is further discussed in Chapter 5, in respect of a possible adjustment from the overall central estimates of TSLRIC and the WACC, and in respect of the relativity considerations of the Act. In addition, we have also considered our overall price decision with respect to how it compares to international TSLRIC model estimates, as discussed in Attachment P – International Comparators; the opposing views of

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[174] Professor Vogelsang "Review of some Submissions on the Commerce Commission's July 2, 2015, draft determination on UCLL/UBA pricing", 26 November 2015, paragraph [78].

[175] Also, as discussed in more detail in Chapter 5, if the evidence demonstrates that incentivising migration to fibre (by way of moving to a different point within a plausible range) would promote competition in telecommunications markets for the long-term benefits of end-users of telecommunications services, then it is within our discretion to make this adjustment.

submitters on the direction and causes of any possible bias in individual decisions; and the costs of currently building a modern replacement fibre network (as discussed in Chapter 3).

*Predictability*

183. Our view regarding the role of predictability evolved during our consultation process.

184. At an early stage of our process, we suggested that respecting reasonable investor expectations would give effect to the section 18 purpose statement (as doing so would help build predictability into regulation).[176] In our December 2014 draft determinations we noted criticisms of that suggestion and revised our view.[177] In the July 2015 further draft determinations we reconsidered the role of an objective of predictability in our decision-making framework, and explained our view that we should be careful not to give predictability disproportionate weight.

185. We remain of the view that regulatory predictability is consistent with the section 18 purpose statement, and it is a relevant consideration that should be considered as part of best regulatory practice. Where regulatory uncertainty exists, this may undermine firms' incentives to invest and innovate. Investment and innovation is generally beneficial to end-users, and therefore a predictable regulatory environment that supports firms' incentives to invest is important to promote competition in telecommunication markets for the long-term benefit of end-users.

186. Spark and Vodafone have submitted that this is an improper application of section 18, and that the Act does not provide for a predictability test.[178] In this regard, we note that we are not seeking to re-interpret section 18 or apply it in a different way. Rather, we believe that regulatory predictability is a relevant consideration (among others) in the broad sense of best regulatory practice.

187. We agree with submitters that regulatory predictability is best considered at a higher level, in terms of best regulatory practice.[179] Predictability is not necessarily relevant across each individual modelling decision. While we do not accept Vodafone's argument that the concept of predictability is "meaningless" in this context, we agree that there are limits to the extent we can provide for predictability with such a large number of modelling decisions.[180]

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176 Commerce Commission "Consultation paper outlining our proposed view on regulatory framework and modelling approach for UBA and UCLL services" 9 July 2014, paragraph [86].

177 Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014, paragraphs [176]-[187].

178 Spark "UBA and UCLL FPP pricing review draft decision" 20 February 2015, paragraph [157]; and Vodafone "Submission on process paper and draft pricing review determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and comments on Analysys Mason's TSLRIC models" 20 February 2015, paragraph [B2.14]

179 See, for example, Spark "UBA and UCLL FPP pricing review draft decision" 20 March 2015, paragraph [61].

180 Vodafone "Cross submission to the New Zealand Commerce Commission on submissions to the Process Paper and Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access services (excluding TSO Boundary considerations)" 20 March 2015, paragraph [C5.5].

188. Some submitters criticised our decision-making process on the basis that we had changed our mind about relevant objectives without changing our “key modelling decisions”.[181] Our thinking has evolved over the course of a lengthy consultation and determination process. This has included reconsideration of some of the objectives that we consider to be relevant to our determination. We have kept an open mind about satisfying ourselves that our modelling decisions are appropriate in light of our final understanding of the relevant objectives and considerations.

**TSLRIC objectives/outcomes**

189. As discussed earlier in this Chapter, the definition of TSLRIC provides some guidance on the various modelling choices, but it is not prescriptive about the approach we should take on all of our modelling decisions. Therefore, our exercise involved a certain amount of estimation and judgement. Since many of the terms contained in the definition of TSLRIC are terms of economic theory, we have drawn on economic theory to help us to interpret TSLRIC.

190. Economic theory provides us with a number of outcomes that are typically considered to be outcomes that arise from an appropriate application of the TSLRIC concept. We refer to these as TSLRIC objectives/outcomes. We had regard to these objectives/outcomes when applying the definition of TSLRIC and considering individual modelling decisions.

*Potential TSLRIC objectives/outcomes*

191. In the July 2015 UCLL and UBA further draft determinations we reconsidered the objectives/outcomes of TSLRIC to which we give weight, and the role that these objectives/outcomes play in our TSLRIC modelling.[182]

192. We set out in Table 2.1 the potential objectives or outcomes that a TSLRIC-based price is typically said to promote.

[181] See, for example, Spark “Further draft pricing review determination for Chorus’ UBA and UCLL services” 13 August 2015, paragraph [10]; Wigley and Company “Submission on further draft pricing review UCLL and UBA determinations” 13 August 2015, paragraph [1.13].

[182] Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 2 July 2015, paragraph [130]; and Commerce Commission "Further draft pricing review determination for Chorus' unbundled bitstream service" 2 July 2015, paragraph [130].

**Table 2.1: Potential objectives/outcomes that a TSLRIC-based price may promote**

| Potential TSLRIC objective/outcome | Description |
|---|---|
| Efficient investment (both by the service provider and by access seekers) | A TSLRIC-based price can support incentives for the service provider to efficiently invest in maintenance and expansion of its network. It can also provide efficient "build/buy" incentives for access seekers, in terms of buying the wholesale service from the service provider, or building an alternative bypass network. |
| Preventing monopoly pricing | A TSLRIC-based price caps the price below the monopoly level. |
| Incentives to minimise costs | A TSLRIC-based price can provide incentives for the service provider to reduce its costs and improve its productivity. |
| Efficient entry in downstream (retail) markets | A TSLRIC-based price can provide incentives for entry such that only efficient access seekers can enter and compete with the service provider in downstream (retail) markets. |
| Efficient use of infrastructure | A TSLRIC-based price can support incentives for access seekers and end-users to use wholesale and retail services efficiently. |
| Efficient cost recovery | A TSLRIC-based price can allow the service provider to recover only costs efficiently incurred, including through providing a normal return on efficient investment. |
| Non-discrimination between the service provider and access seekers | A TSLRIC-based price can mitigate the potential for discriminatory pricing as between access seekers and the service provider. |

193. The link between the TSLRIC objectives/outcomes (which are efficiency-based) and the objectives of section 18 is close. Setting a TSLRIC-based price that meets the TSLRIC objectives/outcomes will generally promote competition for the long-term benefit of end-users.

194. A number of sources support these potential objectives/outcomes.

194.1 The objectives/outcomes identified in Table 2.1 are consistent with those identified by regulatory authorities in Europe – see TERA's review of the objectives used by regulators across Europe in applying LRIC methodologies.[183]

194.2 The ACCC also helped us to understand the possible objectives/outcomes of a TSLRIC-based price. These include promoting efficient entry and exit; supporting incentives for efficient investment in, and use of, infrastructure; providing incentives for cost minimisation; allowing for efficient cost recovery; and mitigating non-discrimination.[184,185]

194.3 Professor Vogelsang has identified many of the TSLRIC objectives/outcomes drawn from his review of the academic literature, which include:

194.3.1 providing prices that are compatible with competitive markets, thereby preventing monopoly pricing;

194.3.2 providing for efficient entry;

194.3.3 providing for allocative (efficient use of infrastructure) and productive (cost minimisation) efficiency; and

194.3.4 providing for dynamic efficiency with respect to efficient investment by the access provider, access seekers and alternative competitors.[186]

194.4 In its 2013 submission on behalf of Vodafone to the Ministry of Business, Innovation and Employment (MBIE) regarding the review of the Telecommunications Act, Network Strategies also identified some of these TSLRIC objectives/outcomes including: providing incentives for efficient entry and exit; efficient investment; allocative efficiency; and cost minimisation.[187]

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183 TERA Consultants "TSLRIC literature review on UBA and UCLL Costing approaches" June 2014, p. 7.

184 Commerce Commission "Process and issues paper for determining a TSLRIC price for Chorus' unbundled copper local loop service in accordance with the Final Pricing Principle" 6 December 2013, paragraph [58].

185 ACCC "Access Pricing Principles – Telecommunications, a guide" 1997, p. 29-30.

186 Ingo Vogelsang "Current academic thinking about how best to implement TSLRIC in pricing telecommunications network services and the implications for pricing UCLL in New Zealand" 25 November 2014, paragraph [45]. See also Ingo Vogelsang "What effect would different price point choices have on achieving the objectives mentioned in s18, the promotion of competition for the long-term benefit of end-users, the efficiencies in the sector, and incentives to innovate that exist for, and the risks faced by investors in new telecommunications services that involve significant capital investment and that offer capabilities not available from established services" 5 July 2013, paragraph [24].

187 Network Strategies "Review of the Telecommunications Act 2001: Key Issues" 13 September 2013, p. 24.

194.5 Spark supported some of these objectives/outcomes, including preventing monopoly pricing, cost minimisation, and recovering efficient costs.[188]

*The role of TSLRIC objectives/outcomes in our modelling decisions*

195. The role of the TSLRIC objectives/outcomes has evolved during our consultation process.[189,190] Our final decision is detailed below.

195.1 As a starting point, we were open to considering any of the potential TSLRIC objectives/outcomes identified above in our modelling decisions (as identified in Table 2.1 above).

195.2 However, we have found in practice that some of the objectives/outcomes noted in Table 2.1 above are of limited relevance given the current New Zealand circumstances.

195.3 For example, an objective/outcome of non-discrimination is relevant when there is a vertically-integrated service provider, as a service provider might otherwise favour its own downstream retail operations over those of its retail competitors. In the present circumstances, however, where Chorus is legally prohibited from operating in the downstream (retail) segment in which access seekers compete, non-discrimination is not such a relevant consideration.[191] We note also that section 69XB of the Act sets out the requirements for undertakings by Chorus relating to supply of certain wholesale telecommunications services, which includes non-discrimination provisions. These factors limit the role played by a TSLRIC objective/outcome of non-discrimination in our modelling decisions in the current context. Even so, we remain open to considering the role of a TSLRIC objective/outcome of non-discrimination, as it may have some relevance in respect of unbundling.

195.4 Further, TSLRIC objectives/outcomes are typically considered to be outcomes that arise from appropriately applying the TSLRIC concept. Accordingly, we have kept the objectives/outcomes in mind (to the extent they were

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188 Spark “Further draft pricing review determination for Chorus’ UBA and UCLL services” 13 August 2015, paragraph [22].

189 In our December 2014 UCLL and UBA draft determination papers we expressed our preference to emphasise predictability and efficient investment as objectives of a TSLRIC-based price (Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014, paragraph [126]; and Commerce Commission "Draft pricing review determination for Chorus' unbundled bitstream service" 2 December 2014, paragraph [96]).

190 In the July 2015 UCLL and UBA further draft determinations we reconsidered the objectives/outcomes of TSLRIC to which we gave weight, and the role that these objectives/outcomes played in our TSLRIC modelling. As explained in our further draft determination, while we kept our minds open to all potential TSLRIC objectives/outcomes, we found in practice that their greatest role was as a cross-check, by ensuring that any of our modelling decisions did not undermine these objectives/outcomes (Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 2 July 2015, paragraph [130]; and Commerce Commission "Further draft pricing review determination for Chorus' unbundled bitstream service" 2 July 2015, paragraph [130]).

191 We note that there is a slight distinction here in respect of unbundling, where Chorus competes (through the provision of the UBA service) at a similar functional level to unbundlers.

consistent with our statutory task) to ensure that we are applying TSLRIC in an appropriate manner, rather than focusing on the objectives/outcomes by themselves.

196. In summary, we have kept our minds open to the potential TSLRIC objectives/outcomes that a TSLRIC-based price may promote (as identified in Table 2.1 above). We have found these TSLRIC objectives/outcomes to be helpful in guiding the overall development of our model.

197. We have also considered these TSLRIC objectives/outcomes when making individual modelling decisions, for example, by asking whether there is anything in our individual or collective modelling decisions that undermines or is inconsistent with the achievement of these outcomes. In stepping back, we have considered whether the collection of modelling decisions has produced a model that is likely to achieve those objectives/outcomes.

**Modelling a hypothetical efficient operator to assist in determining the TSLRIC price**

198. In the following sections we explain our conceptual approach to implementing TSLRIC; the hypothetical efficient operator, its characteristics and role; the context in which the hypothetical efficient operator builds and operates the hypothetical network; and the concept of a MEA.

*The hypothetical efficient operator*

199. The TSLRIC concept is a methodology that bases wholesale prices on the economic costs that would be incurred in providing the service. Economic costs are generally considered to be the forward-looking costs that are incremental to the service in question and efficiently incurred over the long run.[192] In New Zealand, the determination of costs on a forward-looking long run basis is codified in the Act.

200. As we set out in our draft decisions, the conventional approach to implementing the concept of TSLRIC is to estimate forward-looking, long run, efficiently incurred, incremental costs by hypothesising an efficient operator building and operating a new network using a MEA to provide the relevant regulated services.[193,194,195]

192 Baumol, Ordover and Willig (1996, p.3) state that “economic costs are long-run costs that reflect forward-looking efficient investment, including a return on capital consistent with competitive capital markets”. Affidavit of William J. Baumol, Janusz A. Ordover, and Robert D. Willig (1996), Attachment to Comments filed by AT&T on May 14, 1996 in FCC Docket 96-98.

193 Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014, paragraph [149]; and Commerce Commission "Draft pricing review determination for Chorus' unbundled bitstream service" 2 December 2014, paragraph [119].

194 Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 2 July 2015, paragraph [171]; and Commerce Commission "Further draft pricing review determination for Chorus' unbundled bitstream service" 2 July 2015, paragraph [169].

195 We have taken a “core functionality” approach to determine the service that the MEA technology must be capable of providing. The “core functionality” is explained in the “The concept of a modern equivalent asset” part of this Chapter and also in Attachment B.

201. The hypothetical network is built from scratch, as if the hypothetical efficient operator is building on a blank/clean slate. The hypothetical network is unconstrained by legacy choices made regarding, for example, the design of the network, the nature of assets or the mix of technology employed. This involves the assumption that all assets within the existing network no longer exist, and modern and efficient technology is used to build and operate the hypothetical network.

202. When discussing these concepts, we note that the economic costs as measured under TSLRIC are only those that are efficiently incurred. Costs that are efficiently incurred reflect those of least cost technologies and processes, subject to meeting customer preferences, including maintaining scope and quality for the relevant services. As Professor Vogelsang noted, this implies that "outdated technologies and inefficiently incurred costs like redundant manpower are not reflected".[196]

203. We consider that there is a close linkage between the statutory definition of TSLRIC (in particular, "forward-looking" and "long run") and the concept of a hypothetical efficient operator constructing a new network with modern and efficient technology.

204. By assuming a hypothetical efficient operator that replaces the entirety of the network as if building from scratch, the conventional approach takes into account the concept of "long run" costs. Mayo (2003) makes this point in respect of TELRIC where he states that "…as a long run model, TELRIC-based cost calculations appropriately consider all plant and equipment to be malleable, and are therefore constructed from the ground up".[197]

205. Similarly, Professor Vogelsang has stated that "[t]he conventional approach to TSLRIC measurement has been to interpret "long-term" to mean that all costs are variable so that the costs measured are those of a hypothetical firm that starts from scratch".[198]

206. The conceptual paradigm of a hypothetical efficient operator building a new network on a clean slate using modern efficient technology therefore captures the efficient incremental costs that will be incurred over the long run in providing the regulated service. And to the extent that these costs are assessed based on present and ongoing future costs, then it will also account for the "forward-looking" concept of TSLRIC.

207. The economics literature also supports the proposition that the conventional implementation of the TSLRIC concept is based on the assumption of a hypothetical

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[197] John W. Mayo (2003) "Efficient Forward-Looking Telecommunications Networks as a Foundation for TELRIC" in *Pricing Based on Economic Cost: The Role and Mechanics of TELRIC*, a collection of essays published on the FCC website, available at http://apps.fcc.gov/ecfs/document/view;jsessionid=bxchRlNG6hyvDBpyF7cN20J5jv2C5G65Wvs6vV4YgTpvWGQrptYQ!-1694890999!-477673473?id=6515382451, p.1.13.

[198] Ingo Vogelsang "Current academic thinking about how best to implement TSLRIC in pricing telecommunications network services and the implications for pricing UCLL in New Zealand" 25 November 2014, paragraph [86].

network being built from scratch using modern efficient technology, as shown by the following examples.[199]

207.1 Noam states that "TSLRIC is defined as the total forward-looking cost of a hypothetical, efficient system built from scratch, using the most efficient modern technology".[200]

207.2 Kahn, in discussing TELRIC, describes it as "the costs of a hypothetical, most efficient new entrant, constructing an entire set of facilities as though writing on a blank slate".[201]

207.3 Ergas refers to the "thought experiment" underlying TSLRIC as "the hypothetical builder of a new, wholesale only, network".[202]

207.4 Bauer refers to TELRIC as "a forward-looking methodology to generate a benchmark based on the assumption that an efficient, modern network (rather than the legacy network) is in place".[203]

208. Regulators have taken a similar view in respect of the hypothetical efficient operator paradigm underlying the TSLRIC concept. For example:

208.1 The ACCC applied a TSLRIC concept to determine wholesale prices for unbundled local loop services up until 2011 when it was replaced with a building blocks methodology. In respect of the TSLRIC concept applied, the ACCC has stated:[204]

> …each time an access price is determined, the existing sunk investment (in this case the [copper access network]) is revalued on the basis of a hypothetical situation **where a brand new network is instantaneously constructed**, and replicates the existing network's service potential, **but uses best-in-use technology** based on forecast demand. The 'cost' of building this hypothetical replacement network is therefore the 'asset base' from which access prices are determined.

208.2 The Irish Commission for Communications Regulations (ComReg) previously set wholesale prices for unbundled local loop services using a conventional application of a bottom-up long run average incremental cost (BU-LRAIC) model (ComReg has recently moved to an approach based on

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199 The references to the economics literature below are intended to illustrate what the authors consider to be the conceptual framework underlying the TSLRIC/TELRIC concepts. The citations should not be taken to indicate that we either agree or disagree with the remaining arguments raised in the papers cited.

200 Eli M. Noam (2001), *Interconnecting the Network of Networks*, Massachusetts Institute of Technology, Massachusetts, p.95.

201 Alfred E. Kahn (2001), *Whom the Gods Would Destroy or How Not to Deregulate*, AEI-Brookings Joint Center for Regulatory Studies, Washington D.C., p.4.

202 Henry Ergas (2009) "Time Consistency in Regulatory Price Setting: An Australian Case Study" *Review of Network Economics*, 8(2), 153-163, p.160.

203 Johannes M. Bauer (2005) "Unbundling Policy in the United States: Players, Outcomes and Effects" *Communications & Strategies*, 57, 59-82, p.65.

204 ACCC (2009) "Assessment of Telstra's Unconditioned Local Loop Service Band 2 monthly charge undertaking" Final decision, August, p.54, emphasis added.

recommendations by the European Commission, which we discuss further below). Such a model follows the same general principles used for TSLRIC/TELRIC modelling. ComReg has stated in regards to the conventional approach that it used that "[a] principal characteristic of a model of this nature is that it allows for the cost of a newly designed modern efficient network" and that "ComReg believes that the BU-LRAIC methodology should reflect assets of a new network". [205,206]

209. Similarly, in a 2013 submission on behalf of Vodafone to MBIE, Network Strategies summarised standard practice in respect of TSLRIC modelling:[207]

> Regulators typically develop a bottom-up economic/engineering cost model to estimate TSLRIC prices. This involves estimating the cost of replicating the functionality of the network if it had to be built from scratch today. Current market or replacement cost is applied, the network is dimensioned to meet current (and forecast) demand and the number and type of modern equivalent assets (MEA) that need to be costed are estimated.

210. Chorus agreed that "a conventional approach to TSLRIC is consistent with the statutory purpose and the conclusion of the Court of Appeal in its recent consideration of the UBA initial pricing principle".[208] Chorus also agreed that conventional TSLRIC requires consideration of a new network built from scratch.[209]

211. Spark criticised the dates of the above citations, and stated that they do not reflect "modern TSLRIC thinking".[210]

212. However, we note that the same view is expressed in the more recent citations referred to above, such as that of Network Strategies (Spark's consultants in the current FPP process) in 2013, and Professor Vogelsang in 2014. In addition, Tardiff (2015) has referred to the TELRIC methodology as basing "wholesale prices on a hypothetical incumbent that served the entirety of its volumes with completely new equipment".[211]

213. There also seems to be overall agreement on the core elements of this approach. As Wigley and Company submitted, "the one element of common ground between

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205 ComReg (2010) "Response to Consultation Documents No. 09/39 and 09/62" Decision No. 01/10, 9 February, paragraph [1.11].

206 *Ibid*, paragraph [4.177].

207 Network Strategies (2013) "Final report for Vodafone New Zealand: Review of the Telecommunications Act 2001" 13 September, p. 24.

208 Chorus "Cross-submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services (2 July 2015)" 24 September 2015, paragraph [7].

209 Chorus "Cross-submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services (2 July 2015)" 24 September 2015, paragraph [8].

210 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" 13 August 2015, paragraph [86].

211 Timothy Tardiff (2015), "Prices based on current cost or historical cost: How different are they?", *Journal of Regulatory Economics*, 47, 201-217, p. 202.

Chorus and our RSP and consumer representative clients is that[212] 'the historic costs of network deployment … are irrelevant in calculating a forward-looking long run incremental total cost of the service … forward-looking costs reflect the costs that a network operator would incur if it built a new network today using assets collectively referred to as the modern equivalent asset'".[213]

214. Submitters have also generally supported, in broad terms, the use of the hypothetical efficient operator as a tool to implement our statutory task. For example:

214.1 Chorus submitted that the hypothetical efficient operator concept is a tool used to determine the TSLRIC price of providing the regulated service;[214]

214.2 Spark supported the hypothetical efficient operator approach as pointing to a solid foundation for the TSLRIC model;[215]

214.3 Vodafone submitted that "there is general agreement that TSLRIC must reflect the price of a hypothetically efficient operator (HEO) deploying a network using modern equivalent assets (MEA)";[216] and

214.4 Wigley and Company submitted that "the whole idea is not to model the incumbent's network".[217]

215. In summary, we have adopted the conventional approach to TSLRIC of modelling a hypothetical efficient operator constructing a new network with modern and efficient technology as a tool in implementing TSLRIC. We consider that this approach gives effect to the statutory language, is consistent with the TSLRIC objectives/outcomes and assists in developing an overall coherent model that will promote the section 18 purpose statement. We have, however, also remained open to revising or departing from this approach in light of submissions on particular issues as discussed throughout this determination.

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212 Quoting Chorus (Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services (2 July 2015)" 13 August 2015 at [62]).

213 Wigley and Company "Cross-submission in relation to UCLL and UBA draft pricing review determinations" 24 September 2015 at [6.11].

214 Chorus "Submission for Chorus in response to Draft Ricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and Process and Issues Update Paper for the UCLL and UBA Pricing Review Determinations" 20 February 2015, paragraphs [101-102].

215 Spark "UBA and UCLL FPP pricing review draft decision" 20 February 2015, paragraph [36].

216 Vodafone "Submission on process paper and draft pricing review determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and comments on Analysys Mason's TSLRIC models" 20 February 2015, at executive summary "ii)".

217 Wigley and Company "Submission on draft pricing review determination for UBA and UCLL services" 20 February 2015, paragraphs [5.18e] and [2.31].

*The hypothetical efficient operator and "efficiency"*

216. An important component of the hypothetical efficient operator, and indeed the TSLRIC concept, is "efficiency". However, there are different efficiency considerations that we have regard to.

217. For example, the hypothetical efficient operator achieves productive efficiency by minimising its costs in the production of goods and services, subject to factors such as scope, quality and technological performance. That is, subject to meeting customer preferences, the hypothetical efficient operator is assumed to adopt least cost technologies and processes, and to optimise its network deployment to efficiently meet expected demand.

218. In addition to productive efficiency, we are also required by section 18(2) to consider other efficiencies that may result from our decisions. As identified earlier, this includes dynamic efficiency as well as static efficiency. Dynamic efficiency permits an inter-temporal aspect to assessing efficiency, so that we should consider aspects such as lifetimes and forward-looking performance.

219. In assessing whether particular modelling decisions are likely to promote outcomes that are dynamically efficient, we have been conscious of the role played by the price we are setting. As well as being the price at which access seekers will acquire the UCLL service itself, it forms an element of the UBA service and flows through into the UCLFS service. It is a nationwide price, and it affects investment and consumption decisions not just by Chorus, but also by access seekers and consumers of telecommunications services.

220. We also consider efficiency in terms of the outcomes that TSLRIC can achieve, as provided by the various TSLRIC objectives/outcomes identified earlier (such as the incentive for efficient investment).

221. In terms of our application of these concepts, Spark submitted that the "most efficient" means the "cheapest" technology.[218] Spark also submitted that we have "allowed economic concepts to exclude the application of the clear statutory purpose".[219] In particular, Spark submitted that a clear "efficiency objective" is established in the definition of TSLRIC and section 18, and that we have failed to recognise this in our decision-making process.[220,221]

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[218] Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" 13 August 2015, paragraph [42(b)].

[219] Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" 13 August 2015, paragraph [64(b)].

[220] Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" 13 August 2015 paragraph [12] of Executive Summary.

[221] Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" 13 August 2015, paragraph [68].

222. Russell McVeagh stated that "section 18(2) guides the Commission to ensure that only efficient costs are included in its cost model".[222] To the same effect, Wigley and Company submitted that we must first determine the "efficient cost", which it equates with "least cost", before considering any section 18 efficiencies.[223]

223. On the other hand, Chorus and other submitters argued that we applied the concept of efficiency in an "unrealistic" manner.

    223.1 "The Commission is proposing to use unrealistic hypothetical costs which are significantly below what any operator could achieve building a nationwide network in New Zealand today".[224]

    223.2 "The much lower prices proposed by the Commission are based on hypothetical choices that are disconnected from the reality in New Zealand, compounded by unrealistic efficiency discounts".[225]

    223.3 "The Commission's draft determination has used an impossibly high efficiency standard not anchored on real world data".[226]

224. We address the issue of whether particular modelling decisions are unrealistic or otherwise depart from the standard of productive efficiency as they arise in the following Chapters and Attachments.

225. The point we address here is the submissions by Spark, Russell McVeagh and Wigley and Company that we have failed to give effect to the efficiency objective in section 18(2) and that any modelling decision that does not produce the lowest cost possible is inefficient by definition.

226. These submitters appeared to have misinterpreted our framework and taken a one-dimensional approach to efficiency.

227. Specifically, we note the following points.

    227.1 Our immediate task is to apply TSLRIC. The statutory task is informed by section 18 considerations. Section 18 considerations cannot override the obligation to first focus on the application of TSLRIC.

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222 Russell McVeagh "Chorus submission on further draft UCLL and UBA pricing reviews", 24 September 2015, paragraph [28(c)] (emphasis added).

223 Wigley and Company "Submission on draft pricing review determination for UBA and UCLL services" 20 February 2015, paragraph [5.18].] and Wigley and Company "Submission on Further Draft Pricing Review UCLL and UBA Determinations" 13 August 2015, paragraph [4.10].

224 Chorus "Cross-submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services (2 July 2015)" 24 September 2015, p. 3 (emphasis added).

225 Chorus "Cross-submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services (2 July 2015)" 24 September 2015, p. 4 (emphasis added).

226 L1 Capital, Cross-submission dated 24 September 2015, p. 4 (emphasis added).

227.2 The concept of efficiency (including both dynamic and static efficiency) is a core element of our regulatory framework. In particular, we have given effect to section 18(2) which requires us to consider the efficiencies that will result, or will be likely to result, from our decision-making process.

227.3 Most of the TSLRIC objectives/outcomes that we consider when exercising our judgement contain efficiency elements (eg, efficient investment, efficient entry in downstream (retail) markets, efficient use of infrastructure and efficient cost recovery).

227.4 Our modelling decisions are consistent with these objectives/outcomes as shown by the following examples.

227.4.1 The network deployment decision is consistent with the efficient cost recovery and incentives for cost minimisation objectives/outcomes.

227.4.2 The asset valuation decision is consistent with efficient cost recovery (expectation of recovering efficient forward-looking costs), and consistent with promoting efficient build-buy decisions by access seekers.

227.4.3 The decision on the allowance for certain asymmetric risks that the hypothetical efficient operator is likely to face is consistent with efficient cost recovery and incentives for minimising cost.

227.4.4 The decisions on capital contributions are consistent with the efficient cost recovery and efficient investment objectives/outcomes.

227.5 We do not agree that promoting efficient outcomes always means the same as “least cost” or lowest possible cost. Section 18(2) relates to efficiencies that “will result” or are outcomes of our decision-making. That is, we need to consider whether our individual and collective modelling decisions will yield efficient outcomes. This can be distinguished from determining whether an individual modelling choice represents an efficient cost or an efficient firm’s decision. While matters such as network deployment and optimisation may principally involve productive efficiency, decisions that affect incentives to invest (such as the asset valuation methodology) relate to dynamic efficiency. We are not aware of any international precedent that ignores dynamic efficiency considerations in TSLRIC modelling. Further, we do not consider that such an approach would be consistent with the section 18 purpose or the TSLRIC objectives/outcomes.

227.6 Nor do we agree that the Act contemplates a separate exercise of determining the “efficient cost” of the network before considering whether section 18 requires an adjustment to that price so as to promote static or dynamic efficiencies. The task of modelling the network of a hypothetical efficient operator must be guided by the purpose of the Act (including the need to take into account dynamic and static efficiencies). That purpose will not necessarily require that the lowest cost approach be adopted at each and every step.

228. In summary, we have postulated a hypothetical efficient operator that is efficient in the sense that it adopts least cost technologies and processes, taking into account performance, capacity and other considerations. However, in making other modelling choices (such as asset valuation or considering whether to make an adjustment from the central TSLRIC estimate) we are dealing with efficiency concepts that cannot be reduced to a "least cost" requirement.

*The hypothetical efficient operator compared to an efficient Chorus*

229. Submitters have generally supported the hypothetical efficient operator approach, but they differed in their views in how the hypothetical efficient operator concept is characterised for the purpose of the TSLRIC modelling. For example, Chorus characterised the hypothetical efficient operator as a replacement for Chorus without access to Chorus' assets.[227] In contrast, Network Strategies characterised the hypothetical efficient operator as an operator that would seek to re-use assets that were available.[228]

230. We note that alternatives to modelling a hypothetical efficient operator were open to us. These included modelling an "efficient Chorus", that is an entity that had access to Chorus' assets but which is assumed to make efficient investment and operational decisions.

231. While we have kept an open mind on the characteristics of the hypothetical efficient operator, we continue to believe that adopting the conventional approach of hypothesising an efficient operator building and operating an entirely new network using modern assets is more appropriate for this FPP.

232. The concept of the hypothetical efficient operator helps us to model a network that is not constrained by the legacy decisions of the incumbent.

232.1 We believe that our hypothetical efficient operator concept is the most appropriate approach to implementing TSLRIC. In particular, we consider that this approach is the best fit with the statutory requirement to model "forward-looking" and "long run" costs (which are relevant elements of our statutory task), and consistent with the conventional approach for implementing TSLRIC (which is the best way of implementing our statutory task).

232.2 An "efficient Chorus" approach (ie, hypothesising an entity that has access to Chorus' assets) might lead to irrational results. For example, there seems to be no reason to limit that approach to only certain assets, such as trenches and ducts. If the "efficient Chorus" had the existing copper network at its

227 Commerce Commission "UBA and UCLL pricing review determination conference transcript" 15-17 April 2015, p. 66.

228 Commerce Commission "UBA and UCLL pricing review determination conference transcript" 15-17 April 2015, p. 69.

disposal, then this would tend towards a cost model based on the use of that network. That is, the logic of having assets available for re-use may result in a cost model that tended toward the short-run marginal cost of operating the existing copper network. We do not think that such a result would be recognisable as a TSLRIC model since it would omit fixed costs, not involve optimisation and not send appropriate build/buy signals. No party has suggested that this is the correct outcome of the FPP.

232.3 A relevant TSLRIC objective/outcome for this exercise is “efficient investment (both by the service provider and by access seekers)”. As we explain further below, the approach we have adopted for determining TSLRIC can provide neutral incentives for efficient “build/buy” decisions by access seekers, in terms of buying the wholesale service from the access provider (ie, Chorus), or building an alternative bypass network, where it is efficient to do so.

232.4 The conventional approach to TSLRIC is typically seen by regulators and economists as being consistent with the competitive market standard.[229] This is consistent with the section 18 purpose statement of promoting competition for the long-term benefit of end-users. In this regard, we agree with the following statement by the Australian Competition Tribunal in the *Telstra* case on why the competitive market standard is consistent with efficiency and promoting competition:[230]

> A long-established body of economic analysis supports the view that a competitive price sends the right signals for promoting competition in markets for services provided by access seekers by means of their use of the [unbundled local loop service]…; and for the economically efficient use of, and investment in, the infrastructure…

232.5 As mentioned above, the Court of Appeal recently commented, in Chorus’ challenge of our IPP determination for the UBA service, that “the TSLRIC model provides an estimate of the costs of an efficient access provider over a sufficient period of time (long run), on a “forward-looking” basis (reflecting the notional costs to an operator if it built a new network) *rather than of Chorus’s actual costs*” (emphasis added).[231]

233. We also consider that modelling a hypothetical efficient operator will promote the section 18 purpose statement. In particular, we consider build/buy incentives to be important in the New Zealand context and that the hypothetical efficient operator concept is the best tool for ensuring that appropriate incentives are set.

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229 Ingo Vogelsang “Current academic thinking about how best to implement TSLRIC in pricing telecommunications network services and the implications for pricing UCLL in New Zealand” 25 November 2014, paragraph [46], referring to the objectives of “classical” (which we refer to here as conventional) TSLRIC. See also the FCC’s description of its TELRIC methodology, which is consistent with the conventional approach to TSLRIC, and is referred to as replicating “to the extent possible, the conditions of a competitive market” (FCC “In the matter of implementation of the Local Competition Provisions in the Telecommunications Act 1996” CC Docket No. 96-98, August 1996, paragraph [679]).

230 *Application by Telstra Corporation Ltd* [2010] ACompT 1 at [191].

231 *Chorus v Commerce Commission* [2014] NZCA 440 at [30].

234. In terms of the importance of build/buy incentives we note the points below.

234.1 All parties in the present process appeared to accept that the copper network will remain relevant in significant areas of the country for some time. Therefore, in New Zealand, build versus buy incentives remain relevant.

234.2 There has been competitive bypass of parts of Chorus' UCLL network by LFCs (using underground and aerial infrastructure). Further bypass may emerge as a result of the Government's planned expansion of UFB. In terms of the prospect of new entry, Crown Fibre Holdings has contracted with four parties to deploy UFB to 75% of New Zealanders:[232]

234.2.1 Northpower Limited (1.6% of UFB total coverage);

234.2.2 Waikato Networks Limited (13.7% of UFB total coverage);

234.2.3 Enable Services Limited (15.3% of UFB total coverage); and

234.2.4 Chorus Limited (69.4% of UFB total coverage).

234.3 As it can be seen, LFCs (other than Chorus) cover approximately 20% of New Zealand (ie, 30% of 75%).

234.4 We also note that the UFB extension will increase the total coverage of the UFB to at least 80%.[233]

235. Our conventional approach sets appropriate incentives for access seekers to buy the regulated service from Chorus, or build an alternative bypass network, where it is efficient to do so. It is not clear that an "efficient Chorus" approach provides these same incentives. In particular, by reflecting components of Chorus' existing network, the efficient Chorus approach would only provide build/buy incentives where those same parts of Chorus' network could be re-used, regardless of whether or not it is efficient to do so or whether an entity would be able to obtain access to those parts of Chorus' network.

236. For all of these reasons, we have concluded that modelling a hypothetical efficient operator building and operating an entirely new network using modern assets is the appropriate approach for this FPP.

*The role of the hypothetical efficient operator concept*

237. Spark argued that our "interpretation of a 'conventional' TSLRIC framework pre-determines some of the key individual modelling choices it [we] must make".[234]

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232 Information available at http://www.crownfibre.govt.nz/crown-partners/ (last visited 27 November 2015).

233 Information available at http://www.crownfibre.govt.nz/ufb-initiative/ultra-fast-broadband-extension/ (last visited last visited 27 November 2015).

234 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" 13 August 2015, paragraph [12].

Related to this, Spark suggests that our adoption of a conventional approach is a "key determinant" of our modelling choices.[235]

238. We disagree that our interpretation of TSLRIC has "pre-determined" any of our modelling decisions.

239. As we explained in the July 2015 UCLL and UBA further draft determination papers, while the concept of a hypothetical efficient operator building and operating a new network from scratch is important to a number of our modelling decisions, we have also remained open to revising this approach.[236]

240. We also consider that the hypothetical efficient operator concept fits well with our statutory task, the TSLRIC objectives/outcomes and the section 18 purpose statement.

241. We also endeavoured to develop a model that is internally consistent.[237] This consistency was assisted by the use of the hypothetical efficient operator concept as an organising principle. However, in making individual modelling decisions and in making our determination overall, we have:

241.1 considered each decision on its merits;

241.2 remained open to taking an approach even if it did not fit with the hypothetical efficient operator, if this was justified in the circumstances; and

241.3 remained open to adopting a different organising principle.

[235] Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" 13 August 2015, paragraph [11] of Executive Summary.

[236] Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 2 July 2015, paragraph [184]; and Commerce Commission "Draft pricing review determination for Chorus' unbundled bitstream service" 2 December 2014, paragraph [183].

[237] As explained in the relevant Attachments, we recognise that there are degrees of consistency and that a departure from a guiding principle (or revisiting a guiding principle) might be justified in particular circumstances.

242. We have also not used the conventional approach to TSLRIC as a “key determinant” of our modelling choices, as suggested by Spark. Rather, our modelling choices are informed by several elements, as explained in this Chapter.

243. Spark also appeared to suggest that we considered “conventionality” as a principle in its own right.[238] This is not correct – we use “conventionality” as a means of describing a particular way of implementing TSLRIC, and (as we explain in this Chapter) we have considered whether that implementation approach is appropriate relative to alternative approaches.[239]

244. Chorus submitted a “HEO’s business case” that purports to show that a financial analysis based on our TSLRIC modelling “doesn’t stack up”.[240] We reject the intent of Chorus’ analysis.

245. In our December 2014 UCLL and UBA draft determinations and in the July 2015 UCLL and UBA further draft determinations we noted that the conventional approach to TSLRIC “is not intended to be a business plan for building and operating a high-speed nationwide network replacement accounting for resource pressures”.[241,242]

246. The purpose of our TSLRIC exercise is to set robust and representative wholesale prices for the regulated services in accordance with the section 18 purpose statement. As supported by submitters, we have abstracted from reality, eg, the hypothetical efficient operator has sufficient access to resources and instantaneously commissions a national network that replaces existing fixed telecommunications networks. We remain of the view that our modelling does not need to provide a business plan for a nationwide replacement real telecommunications network.

*The context in which the hypothetical efficient operator builds and operates the hypothetical network*

247. We consider that we do not need to specify in too much detail the exact circumstances in which our hypothetical efficient operator will build a replacement network, when the intent of this paradigm is simply to help us identify forward-

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238 See, for example, Spark “Further draft pricing review determination for Chorus’ UBA and UCLL services” 13 August 2015, paragraph [20], suggesting that our approach gives weight to “conventionality”.

239 The conventional approach is also referred to by others as the “classical” approach (see Ingo Vogelsang, “Current academic thinking about how best to implement TSLRIC in pricing telecommunications network services and the implications for pricing UCLL in New Zealand” 25 November 2014, section 3; and Sapere “Report for Chorus Limited - Cross-submission on UCLL and UBA Price Determination Issues” 22 September 2015, paragraph [67]) and the “traditional” approach (see Spark “Analytical framework for considering an uplift to FPP prices” 11 May 2015, paragraph [86]).

240 Chorus “Cross-submission for Chorus in response to Draft Pricing Review Determinations for Chorus’ Unbundled Copper Local Loop and Unbundled Bitstream Access Services (2 July 2015)” 24 September 2015, p. 2.

241 Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014, paragraph [156]; and Commerce Commission "Draft pricing review determination for Chorus' unbundled bitstream service" 2 December 2014, paragraph [126].

242 Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 2 July 2015, paragraph [184]; and Commerce Commission "Draft pricing review determination for Chorus' unbundled bitstream service" 2 December 2014, paragraph [183].

looking long run incremental costs. Even so, some elements of the hypothetical efficient operator thought experiment do need considering, as they help us understand the nature of the costs that are to be incurred. We set out these considerations in this section.

Real world information may be a relevant consideration for our modelling decisions

248. Real-world constraints exist in the hypothetical world in which the network is replaced. These constraints are based on what, in our view, are the constraints that would be faced by a hypothetical efficient operator building a new network in New Zealand. For example, we consider it reasonable that the hypothetical efficient operator would be subject to the TSO obligations, and this obligation constrains the nature of our TSLRIC modelling to some extent. Further explanation is provided in Attachment K – Capital Contributions.

249. Yet we note that not all aspects of the real world are typically reflected in a modelling environment. For example, in the present circumstances we make a simplifying assumption that the hypothetical efficient operator has sufficient access to land, labour, capital and other resources to construct and operate its network, without inducing higher prices for these resources.

250. The hypothetical efficient operator is not constrained by the legacy decisions of the incumbent. This applies, for example to network technology, network design, the nature of the assets and cost structures. The characteristics and costs of the incumbent are therefore not a necessary consideration in regards to the new network that is built and operated for the purposes of determining forward-looking efficient costs.

251. Baumol, Ordover and Willig state that “proper TSLRIC estimates do not simply accept the architecture, sizing, technology, or operating decisions of the ILECs [incumbent] as bases for calculating TSLRIC”.[243] The logic is that the network built by the incumbent, and the costs that it incurs, are not necessarily efficient, and that to take these as given would be inconsistent with the TSLRIC approach of reflecting efficient forward-looking costs.

252. Having said that, real-world information may be used to inform our assessment of constraints a hypothetical efficient operator would likely face and decisions it would likely take. For example, in some circumstances, decisions made by Chorus and others in the real world, to the extent that these are considered efficient, may indicate the hypothetical efficient operator’s likely response to the same issues.

[243] “Affidavit of William J. Baumol, Janusz A. Ordover, and Robert D. Willig (1996), Attachment to Comments filed by AT&T on May 14, 1996 in FCC Docket 96-98, at p.9. See also, for example, Gregory L. Rosston and Roger G. Noll (2002) “The Economics of the Supreme Court’s Decision on Forward Looking Costs” *Review of Economics*, 1(2), 1-13, at p.3, who state that “According to the TELRIC method, the price of a[n] [unbundled network element] should be based on the cost of building an efficient network using the best available technology, rather than the actual cost of the incumbent’s network (or any other network that was built in the past)”.

253. Indeed, many of our decisions involve matters that are, to some extent, objectively measurable. In these cases we believe it is appropriate to use data and evidence, which may include data from Chorus and others, to determine our best estimate of what an objective value is, rather than relying on subjective assertions or speculation. This does not detract from the approach of the hypothetical efficient operator concept; rather, it uses real-world information to inform our assessment of this concept. We discuss the use of real-world data in more detail later in this Chapter in respect of evidential matters.

254. Spark agreed that the hypothetical efficient operator "must not lock-in historic asset classes or network design choices that would be regarded as economically inefficient in a deployment today".[244] Spark also submitted "investments and decisions made in the past, do not necessarily reflect those of the future".[245]

255. Vodafone submitted that "real world information can inform the Commission's assessment of the constraints on an HEO and its likely decisions", and submitted that "it is also necessary to extrapolate from real world information to identify the choices that an efficient HEO would make".[246]

256. We agree with Spark and Vodafone. We agree that we can take into account real-world information (including Chorus') when we have reasons to believe that it is efficient.

257. For instance, as further explained in this determination, we considered Chorus' information when determining: the hypothetical efficient operator's network deployment (we also used LFCs' data); asset lives; price trends (Chorus data has been considered where appropriate only); capital contributions; opex (where we used Chorus' data as an initial consideration and applied an efficiency adjustment in some instances); and NRC (where we have also used Chorus data and adjusted for efficiencies).

The hypothetical efficient operator environment

258. The economics literature on TSLRIC/TELRIC referred to above considers that only the telecommunications fixed network is being built from scratch.

259. In determining long run incremental costs for the fixed telecommunications network that is built from scratch, it is assumed that Chorus' copper network, LFCs' infrastructure and Chorus' UFB infrastructure do not exist. As a consequence, Chorus' and LFCs' demands are served by the hypothetical efficient operator, and the hypothetical efficient operator does not re-use or share their assets. Attachments A and E contain further explanation on this point.

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[244] Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" 13 August 2015, paragraph [42(c)].

[245] Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" 24 September 2015 at [30].

[246] Vodafone "Submission to the New Zealand Commerce Commission Further Draft Pricing Review Determination for Chorus' Unbundled Copper Local Loop Service and Further Draft Pricing Review Determination for Chorus' Unbundled Bitstream Access Service" 13 August 2015, paragraph [A4.5].

260. Our task is to determine a robust representative price for a nationwide copper network. We consider that to assume that the existing LFCs' infrastructure and Chorus' UFB infrastructure existed in the hypothetical environment would not assist in achieving these objectives. In particular, it does not seem plausible in this exercise to assume that the hypothetical efficient operator's network and the LFC/Chorus UFB networks would co-exist, given the nature of the UFB infrastructure as a government-sponsored overbuild of the existing access network implementing modern technology. We also consider that such an assumption may interfere with setting efficient build/buy signals, which would not promote the section 18 purpose statement.

261. However, nothing in the literature suggests that infrastructure of other networks (eg, mobile networks, HFC networks, electricity networks) is also being built; rather, it appears that such infrastructure remains in place.

262. Accordingly, Attachment D considers whether the hypothetical efficient operator could share certain assets (eg, mobile towers, underground or overhead infrastructure) with other networks that already exist.

263. We consider also that, to the extent that it is relevant to our modelling choices, the current regulatory and legislative environment facing the hypothetical efficient operator should generally reflect real-world circumstances.

264. We consider that the Resource Management Act (RMA) 1991, as amended, is a relevant consideration for this determination in terms of costs incurred by the hypothetical efficient operator.[247] We have identified the areas where we consider such costs would arise, including trenching and aerial deployment. As explained further in the relevant Attachments, based on the assumptions that RMA consent would be sought where relevant and granted, we have made our best estimate of the costs associated with obtaining the relevant consents.

265. Similarly, the New Zealand Health and Safety regulations are a relevant consideration in this determination, particularly the Health and Safety in Employment Act 1992 (as amended), and the Health and Safety at Work Act 2015.

266. We consider that the hypothetical efficient operator should conduct its operations in accordance with the relevant New Zealand industry codes of practice and standards. We discuss this in more detail in Attachment J with respect to trenching.

267. As explained in Chapter 1, we have not taken into account proposed changes to the Telecommunications Act because we are required to apply the legislation as it currently stands.

[247] The RMA requires local Councils to ensure that environmental impacts are managed sustainably. To comply with this obligation, each local Council has a set of rules. These rules typically differ to some degree as the rules relate specifically to the relevant local areas and the costs associated with obtaining consents or planning permission also vary.

268. Separately, some submitters suggested that we should take into account reforms to other aspects of the regulatory environment (beyond the Telecommunications Act), such as amendments to the National Environmental Standards for Telecommunications Facilities, in determining the hypothetical efficient operator's environment. While we are not required to assume that the existing regulatory environment will remain static and are open to considering potential developments, in our view it would be too speculative to rely on those changes at this stage.[248]

269. As Chorus submitted in relation to amendments to the National Environmental Standards for Telecommunication Facilities, "the proposed amendments to the NESTF are not in place and there is no guarantee they will be implemented as currently being discussed".[249]

*The concept of a modern equivalent asset*

270. An important aspect of our approach for implementing TSLRIC is the concept of the MEA. The MEA identifies assets that an efficient operator would deploy today to provide the service in question.

271. Using a MEA allows prices to reflect the costs of modern and efficient technology. This is consistent with the definition of TSLRIC, particularly the requirement to estimate costs on a forward-looking basis. Identifying modern and efficient technology that is used to provide the regulated service provides us with an appropriate basis for reflecting the current and ongoing future costs of providing that service.

272. The use of a MEA is also consistent with a number of the TSLRIC objectives/outcomes we have identified earlier in this Chapter. Allowing prices to reflect the costs of modern and efficient technology provides incentives for investment to occur in similar technologies where it is efficient. In a similar manner, a MEA is consistent with providing incentives for Chorus to minimise its costs in line with those that would be associated with modern and efficient technology, and allowing for the recovery of costs that are efficiently incurred.

273. The concept of a MEA is also a key component of the conventional approach to implementing the concept of TSLRIC, which as discussed earlier in this Chapter estimates forward-looking, long run, efficiently incurred, incremental costs by hypothesising an efficient operator building and operating a new network using modern and efficient assets.

274. An alternative to the MEA concept is to assume that the assets providing the regulated service are the existing assets of the incumbent operator. This is the

[248] On 24 September 2015, the Communications Minister and the Minister for the Environment announced proposed changes to the National Environmental Standards following consultation earlier in the year (see http://www.beehive.govt.nz/release/new-rma-standard-streamline-telecommunications-upgrades). However, without firm information about the form and timing of any proposed changes, we consider that the proposed changes remain too speculative to take into account in the present process.

[249] Chorus "Cross-submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services (2 July 2015)", paragraph [47]

approach implicit in the cost model submitted by Chorus as part of our consultation process, which uses Chorus' actual existing network assets to determine TSLRIC-based prices (see Attachment Q – Chorus' cost model for a discussion of this model).

275. We consider that such an approach would not be consistent with the requirement to estimate efficient costs on a forward-looking basis, as legacy assets are unlikely to be the most efficient technology, and their costs may not be efficiently incurred. This is contrary to the efficiency-based TSLRIC objectives/outcomes, the requirement to consider efficiencies in section 18(2) and the conventional approach to implementing the concept of TSLRIC.

276. Submitters generally agree that it is appropriate to undertake a thought experiment using hypothetical tools such as the concept of MEA (Spark,[250] Chorus,[251] Vodafone,[252] Wigley and Company,[253] and WIK).[254] Some submitters have also specifically identified the concept of a MEA as being a key requirement of the TSLRIC concept. For example, Network Strategies submitted:[255,256]

> One of the key requirements of a TSLRIC model is that it represents an efficient network utilising modern efficient assets (MEA) as deployed by a hypothetical operator.

277. Accordingly, we consider it is appropriate to adopt the concept of a MEA as a tool in implementing TSLRIC.

278. We discuss our considerations in selecting a MEA for the UCLL service later in this determination (Attachment B). This includes considering the functional and

250 Spark "UBA and UCLL FPP pricing review draft decision" 20 February 2015, paragraph [36]; and Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" 13 August 2015, paragraph [25].

251 Chorus "Submission for Chorus in response to Draft Ricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and Process and Issues Update Paper for the UCLL and UBA Pricing Review Determinations" 20 February 2015, paragraphs [101-102].

252 Vodafone "Submission on process paper and draft pricing review determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and comments on Analysys Mason's TSLRIC models" 20 February 2015, at executive summary "ii)"; and Vodafone "Submission to the New Zealand Commerce Commission Further Draft Pricing Review Determination for Chorus' Unbundled Copper Local Loop Service and Further Draft Pricing Review Determination for Chorus' Unbundled Bitstream Access Service" 13 August 2001, paragraph [A4.1],

253 Wigley and Company "Submission on draft pricing review determination for UBA and UCLL services" 20 February 2015, paragraphs [5.18e] and [2.31].

254 WIK-Consult "Submission In response to the Commerce Commission's "Further draft pricing review determination for Chorus' unbundled bitstream access service" and "Further draft pricing review determination for Chorus' unbundled copper local loop service" including the revised cost model and its reference documents, paragraph [172].

255 Network Strategies "Final report for Spark New Zealand and Vodafone New Zealand - Commerce Commission draft determination for UCLL and UBA" CONFIDENTIAL, 20 February 2015, p. 75. Note that Network Strategies used the term MEA to refer to a "modern efficient asset", whereas we refer to it as a "modern equivalent asset". This does not alter the intent of the point Network Strategies was making.

256 See also WIK-Consult "Submission in response to the Commerce Commission's Draft pricing review determination for Chorus' unbundled bitstream access and unbundled copper local loop services including the cost model and its reference documents" CONFIDENTIAL, 20 February 2015, paragraph [460].

performance requirements of the hypothetical network to ensure that it is sufficiently equivalent (in a functional sense) to Chorus' UCLL network to produce a price that is robust and representative.

*The European Commission is moving away from the conventional approach to TSLRIC*

279. We have noted that the implementation of TSLRIC using a hypothetical efficient operator building an entirely new network with modern assets is the *conventional* approach. We noted in the July 2015 UBA and UCLL further draft determinations that more recently, however, some regulators have been moving away from that approach.[257] In particular, the European Commission (EC) has recommended a costing methodology to be applied by European regulators that "should not assume the construction of an entirely new civil infrastructure network for deploying an NGA [next generation access] network".[258] Rather, the EC approach assumes that the hypothetical efficient operator can re-use certain legacy civil engineering assets when building a replacement network.

280. The EC's rationale for moving away from the conventional approach to TSLRIC appears to be twofold:

280.1 its recommended approach is regarded as sending the appropriate pricing signals for efficient market entry, reflecting a competitive process in the European context in which new entrants would be unlikely to replicate civil engineering infrastructure;[259] and

280.2 the approach is regarded by the EC as avoiding the risk of over-recovery by the incumbent of costs of re-useable legacy civil infrastructure, consistent with the EC recommendation that regulated access to such assets be provided, as discussed below.[260]

281. As a preliminary point, we note that neither the TSLRIC concept nor the valuation approach regarding civil engineering infrastructure are prescribed by European law.[261] While the Access Directive requires national regulatory authorities to consider imposing price control where effective competition is lacking, it does not

257 Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 2 July 2015, paragraph [193]; and Commerce Commission "Further draft pricing review determination for Chorus' unbundled bitstream service" 2 July 2015, paragraph [192].

258 European Commission "Commission recommendation of 11.9.2013 on consistent non-discrimination obligations and costing methodologies to promote competition and enhance the broadband investment environment" 11 September 2013, paragraph [32].

259 European Commission "Commission staff working document – Impact assessment accompanying the document Commission recommendation of 11.9.2013 on consistent non-discrimination obligations and costing methodologies to promote competition and enhance the broadband investment environment" 11 September 2013, p. 43 and 82.

260 European Commission "Commission recommendation of 11.9.2013 on consistent non-discrimination obligations and costing methodologies to promote competition and enhance the broadband investment environment" 11 September 2013, recommendation [35].

261 We also note that the New Zealand Parliament did not direct us to follow the EC approach.

mandate a particular pricing methodology.[262] In making its recommendation, the EC had discretion in designing an appropriate methodology.

282. By contrast, we are required to apply TSLRIC.[263] This is not to suggest that we are bound by conventional economic underpinnings of TSLRIC. Indeed, we have remained open to both the EC approach and the conventional approach to TSLRIC. However, the EC may have more flexibility than we do to move away from what is considered to be a TSLRIC approach. As we note below, Professor Vogelsang has suggested that it is debatable whether the EC approach is within the limits of the TSLRIC concept. As well as being bound to apply TSLRIC, we are bound to follow the statutory requirement to determine the "forward-looking costs over the long run" of the regulated service.

283. In this context the EC's first rationale for moving away from the conventional approach to TSLRIC appears to be based in part on the desire to promote private investment in high-speed broadband via next generation networks. The EC's approach is based on its view that such investment is expected to occur through the roll-out of a next generation network (eg, fibre) with re-use of the incumbent's civil engineering assets. In the European Union (EU), this process is yet to (materially) occur.

284. We consider, however, that we should take into account the circumstances in New Zealand, and the EC situation (in respect of the hypothetical efficient operator concept and re-use of civil engineering assets) is distinguishable to New Zealand in two important ways.

284.1 The current situation in New Zealand in regards to next generation networks is characterised by fibre deployment through the subsidised UFB roll-out, which has already commenced and is ongoing.[264] In some areas, Chorus' copper network also remains subject to competitive UFB roll-outs by LFCs. Accordingly, we consider that the process regarding next generation network investment in New Zealand is different from that used to justify a movement away from the conventional TSLRIC concept by the EC.

284.2 The EU has a more extensive regulatory regime for regulated access to certain civil engineering assets (eg, ducts, trenches and poles) than New Zealand. Directive 2014/61/EU of the European Parliament and Council of the European Union directs member states to ensure network operators can offer undertakings to provide access to physical infrastructure for deploying

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262 Directive 2002/19/EC of the European Parliament and of the Council on access to, and interconnection of, electronic communications networks and associated facilities.

263 Spark agreed that New Zealand's TSLRIC definition places certain strictures on the implementation of TSLRIC modelling, but considers that these strictures are reflected in the EC's approach (Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" 13 August 2015, paragraph [91]).

264 In broad terms, the Government has offered subsidies (in the form of interest free loans) to network operators willing to invest in next generation networks. The contracts have been awarded by competitive tender with Chorus being successful in some areas and LFCs in others. The process is ongoing. See http://www.crownfibre.govt.nz/crown-partners/agreements-with-ufb-partners/.

high-speed electronic communication networks.[265] In addition, the EC has stated that "[a]ccess to civil engineering infrastructure is crucial for the deployment of parallel fibre networks" and recommended that "[w]here duct capacity is available, NRAs should mandate access to civil engineering infrastructure".[266] This points towards a greater likelihood of competition occurring through the re-use of existing civil engineering assets in the European Union than it would in New Zealand.

285. Where entities constructing a new network are provided regulated access to assets, the pricing of services based on re-use of such assets can be compatible with efficient build/buy decisions, in contrast to the New Zealand situation where there is no such regulated access.

286. Overall, the EC's modified approach to TSLRIC can be seen as implementation of a specific policy framework. Such an approach imposes a tight constraint on legacy network prices and uses relaxed regulation of next generation network prices as an incentive for such investment. [267,268] One possible motivation for this approach is to provide incentives for investment by incumbents in next generation networks.[269]

287. Spark suggested that our consideration of the EC's first rationale amounts to preferring a particular form of competition, and has submitted that it is highly debatable whether it is open to us to do so.[270]

288. We disagree with Spark. We have remained open to the forms of competition that can occur, and consider that our approach to implementing TSLRIC allows competition to occur as and where it is efficient. It is the EC that has focused on attempting to encourage investment in a particular way. As the circumstances in New Zealand are different, we do not consider it appropriate to try to encourage investment in that same way by adopting the EC approach. This would require us to take a view on the place of re-useable assets in future competition, rather than allowing that competition to occur as and where it is efficient. As noted earlier and accepted by Spark, the conventional approach to TSLRIC is consistent with the

265 See Article 3 of "Directive 2014/61/EU of the European Parliament and of the Council of 15 May 2014 on measures to reduce the cost of deploying high speed electronic communication networks".

266 European Commission "Commission recommendation of 20 September 2010 on regulated access to Next Generation Access Networks (NGA)" 20 September 2010, paragraph [12] and recommendation [13].

267 The EC anticipates that access prices for the full unbundled copper local loop will be in the range of €8-10 in 2012 prices (recommendation [41] of European Commission "Commission recommendation of 11.9.2013 on consistent non-discrimination obligations and costing methodologies to promote competition and enhance the broadband investment environment" 11 September 2013).

268 See recommendations [1]-[3] of European Commission "Commission recommendation of 11.9.2013 on consistent non-discrimination obligations and costing methodologies to promote competition and enhance the broadband investment environment" 11 September 2013.

269 Regarding the tight constraint on legacy network prices, WIK has previously stated that "[h]igh levels of copper access charges generate negative incentives for incumbents to invest into fibre because of profit cannibalization" – WIK, "Wholesale pricing, NGA take-up and competition" 7 April 2011, p.9.

270 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" 13 August 2015, paragraph [92].

competitive market standard.[271] This provides a neutral approach to the form of competition that arises.

289. In respect of the EC's second rationale, regarding the risk of over-recovery of costs, in our view TSLRIC is based on forward-looking costs, and is not directly concerned with the regulated firm's recovery of past expenditure.[272] To the extent that the regulated firm over- or under-recovers against the costs it has already incurred, then this does not alter the efficiency-enhancing properties of TSLRIC, including the incentivising of efficient build/buy decisions. In other words, one outcome of TSLRIC is to limit the regulated entity's ability to set prices at a monopoly level. However, this is achieved by setting an objectively efficient price rather than by modelling a reasonable return on the incumbent's historic investment. As we discuss in more detail in in Attachment E in respect of asset valuation, TSLRIC in this regard differs from the approach taken under Part 4 of the Commerce Act. We again note the EC's flexibility as to its choice of pricing principles.

290. Spark submitted that it "seems incontrovertible to us that the creation of windfall gains for a monopoly provider of regulated services must be inefficient. Excess returns above a normal return do not advance end-users' interests in any identifiable way".[273]

291. A substantial body of academic literature and regulatory decision-making (referred to earlier in this Chapter) highlights the efficiency properties of TSLRIC. These efficiency properties arise even though TSLRIC is not directly concerned with the regulated firm's recovery of past expenditure. In contrast, Spark provided no evidence to support its "incontrovertible" proposition. We explain further in Attachment E why the TSLRIC exercise that we are required to undertake is not directly concerned with "windfall gains" and "windfall losses".

292. Spark also appeared to have misinterpreted our analysis here. In contrast to Spark's suggestions, the EC's concern regarding any over- or under-recovery of costs already incurred by the regulated firm does not relate to excess returns above a normal return. Rather, the concern appears to relate to the lifetimes for many assets being much longer than modelled, which could lead to returns in excess of what they would have been had longer modelled lifetimes been used.[274]

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271 Spark said that "the TSLRIC methodology seeks to establish efficient prices that would be the outcome of a competitive market – providing efficient signals for access provider, RSP and end user consumption". (Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" 24 September 2015 at [5]).

272 As noted earlier, the Court of Appeal has taken a similar view – see *Chorus v Commerce Commission* [2014] NZCA 440 at [30].

273 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" 13 August 2015, paragraph [95].

274 See Ingo Vogelsang "Current academic thinking about how best to implement TSLRIC in pricing telecommunications network services and the implications for pricing UCLL in New Zealand" 25 November 2014, paragraph [93] and [107].

293. In terms of the practical risk of over-recovery we also note the following.

293.1 It is difficult to determine with any certainty whether prices set using TSLRIC would result in over-recovery for Chorus relative to its past prices. Professor Vogelsang noted that over-recovery in regards to TSLRIC in the EU has been driven by the modelled lifetimes for many assets being set much shorter than turned out to be the case in reality. This resulted in higher prices than were needed to recover the costs of those assets.[275] In contrast, New Zealand has had no previous bottom-up cost modelling approach to determine Chorus' regulated access prices.[276]

293.2 We are setting TSLRIC in the factual context of the UFB fibre network being built, facilitated by government subsidy.[277] This will result in end-users migrating from the copper network to the fibre network.

293.3 In our view, it is by no means self-evident that Chorus will over-recover its costs on the copper network over the lifetime of its copper assets, when a certain proportion of its customers will migrate away to fibre before Chorus can recover those costs.[278] We have not received any submissions during this consultation process to convince us that any over-recovery exists.

294. Windfall gains or losses are possible when a price based on the TSLRIC concept is reset at a future regulatory determination, if the revaluation of assets based on current replacement costs differs from what was expected (and has been reflected in the price trends) at the current determination. However, as we discuss in more detail in Attachment E in regards to asset valuation, future resets should not result in systematic gains or losses provided the tilted annuity parameters are set in an unbiased manner.

295. More generally regarding the EC approach, we also note Professor Vogelsang's view, that it is open to debate whether the EC's approach is within the limits of the TSLRIC concept.[279] Professor Vogelsang noted that while the EC sees its approach as consistent with the conventional TSLRIC concept, in his view the approach is in fact a

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275 Ingo Vogelsang "Current academic thinking about how best to implement TSLRIC in pricing telecommunications network services and the implications for pricing UCLL in New Zealand" 25 November 2014, paragraph [93] and [107].

276 Further, we have accounted for the risk of asset stranding through the use of our asset lives (see Attachment F – asymmetric risk). Whether this risk eventuates or not, the modelled asset lifetimes will not necessarily match what happens in reality. Even so, the risk of asset stranding remains.

277 We note also that the UFB roll-out was subject to a competitive tender. Such competition would provide an element of tension that would be expected to compete away, to some extent, any monopoly rents.

278 To the extent that over-recovery did occur, this could be mitigated to some extent by competition between Chorus' copper network and the fibre networks of LFCs. That is, in non-Chorus UFB areas, Chorus may lower the price below the TSLRIC-based price cap to compete with LFCs, reducing any possible over-recovery that might otherwise occur.

279 Ingo Vogelsang "Reply to Comments on my November 25, 2014 paper "Current academic thinking about how best to implement TSLRIC in pricing telecommunications network services and the implications for pricing UCLL in New Zealand"" 23 June 2015, paragraph [98].

break from this concept.[280] Similarly, Sapere submitted that Spark's approach to TSLRIC (which is based on the EC approach regarding asset re-use) "does not fall under the auspices of TSLRIC".[281]

296. In conclusion, we remain of the view that there are important differences between New Zealand and the EC approach regarding the hypothetical efficient operator concept and re-use of civil engineering assets. On balance, we do not think there is a sufficiently strong case to follow the EC and move away from the conventional approach to implementing TSLRIC.[282]

297. Therefore, our decision is that TSLRIC is best implemented using the conventional approach, that is, by assuming a hypothetical efficient operator building and operating an entirely new network from scratch, using MEA technology, to provide the relevant regulated services. We also consider that the conventional approach best fits with the statutory task of determining "forward-looking costs" over the "long run".

298. While the concept of a hypothetical efficient operator building and operating an entirely new network from scratch is important to a number of our modelling decisions, we have also remained open to revising this approach. But we have found no reasons to justify us doing so.

299. In particular, after working through all the detailed decisions, we have remained of the view that the concept of a hypothetical efficient operator building a new network from scratch will best promote the section 18 purpose statement, by providing a framework for setting a price that is consistent with the competitive market standard. In doing so, this approach also provides for economic efficiency, consistent with section 18(2) and the TSLRIC objectives/outcomes, including by providing neutral incentives for build/buy decisions to occur where efficient.

**Evidential matters**

300. In the case of a number of our modelling decisions we have been assisted by looking at real-world evidence. Examples include the percentage of aerial deployment in our modelled network, the economic lifetime of assets in our model, and the appropriate efficiency adjustment to apply in respect of opex.

301. In these instances we consider our best estimate of what an objective value would be to implement our statutory task. The evidence we considered included: data we gathered from Chorus, Vodafone, Spark, and LFCs; the views of experts including

280 Ingo Vogelsang "Current academic thinking about how best to implement TSLRIC in pricing telecommunications network services and the implications for pricing UCLL in New Zealand" 25 November 2014, paragraph [103].

281 Sapere "Report for Chorus Limited - Cross-submission on UCLL and UBA Price Determination Issues" 22 September 2015, paragraphs [75].

282 We also note that the ACCC recently reviewed and amended the pricing principle for fixed line access in Australia. In contrast to the EC varying the implementation of TSLRIC, the ACCC rejected TSLRIC and replaced it with a building blocks approach (ACCC "Review of the 1997 telecommunications access pricing principles for fixed line services Draft Report" September 2010).

Beca, NZIER, and TERA's; and international benchmarking or approaches used by other regulators.

302. At the conference, Chorus stated that there are certain modelling questions we need to answer by reference to the best available evidence.[283] Similarly Vodafone submitted that an assessment of the evidence can be used to answer some modelling questions.[284]

303. We have attempted to make best use of the available evidence. We have weighed up the available data points, considered the views of submitters, and exercised our judgement as to what provided the best objectively measurable data.

**Other relevant considerations**

304. In addition to the various elements set out above, there are also other considerations relevant to our modelling decisions.

*Capital contributions*

305. In our model of the hypothetical efficient operator, if the evidence suggests that certain costs are unlikely to fall on the hypothetical efficient operator, but rather are borne by other parties for parts of the network build, then we consider that these costs should not be included in TSLRIC. This might occur where the hypothetical efficient operator would seek a capital contribution from an end-user or require the end-user to provide part of the infrastructure to be connected.

306. We consider that this view is consistent with the principle against double recovery contained in clause 4B (discussed below), and it would be inconsistent with the promotion of competition for the long-term benefit of end-users to allow double recovery where it can be clearly identified.

307. In TSLRIC terms, we consider that these costs should not be included in TSLRIC since the hypothetical efficient operator (as the service provider) would not bear such costs. We discuss this issue further in Attachment K – Capital contributions.

*Practical considerations*

308. We note that because we are preparing a model (rather than building and deploying a new network in reality), modelling practicalities may often be an important consideration. These include the need to avoid unnecessarily complex approaches to modelling or the need to provide for modelling transparency. Examples of this are our modelling choice regarding the use of either the Shapley-Shubik approach or capacity-based approach in respect of cost allocation (as discussed in Attachment N – Cost Allocation), and our modelling choice for cable routes to follow the road network (as discussed in Attachment C – Network Optimisation).

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[283] Commerce Commission "UBA and UCLL pricing review determination conference transcript" 15-17 April 2015, p.35.

[284] Commerce Commission "UBA and UCLL pricing review determination conference transcript" 15-17 April 2015, p.40-41.

**Additional legal requirements**

309. The Act sets out a number of additional legal requirements that apply when determining FPP prices for the UCLL services, which we now discuss.

*We must ensure no double recovery of costs recovered in prices of designated or specified services (clause 4B)*

310. Clause 4B of schedule 1 of the Act provides:

> In applying [the FPP], the Commission must ensure that an access provider of a designated service does not recover costs that the access provider is recovering in the price of a designated or specified service provided under a determination prepared under section 27 or 30M or a designated or specified service provided on commercial terms.

311. The UCLL price we set must not allow Chorus to recover costs that it recovers in the prices of other "designated services" and "specified services" Chorus provides.[285,286]

312. We also allocate the costs we are currently modelling for the UCLL service and UBA service to avoid double recovery of those costs in the prices we set for those services. We are well placed to do that given that we are pricing the two services at the same time.

313. Clause 4B applies to designated or specified services provided under a STD where a regulated price applies, and designated or specified services provided on commercial terms where an unregulated price applies. Accordingly, if and how Chorus provides designated or specified services on commercial terms will affect the costs allocated to the regulated prices that we set.

314. We note that including a reasonable allocation of the forward-looking common costs of the service provider in TSLRIC (as we discussed above) is additional to this requirement in clause 4B to avoid double recovery of particular costs recovered by Chorus. If we were to conclude that a reasonable allocation of the forward-looking common costs of the service provider would lead to Chorus double-recovering costs in terms of clause 4B, then we must not make that allocation of the forward-looking common costs in the TSLRIC modelling.

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[285] A "designated service" means:
- a "designated access service", which means a service described in subpart 1 of Part 2 of Schedule 1 of the Telecommunications Act 2001; or
- a "designated multinetwork service", which means a service described in subpart 2 of Part 2 of Schedule 1 of the Telecommunications Act 2001. These are: Local telephone number portability service; Cellular telephone number portability service; National toll-free telephone number portability service; and Telecom's fixed PSTN to mobile carrier pre-selection service.

[286] A "specified service" means a service described in Part 3 of Schedule 1 of the Telecommunications Act 2001. These are: National roaming; Co-location on cellular mobile transmission sites; and Co-location of equipment for fixed telecommunications services at sites used by Broadcast Communications Limited.

*We "must determine" geographically averaged price (clause 4A)*

315. Clause 4A of Schedule 1 of the Act provides that, in applying the FPP for the UCLL and UBA services, we "must determine" a geographically averaged price, which is defined in clause 1 of Schedule 1 as:

> **geographically averaged price** means a price that is calculated as an average of all geographically non-averaged prices for a designated service throughout the geographical extent of New Zealand.

316. Prices for the UCLL service remained geographically de-averaged until 1 December 2014.[287]

317. Turning to the definition of geographically averaged price, we consider that we would only need to calculate the average of geographically non-averaged prices if we had geographically non-averaged prices to begin with. That is, we are not required to first set geographically non-averaged prices, though we may do so if we choose to.

318. In our view, Parliament's reference to calculating an average of geographically non-averaged prices simply reflected the fact that, when clause 4A was introduced, we had been setting non-averaged prices and so averaging them was the easiest and an efficient way to produce the necessary single price.

319. In this determination, the prices that we determine based on TSLRIC are single national prices that apply throughout the geographical extent of New Zealand.

*We must set an expiry date*

320. Section 52(f) of the Act requires us to set an expiry date. [288] The expiry date relates to the price we are setting in this pricing review determination process. There is no expiry date for the UCLL STDs.[289,290]

321. On 13 January 2014 we published a supplementary paper to the December 2013 UCLL process and issues paper with our preliminary views on the effect of the expiry date under the Act.[291] We have restated those views in our draft and further draft decisions.[292]

322. It is not clear from the Act what prices will apply for the UCLL and SLU STDs at the expiry of the price set in this UCLL pricing review determination (ie, the determination we are currently making).

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287 Telecommunications (TSO, Broadband, and Other Matters) Amendment Act 2011, s 73(3).

288 See also section 62 of the Act.

289 That is, there is an expiry date for the determination setting the price resulting from the review but the STD – apart from the price embedded in it – does not have an expiry date.

290 See section 30Q of the Act.

291 Commerce Commission "Process and issues for determining a TSLRIC price for Chorus' unbundled copper local loop service - supplementary paper on expiry date" (13 January 2014).

292 Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 2 July 2015, paragraph [236]; and Commerce Commission "Further draft pricing review determination for Chorus' unbundled bitstream service" 2 July 2015, paragraph [235].

323. We would expect to amend the STDs to update the UCLL and SLU prices before the pricing review determination expires. This would avoid the STD prices reverting to the IPP price, which otherwise appears to be the effect of having to include an expiry date in the pricing review determination.

324. The price would be recalculated in accordance with the FPP through sections 30R and 30P(1)(a)(ii) of the Act (that is, we would not revert to the IPP).

325. We also consider that we have the ability to update the FPP price to take effect before the pricing review determination expires, either under sections 30R and 30P(1)(a)(ii) of the Act (discussed below) or if we incorporated an updating process into the pricing review determination.

326. Chorus' submission on the December 2013 UCLL process and issues paper set out its understanding of that proposed approach to the expiry date.[293] We confirmed in our 14 March 2014 further consultation paper that Chorus' submission broadly corresponded with our proposed process on expiry of the pricing review determinations. But we noted that one possible extra step not set out in Chorus' summary was that it is possible that the UCLL model itself might need to be updated as part of amending the STDs to update the UCLL price before the expiry of the pricing review determination.[294]

327. The expiry date determines the regulatory period, which has two important roles in a TSLRIC model:[295]

    327.1 it is an important input used to estimating the WACC; and

    327.2 it sets the timeframe over which the price that we determine will be in force. This means the regulatory period sets both the start and end dates of the model.

328. The length of the regulatory period does not affect, for example, our view of "forward-looking" in the definition of TSLRIC, or our approach to asset lives or asset depreciation.

*We are setting an expiry date of five years from the start date of the regulatory period*

329. We sought views on the length of the regulatory period in our December 2013 UCLL process and issues paper. Most submissions supported a five-year regulatory period. However, Chorus argued that ten years would be the appropriate length for the

293 Chorus "Submission in response to the Commerce Commission's Process and issues paper for determining a TSLRIC price for Chorus' unbundled bitstream access service in accordance with the Final Pricing Principle" 14 February 2014, paragraph [152].

294 Commerce Commission "Further consultation paper on issues relating to determining a price for Chorus' UCLL and UBA services under the final pricing principle" (14 March 2014), paragraph [6].

295 In our December 2014 UCLL draft determination paper we stated there were three roles. This third, separately identified, yet relevant role is the period over which a levelised price was applied. As we discuss further in Chapter 4 of this determination, we are no longer setting a levelised price over the regulatory period.

regulatory period. This was primarily because, in its view, that length of time would provide more certainty for business planning and investment.[296]

330. In our December 2014 UCLL and UBA draft determinations, we noted that our consultations up to that date regarding the regulatory period had not included any reference to the possibility of backdating of the determination.[297] Our comments to that point had been based on the assumption that what we referred to as the regulatory period would begin on the date of the final determination. Accordingly, we noted that we interpreted the submissions on the regulatory period as addressing the issue of the expiry date of the determination. We noted that submissions favouring a five-year regulatory period advocate an expiry date five years after the date of the final determination. We noted also that backdating, if we decided that it was warranted, could be implemented by way of some form of adjustment to the regulatory period.

331. In the discussion below we continue to use the term "regulatory period" for convenience, but the term should be interpreted as referring, in the view of Commissioners Gale and Welson, to the period starting five years from 16 December 2015. Commissioner Duignan considers backdating to 1 December 2014 should apply. Chapter 7 explains our approach to backdating.

332. In our July 2014 regulatory framework and modelling approach paper, we outlined our preliminary view that:

332.1 a five-year regulatory period is the most appropriate for our TSLRIC modelling; and

332.2 we should have the same regulatory period for both the UCLL and UBA services. This is supported by the Act's requirement that we consider the relativity between the UCLL service and the UBA service.[298]

333. We outline below the reasons we gave in that paper, with some modifications we proposed in our December 2014 UCLL and UBA draft determination papers and our July 2015 UCLL and UBA further draft determination papers based on further consideration of the issue and submissions.

333.1 We consider five years is supported by the broader legislative context. The Act does not define how often we should review a STD (or in this case the part of a STD that relates to price). However, it does provide some guidance that suggests a five-year regulatory period is appropriate.

[296] Chorus "Submission in response to the Commerce Commission's Process and issues paper for determining a TSLRIC price for Chorus' unbundled copper local loop service in accordance with the Final Pricing Principle" 14 February 2014, paragraph [23].

[297] Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014, paragraph [236]; and Commerce Commission "Draft pricing review determination for Chorus' unbundled bitstream service" 2 December 2014, paragraph [207].

[298] Telecommunications Act 2001, s 19(b) and Schedule 1, Part 2, Subpart 1.

333.1.1 Five years is the period within which we must consider whether to review whether a service should remain regulated. Schedule 3 provides that we must consider:[299]

> … at intervals of not more than 5 years after the date on which a designated service or specified service came into force, whether there are reasonable grounds for commencing an investigation into whether the service should be omitted from Schedule 1 under s 66(b).

333.1.2 Given that the Act requires us to review whether to deregulate a service within five years, it seems appropriate that we should endeavour to review prices in STDs at no longer than five-year intervals.

333.2 Some international regulators have adopted a shorter regulatory period (eg, Sweden, France, Denmark, Ireland and Germany all support a regulatory period of three years or less).[300]

333.3 It is likely that in 2019 the roll-out of fibre to deliver UFB will be significantly further advanced and we will have a better idea of the effects of UFB migration on the markets for UCLL and UBA.[301] By then the Government's review of the Act should be complete and any changes should have taken effect.[302]

333.4 In combination, the above matters also seem to us to suggest that a seven-year period would be too long.

334. We note that section 53M of the Commerce Act 1986 requires every price-quality path to have no longer than a five-year regulatory period. This is more prescriptive than the Act, but it is widely agreed that the telecommunications market is a faster changing market, which supports our view that we should be reviewing STD prices at intervals of no longer than five years.

335. In response to our July 2014 regulatory framework and modelling approach paper, Vodafone and Spark supported our preliminary view of a five-year regulatory period for both the UCLL and UBA services.[303,304] Chorus stated that it would prefer to have

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299 Telecommunications Act 2001, Schedule 3, clause 1(3).

300 Commerce Commission "Consultation paper outlining our proposed view on regulatory framework and modelling approach for UBA and UCLL services" 9 July 2014, paragraph [321].

301 We consider that UFB migration is a relevant real-world consideration in respect of determining the length of the regulatory period. In contrast, in regards to the TSLRIC concept, as noted above not all aspects of the real world are relevant in a modelling environment. In this regard, as previously discussed we have assumed that existing UFB (LFC and Chorus UFB) infrastructure does not exist in the hypothetical environment.

302 Telecommunications Act 2001, s 157AA.

303 Vodafone NZ "Submission to the New Zealand Commerce Commission - Comments on Consultation paper outlining Commission's proposed view on regulatory framework and modelling approach for UBA and UCLL services" 6 August 2014, section D2.

a reasonable period of price stability to focus on the UFB roll-out and migration of customers.[305] Chorus reiterated that it would like a longer regulatory period, and suggested a compromise of seven years, to balance regulatory and pricing stability.[306]

336. In our December 2014 UCLL and UBA draft determination papers we explained the reasons why we continued to hold the view that we should set the expiry date five years from the date of our final determination.[307] This is our final decision.

337. Chorus was the only party to submit further on the issue of the regulatory period. Chorus maintained its position that a ten-year regulatory period, or as a compromise a seven-year period, is appropriate.[308] Chorus submitted that a longer period would provide a period of price stability over which it could focus on the UFB roll-out and migration of customers to UFB, and would provide certainty for Chorus and its customers while the Government's review of the legislative process takes place.[309]

338. We acknowledge that a ten- or seven-year regulatory period could be appropriate in certain circumstances. However, on balance, we remain of the view that we should set a five-year regulatory period.

339. We consider that a five-year regulatory period provides the appropriate balance between providing for a reasonable period of price stability, while allowing for our cost model and modelling decisions to remain up-to-date in a fast-changing telecommunications market.

340. Before the end of the expiry date of the pricing review determination, we would expect to conduct a review under section 30R of the Act, regarding the price payable for the service for the next five-year period (the FPP price reset).

341. As well as considering and determining a price for the service for the next five-year regulatory period, we would expect to update the inputs in our cost model and review whether any other change in circumstances since our previous pricing review

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304 Telecom "UCLL and UBA FPP: consultation on regulatory framework and modelling approach – Submission Commerce Commission " 6 August 2014, paragraphs [154]-[155].

305 Chorus "Submission in response to the Commerce Commission's Consultation paper outlining its proposed view on the regulatory framework and modelling approach for UBA and UCLL services (9 July 2014)" 6 August 2014, paragraph [176].

306 Chorus "Submission in response to the Commerce Commission's Consultation paper outlining its proposed view on the regulatory framework and modelling approach for UBA and UCLL services (9 July 2014)" 6 August 2014, paragraph [179].

307 Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014, paragraph [243]; and Commerce Commission "Draft pricing review determination for Chorus' unbundled bitstream service" 2 December 2014, paragraph [214].

308 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and Process and Issues Update Paper for the UCLL and UBA Pricing Review Determinations" 20 February 2015, paragraph [355].

309 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and Process and Issues Update Paper for the UCLL and UBA Pricing Review Determinations" 20 February 2015, paragraph [356].

determination causes us to reconsider any of our fundamental modelling decisions. The Act defines a "change in circumstances" as follows:[310]

> change in circumstances, in relation to the price payable for a service, means any change in relevant circumstances since the last date on which that price was calculated (for example, any change to the terms of the service).

342. Without limiting our discretion, we consider that we would be unlikely to revisit all of the choices we made at this determination in a review under section 30R of the Act conducted during the regulatory period of this pricing review determination process.

*Section 19(b) and relativity*

343. Section 19(b) requires us to consider any additional matters specified in Schedule 1 regarding the application of section 18. For the UCLL/UBA services, that additional matter is the relativity between the UCLL service and the UBA service. We discuss this in more detail in Chapter 5, including considering submissions in respect of relativity. We note briefly here that the relativity of the price of UCLL service to the price of UBA service will affect incentives to unbundle, and that considering relativity involves considering the weight we give to unbundling incentives. We note also that the price of the UBA increment (the price of additional costs incurred in providing the UBA service) is the primary driver of incentives to unbundle.

344. By way of summary of our discussion of the relativity consideration in Chapter 5, we find that relativity guides us less towards attempting to promote unbundling, and more towards the efficiency aspects of the section 18 purpose statement. We consider that we should be neutral in promoting unbundling, and allow for unbundling to occur to the extent that it is efficient.

*TSLRIC definition: costs incurred in relation to a TSO instrument*

345. Limb (b) of the Act's definition of "forward-looking common costs" provides that they do not include "any costs incurred by the service provider in relation to a TSO instrument". We have considered the meaning of limb (b). Before discussing that meaning, we briefly explain the TSO instruments.

346. The term "TSO" is an acronym of "telecommunications service obligations" which the Act defines as "obligations in relation to a TSO instrument".[311] The relevant TSO instruments are:[312]

    346.1 the "TSO Deed for Local Residential Telephone Service" (which we refer to here as the Spark Deed), and

310 Telecommunications Act 2001, s 30B.

311 Telecommunications Act 2001, s 5.

312 See www.med.govt.nz/sectors-industries/technologycommunication/communications/telecommunications-service-obligations. There is also a TSO Deed for Telecommunications Relay Services, between the Crown and Sprint International New Zealand, which is not relevant to the UCLL service.

346.2 the "TSO Deed for TSO Network Services" (which we refer to here as the Chorus Deed).

347. In essence, the obligations that arise from those TSO instruments ensure the provision of a residential voice service on certain lines. The provision obligations are split between Chorus, who provides the underlying connection to the end-user in accordance with the Chorus Deed, and Spark, who provides the voice service across Chorus' network in accordance with the Spark Deed.

348. The Chorus Deed contains the following principles.[313]

348.1 Principle 1: Chorus will charge Spark no more than an amount equivalent to the regulated price of Chorus' unbundled copper low frequency (UCLF) service (as amended from time to time) for the "TSO network service", which is the baseband service Chorus provides to Spark as the input service for use by Spark in providing the local residential telephone service under the Spark Deed.[314] Chorus will charge Spark no more than that amount provided that the overall profitability of "Chorus' fixed business" is not or will not be unreasonably impaired (as evidenced by audited accounts prepared for that business). Chorus may selectively offer lower prices, including on a geographical or customer segment basis, if it wishes.

348.2 Principle 2: Chorus will make the "TSO network service" as widely available to Spark as Spark is required to make the local residential telephone service available under the Spark Deed. In turn, the Spark Deed states that Spark will continue to make local residential telephone service as widely available as it was at 20 December 2001 – that area is known as the "TSO footprint".[315]

349. Accordingly, the TSO footprint is a subset of the total connections in Chorus' access network, as all business connections and any residential connections after 20 December 2001 are not included in the TSO footprint.

350. The Chorus Deed, together with provisions in the Act, provide a mechanism for Chorus to potentially recover any additional costs incurred in providing the TSO network service that it does not recover by charging an amount equal to the regulated price for UCLF.[316] (The regulated price for the UCLF service for relevant purposes is the regulated price under the UCLL STD, which is one of the UCLL service prices we are currently setting.)[317] Chorus can apply to be able to charge more for the TSO network service, if it considers that the overall profitability of its fixed business has been, is being, or will be unreasonably impaired.[318] If Chorus did so, we

313 See clause 5 of the TSO Deed for TSO Network Service (8 November 2011), accessible from the link in the footnote immediately above.

314 The UCLF service is described below.

315 TSO Deed for Local Residential Telephone Service (8 November 2011), principle 3 at clause 5.3.

316 Telecommunications Act 2001, ss 71A, 94, 94C and 94D.

317 Telecommunications Act 2001, Part 2, Subpart 1, description of Chorus's Unbundled Copper Low Frequency Service.

318 TSO Deed for TSO Network Service (8 November 2011), clauses 7-12.

would be required to determine those costs of complying with the TSO instrument and record them in a cost calculation determination.[319] Those additional costs, which are known as "TSO charges", are then payable by the Crown to the service provider (Chorus) to compensate it for the additional costs above the UCLL STD price of providing the service.[320]

351. Our view is that limb (b) of the Act's definition of "forward-looking common costs" is intended to make it clear that if Chorus receives a TSO payment, then the corresponding TSO costs must be excluded from the TSLRIC calculations for the UCLL service. Otherwise those costs would be recovered twice.

352. We consider this interpretation is supported by the legislative and policy history. Limb (b) of the Act's definition of "forward-looking common costs" has remained unchanged since the Act was originally enacted in 2001. The Act followed the Fletcher Inquiry, which reported in September 2000. At the time of the Fletcher Inquiry, the TSOs were called the Kiwi Share obligations (KSOs). The Inquiry said:[321]

> Kiwi Share Losses
>
> … the Inquiry recommends that in all cost-based pricing determinations on Telecom's fixed network no recovery of Kiwi Share obligation losses be incorporated. This means that, in the benchmarking exercises, any additions countries make to call related prices to recover access deficits or universal service losses should be removed, and nothing added for any KSO losses. Similarly, in any TSLRIC modelling the KSO losses should be deducted from total network costs and the number of residential local calls should be included in usage even though they are free.

353. It went on to recommend:

> 20. Cost-based prices should not include a contribution to any losses arising from Telecom's Kiwi Share obligations.

354. When the Act was originally enacted in 2001, what is now the UCLF service was not a designated service and the price Telecom was permitted to charge under the Deed applicable at the time was based on the standard residential rental price applicable at 1 November 1989 (ie, a retail-based price).[322] In addition, Telecom could be paid the net cost of complying with the TSO instrument.[323] Currently, Chorus is receiving the UCLF price for TSO lines, and the UCLF price is the regulated price for the UCLL STD. Unless and until Chorus applies for and receives TSO charges in respect of the Chorus Deed, we do not consider that there are any relevant costs to be excluded under limb (b).

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319 See Telecommunications Act 2001, Part 3, Subpart 2, and particularly ss 94 and 94K.

320 Telecommunications Act 2001, s 94L.

321 Ministerial Inquiry into Telecommunications, Final Report, 27 September 2000, p.69.

322 See Telecommunications Service Obligations (TSO) Deed for Local Residential Telephone Service (December 2001), clause 7.2.

323 Telecommunications Act 2001, as originally enacted, ss 80-94.

355. An alternative interpretation of limb (b) of the Act's definition of "forward-looking common costs" is that Parliament intended for us to exclude any lines to end-users within the TSO footprint that only deliver voice services from the hypothetical network we use to model the costs of the UCLL service.[324]

356. In our view the alternative interpretation is unlikely to reflect Parliament's intention. The better interpretation is that limb (b) was included to avoid double recovery and is only relevant where Chorus receives a separate payment for TSO additional costs (ie, the TSO charges). Given that the Act links the price of the UCLF service to UCLL, and that Chorus has not applied to recover TSO additional costs, we are not currently required to address any potential for double recovery in relation to TSO costs in our model. Submitters have not taken issue with this proposed approach.

357. If now or at any time in the future Chorus was receiving TSO charges, then we consider it would be open to us to initiate a section 30R review to consider whether a change in circumstances made it necessary to update the price of UCLL (and therefore UCLF).

*The Act links the price of the UCLF service to the prices we set in this pricing review determination*

358. The UCLF service is similar to the UCLL service, but it only enables access to and interconnection with the low frequency (being the frequency band between 300 and 3400 Hz) in Chorus' copper local loop network. Broadband cannot be provided over the UCLF service, as bitstream services use higher frequencies.

359. The UCLF service was inserted as a designated access service in Schedule 1 by the Telecommunications (TSO, Broadband, and Other Matters) Amendment Act 2011 (Amendment Act) which allowed Chorus to structurally separate from Telecom (now Spark). Telecom was prohibited from purchasing UCLL until 1 December 2014, but was able to purchase the UCLF service.[325] That is, although Spark was unable to unbundle for three years, it could purchase the UBA service to provide broadband to end-users, or purchase the UCLF service to provide voice services (but not broadband) to end-users.

360. The IPP for the UCLF service is:[326]

> Either—
> (a) the geographically averaged price for Chorus's full unbundled copper local loop network;
> or
> (b) if a person is also purchasing Chorus's unbundled bitstream access service in relation to the relevant subscriber line, the cost of any additional elements of Chorus's local loop network that are not recovered by the price for Chorus's unbundled bitstream access service

324 This alternative interpretation was explained in the July 2015 UCLL further draft determination (Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 2 July 2015, paragraphs [270]-[272]).

325 See the "access seeker" description in the description of "Chorus's unbundled copper local loop network" in Subpart 1 of Part 2 of Schedule 1 of the Telecommunications Act 2001.

326 Telecommunications Act 2001, Schedule 1, Part 2, Subpart 1.

*The meaning of the Act's pricing principle for the UCLF service*

361. The phrase "Chorus's full unbundled copper local loop network" was introduced by the 2011 Amendment Act.[327] When we first set the price for the UCLF service, before the 2011 Amendments came into effect on 1 December 2011, we set it as the price in the UCLL STD.[328] At that time, the price in the UCLL STD was the price set in 2007 when Chorus' local loop network had comparatively few cabinets.

362. When we later re-benchmarked the prices of UCLL services, we reconsidered what the price for the UCLF service should be. As explained in the July 2015 UCLL further draft determination, there were two key views as to what the Act's pricing principle for the UCLF service required.[329]

363. In the UCLL December 2014 draft determination paper and in the UCLL July 2015 further draft determination paper we expressed the view that the word "full" was likely intended by Parliament to refer to the full-loop of the UCLL service as opposed to the sub-loop of the SLU service, and that the price for the UCLF service should be the price in the UCLL STD.[330] We remain of this view.

364. We consider that, at the time of the 2011 amendments, the word "full" was an established industry term of art used to refer to the full-loop service of UCLL (that is, the loop from the end-user to the exchange on non-cabinetised lines) as opposed to the sub-loop service of SLU between the end-user and a cabinet. This is, for example, the terminology used throughout our SLU STD in 2009. We consider that if Parliament had intended a more significant change – that is, the introduction of a new concept of a full-UCLL price that includes both cabinetised and non-cabinetised lines – then this would have been more clearly expressed in the Act and would have been discussed in the legislative history.

365. Further, we consider that setting a price for the UCLF service equal to the price in the UCLL STD fits better with the rest of the Act and is more likely to give effect to the section 18 purpose statement. That is because setting different prices for the UCLF service and for the UCLL service could lead to arbitrage. Although Spark is now unconstrained from purchasing the UCLL service, we still consider that it would not be consistent with the section 18 purpose statement to differentiate prices between these services. In our view, we should, as a general principle, read the words of the Act as being consistent with the section 18 purpose statement.[331]

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327 The phrase also appears in the pricing principles for the designated access service: "Local access and calling service offered by means of fixed telecommunications network", but in no other place in the Act.

328 Commerce Commission "Standard terms determination for the designated service of Chorus's unbundled copper low frequency service" Decision 738, 24 November 2011, paragraphs [57]-[63].

329 Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 2 July 2015, paragraphs [280]-[282]).

330 Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 2 July 2015, paragraph [283].

331 *Chorus v Commerce Commission* [2014] NZCA 440 at [153].

*Our approach to setting TSLRIC for UCLL and SLU is consistent with both views*

366. As explained in Chapter 4, we take the TSLRIC of the unbundled local loop (ULL) and derive TSLRIC-based prices for the UCLL and SLU STDs.[332] To do this we have taken an aggregation approach; the price of the UCLL STD service will be equal to the price of the SLU STD service plus the modelled TSLRIC price of the fibre feeder.

367. Given our views above, the UCLF price will be based on the UCLL STD service price.

368. However, we note that, as a result of our approach to aggregation, the same price would apply for the UCLF service even if it was based on full-UCLL. The details of our approach are explained in Chapter 4.

369. Accordingly, setting the price for the UCLF service equal to the UCLL STD price is in fact consistent with both views about the meaning of the Act's pricing principle for the UCLF service given our approach to aggregation. Taking either view would lead to the same result.

370. If there is concern about the Act's pricing principle for the UCLF service, we could consider it as part of a Schedule 3 investigation into the UCLF service.[333]

**Our views in relation to the *Vodafone TSO* and *Telstra* cases**

371. Some submitters have the view that *Vodafone New Zealand Ltd v Telecom New Zealand Ltd* (the *Vodafone TSO* case) and *Application by Telstra Corporation Ltd* (the *Telstra* case) are relevant considerations for this process.[334,335]

372. As explained below, the context and circumstances of these cases were different from those in this FPP process.

373. Having said this, we consider that our approach to determining the TSLRIC of the UCLL services is consistent with the principles to be derived from the Supreme Court's judgment in the *Vodafone TSO* case.

*The Vodafone TSO case*

374. The *Vodafone TSO* case concerned the provision of residential telephone connections to commercially non-viable customers (CNVCs). Under the TSO regime in effect at the time, Telecom provided a residential telephone connection to CNVCs and obtained recompense from other telecommunications service providers who connected to its network.[336] The regime was designed to spread the cost of providing this service across the industry in a manner that was transparent and competitively neutral.

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332 ULL is not the same as full-UCLL. ULL includes UCLL and SLU, but not SLU backhaul or SLES. Full-UCLL includes all of UCLL, SLU and SLES.

333 See Telecommunications Act 2001, ss 66(c)(vi) and 68.

334 *Vodafone New Zealand Limited v Telecom New Zealand Limited* [2011] NZSC 138, [2012] 3 NZLR 153.

335 *Application by Telstra Corporation Ltd* [2010] ACompT 1.

336 At [1] per Elias CJ; and at [19]-[23] per Blanchard, McGrath and Gault JJ.

375. Under the old Part 3 of the Telecommunications Act, Telecom was entitled to compensation for the "net cost" of meeting the TSO obligations as calculated by us. This was not to be based on Telecom's actual costs, but rather Telecom was entitled to recover the "unavoidable net incremental costs to an efficient service provider" of providing the TSO service.[337] That calculation was also required to take into account "the range of direct and indirect revenues and associated benefits" of providing the service to CNVCs, less the costs of doing so, and "the provision of a reasonable return on the incremental capital employed in providing the services to those customers."[338]

376. In other words, the purpose of the net cost formula was to allow Telecom to recover "the cost to it of efficiently servicing its commercially non-viable customers."[339]

377. The issue before the Courts was whether we had erred in law by choosing a model based on Telecom's existing core copper network with limited optimisation, and valuing that network at its replacement cost. The Supreme Court found that our approach was inappropriate for two reasons:

377.1 we had failed to adjust our model to allow for the introduction of mobile technology "where it is most efficient" to be used by an efficient service provider;[340] and

377.2 we had used a replacement cost methodology to value old assets that were partially or wholly depreciated and would not in reality be replaced by Telecom in the future.[341]

378. As a result, we were required to reconsider various TSO net cost determinations.

379. The Court was concerned to ensure that the objective standard of an efficient service provider provided an effective cap on Telecom's recoverable costs.[342] This meant that the assessment of net cost had to be based on the capital actually employed by Telecom (subject to efficiency considerations), otherwise the "cap" might be higher than the costs actually incurred.[343] If the net cost amount exceeded Telecom's actual costs, then Telecom could receive windfall profits and its competitors would be placed at a competitive disadvantage against the then vertically-integrated

337 Section 5.

338 Section 84(1).

339 At [82] per Tipping J.

340 At [8], [9] and [17] per Elias CJ; and at [74]-[76] per Blanchard, McGrath and Gault JJ.

341 At [70]-[72] per Blanchard, McGrath and Gault JJ and [81] per Tipping J. Elias CJ declined to express a view on the asset valuation methodology ([15]).

342 At [9] per Elias CJ. See also *Vodafone New Zealand Ltd v Telecom New Zealand Ltd* HC Wellington CIV-2008-485-2194, 1 April 2010, at [64]-[65] per Winkelmann J.

343 At [70]-[71] per Blanchard, McGrath and Gault JJ; and at [81]-[83] per Tipping J. See also *Vodafone New Zealand Ltd v Telecom New Zealand Ltd* HC Wellington CIV-2008-485-2194, 1 April 2010, at [67] and [72]-[74] per Winkelmann J.

Telecom.[344] Accordingly, using a replacement cost methodology to value old assets that were not going to be replaced was seen as inconsistent with the statutory purpose behind the TSO regime then in place.

380. Chorus submitted that the *Vodafone TSO* case is distinguishable (as both the statutory text of the relevant pricing principle and purpose are different), and also points to the Court's comments about the low precedent value of the case.[345,346]

381. Vodafone has indicated that the *Vodafone TSO* case does not have much to say in the context of our TSLRIC exercise, other than in relation to the question of asset stranding.[347,348]

382. On the other hand, Spark and Wigley and Company argued that the case is indistinguishable.[349,350]

<u>Our circumstances are different</u>

383. We have been guided by the *Vodafone TSO* case in relation to questions of network optimisation. In particular, our hypothetical efficient operator concept models the construction of a new network with modern and efficient technology.

384. However, in our view the Court's concerns about the adoption of a replacement cost methodology arose out of the specific context of calculating the "net cost" to an efficient service provider of meeting the TSO obligations and do not apply to economic regulation generally or to TSLRIC-based prices in particular.

385. As noted above, the *Vodafone TSO* case concerned the situation where Telecom was required to provide a universal service to all residential customers which necessarily

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344 *Vodafone New Zealand Ltd v Telecom New Zealand Ltd* HC Wellington CIV-2008-485-2194, 1 April 2010, at [74] per Winkelmann J.

345 Chorus "Cross submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and Process and Issues Update Paper for the UCLL and UBA Pricing Review Determinations 20 March 2015, paragraph [285].

346 Chorus "Cross-submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services (2 July 2015)" 24 September 2015, paragraphs [137] and [138].

347 Commerce Commission "UBA and UCLL pricing review determination conference transcript" 15-17 April 2015, p.221.

348 Vodafone "Submission on process paper and draft pricing review determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and comments on Analysys Mason's TSLRIC models" 20 February 2015, paragraph [D8.1(e)] .

349 Spark "UBA and UCLL FPP pricing review draft decision", 20 March 2015, paragraph [123]; Spark "Submission on UBA and UCLL FPP pricing review determination" 20 February 2015, paragraph [333]; and Spark "Submission on UBA and UCLL FPP pricing review determination" 20 February 2015, paragraph [333] and Russell McVeagh "Memorandum to Telecom on UCLL and UBA Final Pricing Reviews" 30 April 2014, paragraphs [9(b)] and [12].

350 Wigley and Company "Submission on draft pricing review determination for UBA and UCLL services" 20 February 2015, paragraph [13.12]; Wigley and Company "Submission on draft pricing review determination for UBA and UCLL services" 20 February 2015, paragraph [13.10].

involved a service to CNVCs.[351] Under the TSO regime that applied at the time, Telecom was entitled to a contribution towards the cost of uneconomic customers from other telecommunications companies (which could be described as a "top up" payment).

386. However, this "cost" was subject to a cap in that Telecom could only seek recompense for the costs it incurred acting efficiently. In these circumstances, the Court found it was an error to conduct a hypothetical exercise that valued depreciated assets at optimised replacement cost where Telecom was unlikely to replace such assets. The Court found that this approach would "artificially inflate" the value of the existing assets.[352] The Court stressed that in the context of the definition of "net cost", the efficient service provider was intended "to be a proxy for a firm which will continue to employ old assets",[353] and its costs "must be construed as meaning '… cost to Telecom acting efficiently'." [354]

387. In other words, the efficiency cap had to be tied closely to Telecom's actual costs (subject to optimisation) and could not be based upon those of a hypothetical network operator building a network from scratch.

388. We note that in that case we were not required to apply TSLRIC and the Court was not concerned with the proper approach to TSLRIC generally. Rather, the Court's views were based on the statutory purpose of the "net cost" calculation as being a cap on the extent to which Telecom's actual costs could be recovered from its competitors – a statutory requirement that does not apply here.[355]

389. Both Blanchard J and Elias CJ noted that the decision would have limited precedential value because of the "unique nature of the Part 3 regime" and subsequent legislative changes.[356] As noted by the High Court in the Input Methodologies judgment, the *Vodafone TSO* case dealt with the meaning of the specific statutory definition of "net cost" rather than the use of a more broadly expressed decision-making power.[357]

390. In this pricing review determination, we are required to apply a TSLRIC approach (with its focus on forward-looking costs incurred over the long run) and we have carried this out in the conventional way of modelling the costs of a hypothetical efficient operator constructing a new network (ie, not a "top up payment" nor a cap on the recovery of actual costs, but modelling a full service cost over the long run). The sort of considerations that are relevant to such an access price (as discussed

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351 At [23] per Blanchard, McGrath and Gault JJ.

352 At [70] per Blanchard, McGrath and Gault JJ.

353 At [70] per Blanchard, McGrath and Gault JJ.

354 At [82] per Tipping J.

355 At [57] per Blanchard, McGrath and Gault JJ it was noted that the calculation of an amount of net cost was not "a broadly expressed power designed to achieve economic objectives". TSLRIC can be fairly described as such a broadly expressed power.

356 *Vodafone New Zealand Limited v Telecom New Zealand Limited* [2011] NZSC 138 at [7], [64].

357 *Wellington International Airport Ltd v Commerce Commission* [2013] NZHC 3289 at [999].

above in relation to the TSLRIC objectives/outcomes) are quite different from those that arose in relation to the calculation of "net cost" in the *Vodafone TSO* case.

391. We have explained earlier in this Chapter why we considered that it was appropriate in the current context to adopt the hypothetical efficient operator concept as the basis of our model. As Chorus submitted, the hypothetical efficient operator concept "is accepted not to be a proxy for Chorus but rather replaces it, and the Commission has selected a MEA which differs from the technology actually used by Chorus to provide the service".[358] In these circumstances we do not consider that the Court's concerns about using a replacement cost methodology arise.

392. We explain how our modelling decisions have applied the *Vodafone TSO* case in the relevant Attachments.

*The Australian Telstra case*

393. Spark and Wigley and Company submitted that the *Telstra* case is a relevant "overseas precedent on TSLRIC" that we should follow in this determination.[359]

394. In the *Telstra* case, the issue for the Australian Competition Tribunal (and before it the ACCC) was whether the access undertaking lodged by Telstra in respect of the unconditioned local loop service (ULLS) – the equivalent of our UCLL service – for Band 2 areas (the "undertaking") was reasonable in terms of the various criteria set out in section 152AH of the Trade Practices Act 1974.

395. The Tribunal rejected the undertaking for three main reasons.

396. First, the Tribunal found that Telstra's TSLRIC model was not capable of estimating the efficient costs of supplying the ULLS because it was too closely tied to Telstra's historic choice in relation to cable routes. In particular, the model assumed the use of existing locations of pillars, manholes and pits and thereby severely limited the optimisation of cable routes.[360]

397. Second, the Tribunal considered that under the statutory reasonableness criteria referred to above, the focus should have been on Telstra's actual costs taking into account the assets it has in place, and on providing a commercial return on its prudent past investment, rather than on the costs of a hypothetical new operator.[361] In reaching its decision, the Tribunal commented that in light of the evolving nature of the telecommunications industry in Australia and the lack of deployment of

358 Chorus "Cross-submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services (2 July 2015)" 24 September 2015, paragraph [140.2].

359 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" 24 September 2015, paragraph [124]. See also Wigley and Company "Cross-submission in relation to UCLL and UBA draft pricing review determinations" 24 September 2015, paragraph [7.8].

360 *Application by Telstra Corporation Ltd* [2010] ACompT 1 at [230]-[237].

361 *Application by Telstra Corporation Ltd* [2010] ACompT 1 at [239]-[249].

competing end-to-end infrastructure, a "regulated asset base" approach might be simpler and more appropriate.[362]

398. We note that following the decision, the ACCC reviewed the pricing principles for fixed line access and moved away from TSLRIC in favour of a "building blocks" approach.[363]

399. Third, the Tribunal stated that no "material before [it] that independently addresses the reasonableness criteria as they might apply to the $30 figure proposed by Telstra in its undertaking. Consequently, the Tribunal is unable to satisfy itself that $30 would be a reasonable price".[364]

400. We note that in this FPP process submitters and their experts had very different views on how much the regulated services would cost.

400.1 Spark[365] and WIK[366] referred to a UCLL price and the price of the additional costs of providing the UBA service of $16.64 and $7.83 (UBA total price of $24.47) respectively each month.[367]

400.2 Chorus and Analysys Mason referred to a UCLL and the price of the additional costs of providing the UBA service of $74.10[368] and $16.57[369] (UBA total price of $90.67) respectively each month.

401. We have found the reasoning in the *Telstra* case to be helpful in relation to our decisions around optimisation. As further explained in Attachment C, we have taken an approach to network optimisation that is efficient and appropriate to the current circumstances. In particular, our model was only informed by the existing number of nodes and their existing locations. We have optimised the cable routes, building sizes and MDF coverage areas instead of using the existing coverage areas in Chorus' copper network.

402. We do not, however, consider that the Tribunal's focus on the incumbent's actual costs and preference for a "regulated asset base" type of approach is required or appropriate in our circumstances for the following reasons.

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362 *Application by Telstra Corporation Ltd* [2010] ACompT 1 at [198]-[199].

363 This is further discussed in the Attachment E.

364 *Application by Telstra Corporation Ltd* [2010] ACompT 1 at [248].

365 Spark "UBA and UCLL FPP pricing review draft decision" 20 February 2015 at [18].

366 WIK "Submission In response to the Commerce Commission's "Draft pricing review determination for Chorus' unbundled bitstream access service" and "Draft pricing review determination for Chorus' unbundled copper local loop service" including the cost model and its reference documents", paragraph [452].

367 We note that in September 2013, Telecom (now Spark) submitted to MBIE that "A total copper price range of $35-$40 may better approximate expected forward-looking costs" (Telecom "Review of the Telecommunications Act 2001: Discussion Document" 13 September 2013 at [26(c)]).

368 Analysys Mason "Report for Chorus to provide to the Commerce Commission - Model user guide for UCLL hybrid bottom-up model" 28 November 2014, paragraph [2.1].

369 Analysys Mason "Report for Chorus to provide to the Commerce Commission - Model user guide for UBA model" 28 November 2014, paragraph [2.1].

402.1 In the *Telstra case* "the main question in issue between the parties was the reasonableness of the proposed access charge of $30 per month" for the ULLS service which was to be judged against a variety of criteria.[370] The "main question" posed to us is different. Parliament gave us the specific task of setting the UCLL price using TSLRIC.

402.2 That is, unlike Australia, we are required by law to apply TSLRIC. Further, the definition of TSLRIC includes the reference to "forward-looking costs" over the "long run". Therefore, in contrast to the *Telstra case*, it is not open to us to decline to apply TSLRIC.

402.3 Rather than applying statutory "reasonableness criteria" and selecting an "appropriate means of providing an outcome which may inform the reasonableness of the proposed monthly charge"[371], we must apply TSLRIC and give effect to the section 18 purpose statement, in the process of which we are guided by the TSLRIC objectives/outcomes.

402.4 As explained earlier in this Chapter, we consider that the appropriate approach to TSLRIC in our circumstances is to take the conventional approach – ie, look at the costs of a hypothetical efficient operator building and operating a new network rather that to estimate the incumbent's ongoing costs.[372] As the Court of Appeal recently commented:[373]

> The TSLRIC model provides an estimate of the costs of an efficient access provider over a sufficient period of time (long run), on a "forward-looking" basis (reflecting the notional costs to an operator if it built a new network) rather than of Chorus's actual costs (emphasis added).

402.5 As discussed earlier in this Chapter, we consider that the hypothetical efficient operator approach sets build/buy signals that continue to be important in promoting competition in our environment. In that respect, we take a different view to the Tribunal. In contrast, the *Telstra* decision was made in the context of the recently-contracted National Broadband Network project which involved the national deployment of fibre and the copper network ultimately being "cut off".

403. In summary, we have considered the reasoning in the *Telstra* case and concluded that our approach to network optimisation is materially different from the model rejected by the Tribunal. We have also concluded that the different legal and factual context in New Zealand means that the focus on the incumbent's actual costs is not required or appropriate for our FPP process.

370 *Application by Telstra Corporation Ltd* [2010] ACompT 1 at [30].
371 *Application by Telstra Corporation Ltd* [2010] ACompT 1 at [33].
372 *Application by Telstra Corporation Ltd* [2010] ACompT 1 [231].
373 *Chorus v Commerce Commission* [2014] NZCA 440 at [30].

*Conclusion*

404. The context and circumstances of the *Vodafone TSO* case and the *Telstra* case were different from the current case. We are required to determine TSLRIC for the UCLL services. For the reasons given in this determination, we are satisfied that we have constructed an appropriate model for determining the cost of the UCLL service that is fit for purpose.

**Conclusion**

405. In this Chapter 2 we have explained that our regulatory framework under which we are setting prices using TSLRIC for the UCLL service is informed by several elements – in particular:

405.1 the definition of TSLRIC;

405.2 section 18 considerations;

405.3 TSLRIC objectives/outcomes that we considered when exercising our judgement;

405.4 our approach to implementing the TSLRIC concept, including:

405.4.1 the characteristics of the hypothetical efficient operator; and

405.4.2 the hypothetical efficient operator environment;

405.5 the concept of MEA;

405.6 evidential matters;

405.7 other relevant considerations;

405.8 additional legal requirements; and

405.9 *Vodafone TSO* case principles.

406. In submissions on our July 2015 UCLL and UBA further draft determinations, one of the more controversial aspects of our framework was how the hypothetical efficient operator concept is characterised for the purpose of the TSLRIC modelling.

407. With this in mind, we have remained open to revising our framework while making modelling decisions. We have not received any submissions, nor found any reason that has persuaded us to change the application of the conventional approach, the hypothetical efficient operator or its characteristics.

408. After working through all the modelling decisions, we have remained of the view that the concept of a hypothetical efficient operator will best promote both the TSLRIC objectives/outcomes and the section 18 purpose statement. Our modelling decisions are based on identifying forward-looking efficient costs over the long run. As we have previously explained in this Chapter, a price based on these costs promotes the TSLRIC objectives/outcomes and the section 18 purpose statement.

409. In the other Chapters and Attachments of this determination we explain further how the modelling decisions are consistent with and/or do not undermine the relevant elements of our framework.

# Chapter 3: How we have calculated the TSLRIC for the UCLL service

410. Having established the nature of the TSLRIC exercise to be undertaken in Chapter 2, in this Chapter we summarise the implementation decisions we have made for determining the TSLRIC of the UCLL service.

411. We have taken the following steps to determine the TSLRIC of the UCLL service.

411.1 First, we determined:

411.1.1 the network footprint to be modelled for the UCLL service, which means determining the size of the network over which the UCLL service will be modelled; and

411.1.2 the demand for the UCLL service over the regulatory period (which is used to determine per unit costs).

411.2 Secondly, we identified the most efficient way for modelling the UCLL service using modern technology. This involved determining the modern equivalent asset (MEA), network optimisation and the method of deployment of the modelled network.

411.3 Thirdly, we determined the various costs of the modelled network. This involved establishing the following:

411.3.1 the method for asset valuation;

411.3.2 the weighted average cost of capital;

411.3.3 the appropriate treatment of asymmetric risk;

411.3.4 the method of asset depreciation;

411.3.5 the setting of asset lives;

411.3.6 the applicable price trends;

411.3.7 the calculation of trenching costs;

411.3.8 the treatment of capital contributions;

411.3.9 the modelling basis for tax; and

411.3.10 the calculation of operating expenditure.

411.4 Fourthly, we allocated costs across services provided by the hypothetical efficient operator. This step involves allocating the forward-looking common costs across services provided by the hypothetical efficient operator, and then calculating the cost of the UCLL and SLU services, which is discussed in Chapter 4.

411.5 Finally, we performed a cross-check on the TSLRIC price determined by our modelling. The purpose of the cross-check was to consider whether the decisions we had made in determining the TSLRIC price resulted in any upward or downward bias.

412. As discussed in Chapter 2, the conventional approach to calculating a TSLRIC is to hypothesise an efficient operator building and operating an entirely new network. The hypothetical efficient operator is not constrained by legacy decisions made regarding the technology or deployment of the current network. This has been a helpful guiding principle to inform our modelling decisions and determine the forward-looking long run costs of the UCLL service. In order to construct the model we have also relied on expert advice and data from Chorus and other operators (internationally and nationally), and applied adjustments where appropriate.

413. In making our modelling decisions, we have also tried to ensure that the individual decisions create a coherent model as a whole. Although the decision-making process is described above as a liner sequence, we have also considered the inter-relationship between modelling decisions (for example, between asset valuation, network footprint, demand and capital contributions). This helps us ensure coherence. We have also considered whether the order of the decisions is important. We are comfortable that the sequence set out above is a logical approach and has not hindered our consideration of all the individual decisions (including their relationship to each other), particular given our iterative approach to consultation.

414. In order to carry out the TSLRIC modelling exercise, we engaged TERA Consultants (TERA) to build the cost model for the UCLL (and UBA) service and to provide expert advice on TSLRIC modelling.

415. Alongside this paper we have published a number of reports compiled by TERA that provide further detail on how it has built the cost model for the UCLL service. We have reviewed these reports and agree with the advice and with the approach TERA has taken in building the detailed cost model for the UCLL service.

416. The cost model consists of five parts:[374]

416.1 geospatial data processing – determines all cable paths from the end-user dwellings to the network nodes;[375]

416.2 access network dimensioning – dimensions the access network based on the geospatial data analysis (for example, cables and civil engineering);

416.3 access network model – once the access network is dimensioned, costs are derived by multiplying the network inventory by the unit costs;

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374 For a full description detailing the specification of the cost model see TERA Consultants "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services: - Model Specification" December 2015.

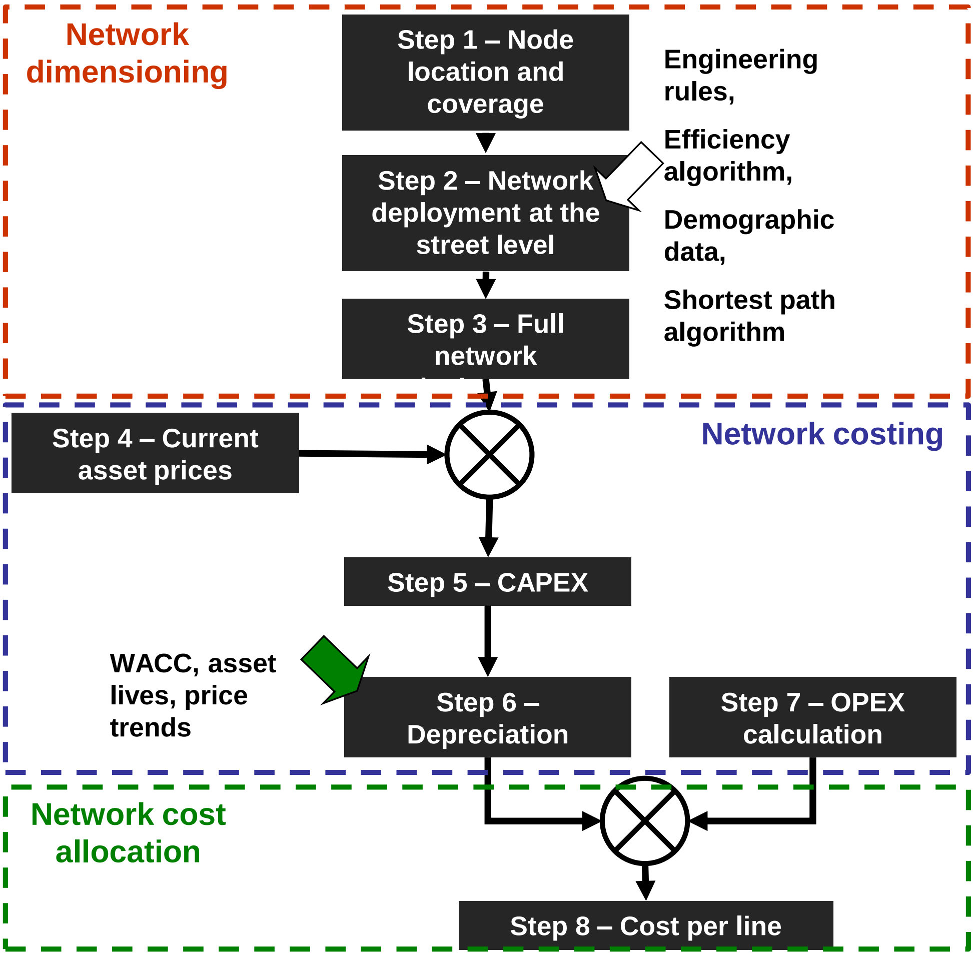
375 The geospatial processes we have undertaken are summarised in TERA's Model Specification paper.

416.4 opex model – derives the opex and non-network costs for each service; and

416.5 core network model – dimensions and derives the costs of the core network and derives the price for each service.

417. The decisions we set out in this Chapter relate to the dimensioning and costing of the access network, which determines the cost for the UCLL service. Figure 3.1 below illustrates how the cost of the UCLL service is determined in the access network model.

**Figure 3.1: Access network modelling approach**




418. Having consulted extensively and considered submissions and cross submissions, we set out below our key decisions on our approach to modelling the cost of the UCLL service. Detailed discussions and reasons for our decisions are included in Attachments to this determination.

419. Matters of a more technical nature are addressed in TERA's review of submissions document, which we have published alongside this determination.[376] We have discussed these "technical" submissions with TERA. Responses to these points are

[376] See TERA Consultants "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services – Analysis of the responses to the second consultation following the further draft determination" December 2015.

set out in TERA's review of submissions. We have reviewed this document and we agree with TERA's responses to the submissions made.

**Determining the network footprint and demand for the UCLL service**

*Network footprint and demand for the UCLL service*

420. The network footprint determines the number of connections that comprise the access network, informs where the modelled network will be deployed, and is a key determinant of the network's cost.

421. The network demand determines the number of paying customers over which total modelled costs will be spread to produce a cost per user.

    421.1 Setting constant network demand leaves the relationship between network footprint and demand fixed throughout the regulatory period, and the cost per user remains fixed. Alternatively, modelling demand migration allows the demand to move, which flows through to the cost per user calculations.

    421.2 The time the modelled network takes to attract demand and reach full load is reflected in the level of demand assumed to be served from Day 1. This could mean a higher cost per user in the early years as demand builds.

422. Our final decisions are that:

    422.1 the hypothetical efficient operator's network connects every building and dwelling along New Zealand's road network;

    422.2 the hypothetical efficient operator has demand equal to the number of end-users paying for services on Chorus' copper and fibre networks, and LFC networks;

    422.3 there is constant demand on the hypothetical efficient operator's network;

    422.4 the end-users comprising the network demand all take services from the hypothetical efficient operator from Day 1; and

    422.5 the hypothetical network is not connected to addresses in the Christchurch Red Zone.

423. Our key reasoning for these decisions is based on:

    423.1 the need for us to select an appropriate network scale to determine a representative price for the regulated service, which we consider is best achieved by selecting a nationwide network footprint similar to Chorus' copper network;[377]

[377] As set out in our Framework, the purpose of our TSLRIC exercise is to set robust and representative wholesale prices for the regulated services in accordance with the section 18 purpose statement. As supported by submitters, we have abstracted from reality, eg, the hypothetical efficient operator has

423.2 relevant real-world information, which informs our geospatial footprint modelling and demand considerations;[378] and

423.3 our framework and a European Commission recommendation, which has informed our treatment of fibre and cable networks, and their respective demand.

424. Attachment A provides a detailed discussion of how we have reached our final decisions on the network footprint and demand.

**Determining the modelled network**

425. Once we determined the network footprint for the UCLL service, we then determined the efficient costs of serving that network footprint. To do so we have first considered what a hypothetical efficient operator would likely build today to provide the UCLL service (the modelled network). We have then considered how the hypothetical efficient operator would likely deploy that network, including network optimisation.

*Selecting the modern equivalent asset for the UCLL service*

426. In order to identify the assets that a hypothetical efficient operator would deploy today to provide the UCLL service we have used the concept of a modern equivalent asset (MEA). Using a MEA allows prices to reflect the costs of modern and efficient technology. This is consistent with the definition of TSLRIC in the Act, particularly the requirement to estimate costs on a forward-looking basis.

427. We have taken a core functionality approach to determine the service that the MEA network must be capable of providing. In our view, a core functionality approach allows us to identify the key features of and optimise the UCLL service.

428. In terms of core functionality:

428.1 in our view, the core functionality of the UCLL service is to allow access seekers to provide voice and broadband services;

428.2 we have clarified our view of broadband – where the MEA does not have to be unbundleable, we consider that the candidate MEA technology must be capable of supporting a layer 2 bitstream service with equivalent performance to Chorus' UCLL network.

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sufficient access to resources and instantaneously commissions a national network that replaces existing fixed telecommunications networks.

378 As set out in our Framework, many of our decisions involve matters that are, to some extent, objectively measurable. In these cases we believe it is appropriate to use data and evidence, which may include data from Chorus and others, to determine our best estimate of what an objective value is, rather than relying on subjective assertions or speculation. This does not detract from the approach of the hypothetical efficient operator concept; rather, it uses real-world information to inform our assessment of this concept.

429. We consider that to satisfy the equivalence criterion, the MEA network should be able to provide, to a large extent, a point-to-point, unbundleable layer 1 connection. In particular, exchange service areas (ESAs) that have already been unbundled, or are of a similar size to those that have been unbundled, must provide this functionality.

430. Our final decisions as to the MEA are below.

430.1 In ESAs where we consider that the MEA network must be able to provide a point-to-point (P2P), unbundleable service, we have selected P2P-FTTH as the MEA network.

430.2 For the remaining ESAs, a P2P, unbundleable service is not a requirement of the MEA network.

430.3 We have modelled several scenarios and have determined that the lowest cost technology is a mixed P2P-FTTH/FWA network with FWA based on certain RBI FWA sites.

430.4 Accordingly, the MEA network in ESAs where a point-to-point, unbundleable network is not a requirement is a mixed P2P-FTTH/FWA.

431. We gave consideration to whether an adjustment at the ESA level is appropriate in light of our hypothetical efficient operator/MEA approach to TSLRIC.

432. We consider the ESA level approach is inconsistent with our TSLRIC objective of incentivising efficient investment, as it may disincentivise investment in new and improved technologies and services.

433. As the P2P-FTTH/FWA MEA network costs less than the FTTN network at the national level, it was not necessary for us to consider if we should make a cost adjustment to the P2P-FTTH/FWA network at that level.

434. Attachment B provides a detailed discussion of how we have reached our final decisions on the MEA for the UCLL service.

*Network optimisation*

435. At a high level, optimisation within TSLRIC modelling is concerned with two aspects:

435.1 how much of the existing network should be reflected in the modelling (all, none, or somewhere in between); and

435.2 what will be the basis for deriving the costs – built-up from granular cost components (bottom-up), or adopting something closer to the network provider’s aggregated accounts (top-down).

436. Consistent with our use of the hypothetical efficient operator concept to model the TSLRIC costs, we have taken a scorched earth approach as our starting point.[379]

[379] That is, the hypothetical efficient operator builds its new network from scratch without being constrained by Chorus’ legacy decisions.

However, for the reasons set out below, we consider that a modified scorched node approach is appropriate and provides a reasonable approximation of the forward-looking efficient costs that would be incurred in supplying the UCLL service.

437. Our approach to optimisation retains the existing number and location of nodes (ie, exchanges)[380] in Chorus' copper network. All other aspects of the access network have been scorched and optimised - notably the cable routes linking end-users and exchange locations. We consider that this provides an appropriate and reasonable estimate of a scorched earth approach.

438. In terms of the details of our approach:

438.1 we have redefined the exchange coverage areas by computing them using a Voronoï algorithm instead of using the existing exchange coverage areas in Chorus' copper network;

438.2 our optimisation of cable routes has required us to implement minor modifications to take into account the location of notional nodes and network connectivity;

438.3 we have optimised the size of Chorus' exchange buildings based on a bottom-up calculation of the space required to house equipment;

438.4 where available, we have used data provided by Chorus to inform the bottom-up calculation to model the most efficient deployment; and

438.5 For practicality, and where applicable, we have constrained the modelled network to the road network. Cable routes follow the New Zealand road network, which we have determined includes motorways, private roads, and access ways.

439. Attachment C provides a detailed discussion of how we have reached our final decisions on network optimisation.

*Deploying the modelled network*

440. We have considered the following when determining how our modelled network will be rolled out:

440.1 how much of the access network will be on poles rather than trenched;[381]

440.2 where (or to which end-users) Fixed Wireless Access (FWA) will be deployed; and

440.3 how much of the network can share costs with other infrastructure (eg, electricity distribution networks).

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380 Cabinets are retained for modelling UCLL based on copper technology. However, they are scorched for modelling based on fibre or FWA technologies.

381 Our decisions on trenching costs are set out in Attachment J.

441. Below we discuss these decisions under the three broad headings of aerial deployment, FWA deployment, and infrastructure sharing.

*Aerial deployment*

442. Aerial deployment refers to the use of poles to deploy distribution cables and lead-in cables instead of burying them (known as underground deployment).

443. Aerial deployment has a lower capital cost than underground construction, but has higher operational costs. It is also easier to share aerial infrastructure with other networks (notably electricity distribution networks) than underground construction. Overall, the cost of aerial is cheaper than the cost of underground deployment.

444. It is important that we set an accurate price for aerial deployment by:

444.1 determining a realistic way for costs to be split between the hypothetical efficient operator and electricity distribution businesses (EDBs); and

444.2 setting a reasonable cost of getting consent for the hypothetical efficient operator.

445. We have decided that the hypothetical efficient operator will use aerial infrastructure for:

445.1 47% of distribution cables; and

445.2 46% of lead-in cables.

445.3 The key reasons for these deployment decisions are: we recognise that the hypothetical efficient operator would seek to use aerial infrastructure where possible because it is cheaper (particularly where infrastructure can be shared with other providers);

445.4 however, it will not always be possible for the hypothetical efficient operator to get consent to deploy its network; and

445.5 we use real-world evidence about the EDBs' use of aerial deployment as a guide to where the hypothetical efficient operator would deploy its network aerially. This is because we are uncertain that the hypothetical efficient operator would receive consent to deploy its network aerially elsewhere. Further, the opportunity to share infrastructure would not be present in other areas.

446. In terms of the cost of deployment, we have decided that:

446.1 the hypothetical efficient operator will rent access to the EDBs' poles for the purpose of distributing its network and running lead-ins into buildings on the major side of the road;

446.2 the hypothetical efficient operator will build lead-in poles on the minor side of the road;

446.3 EDBs will rent access to the hypothetical efficient operator's poles to provision buildings on the minor side of the road; and

446.4 the hypothetical efficient operator will have to pay to replace 10% of EDB poles.

447. We set the annual price of pole rental that the hypothetical efficient operator pays to the EDB at:

447.1 $[ ]**CNZCI** for EDB poles where the EDB receives reciprocal access to one of the hypothetical efficient operator's poles (for no additional cost); and

447.2 $[ ]**CNZCI**, **UFFCI** for each EDB pole where the EDB does not access a pole provided by the hypothetical efficient operator.

448. We set the cost the hypothetical efficient operator pays to gain consent to install poles on the minor side of the road at a total of $[ ]**CNZCI**.

449. We have selected these modelling settings because we understand that they reflect what occurs in the real world. We have set the level of pole replacement and pole rental and consenting based on real-world data, including data from Chorus.

*FWA deployment*

450. In considering FWA deployment, our goal has been to identify where a hypothetical efficient operator would deploy FWA. We have taken into account unbundleability, line speed performance, different FWA technologies, and different deployment strategies. We have also taken into account real-world information relating to capability, limitations, and cost, and been informed by the recently deployed RBI FWA network in New Zealand.[382]

451. FWA will be modelled:

451.1 using LTE technology at 700 MHz;

451.2 with a site capacity of 66 Mbps (three sectors);

451.3 to only connect end-users within the TSO-derived boundary (as explained in Attachment K – Capital contributions);

451.4 in exchange service areas (ESAs) where we have determined that unbundleability is not required;

[382] As set out in our Framework, many of our decisions involve matters that are, to some extent, objectively measurable. In these cases we believe it is appropriate to use data and evidence, which may include data from Chorus and others, to determine our best estimate of what an objective value is, rather than relying on subjective assertions or speculation. This does not detract from the approach of the hypothetical efficient operator concept; rather, it uses real-world information to inform our assessment of this concept.

451.5 using the Vodafone RBI FWA site coverage and location within non-unbundle-able ESAs;

451.6 to meet the existing copper line speeds with a cap of 1.9 Mbps and floor of 150 kbps;

451.7 to connect the longest lines first; and

451.8 to utilise microwave backhaul where efficient.

452. FTTH will be modelled to all lines that, due to site capacity constraints, cannot be served by FWA.

453. We have compared the costs of a range of deployment scenarios for the relevant ESAs being:

453.1 FWA-only;

453.2 FWA/FTTH mix; and

453.3 FTTH-only.

454. We have adopted the lowest cost scenario, which is an FWA/FTTH mix using the RBI FWA sites across all non-unbundleable ESAs.

*Infrastructure sharing*

455. Underground infrastructure sharing refers to the sharing of trenches (and sometimes ducts) between parties that both deploy cables underground for the purpose of distributing their network to the end-users.

456. Sharing underground infrastructure can reduce the cost of deploying underground infrastructure as the cost is split between two parties. Therefore, it is important that we try to set a realistic level of infrastructure sharing in the TSLRIC model to avoid setting a TSLRIC price which is too high or too low.

457. Our final decisions are to:

457.1 include 5% of underground infrastructure sharing with EDBs; and

457.2 maintain the saving generated from infrastructure sharing at 50% but not to include any savings for the cost of installing ducts.

458. We recognise that the hypothetical efficient operator would look to share infrastructure wherever possible.

459. However, it would not be practical to reopen existing underground infrastructure to install the hypothetical efficient operator's infrastructure. Therefore, this will only take place when EDBs are looking to deploy their network underground.

460. We based the extent of underground infrastructure sharing and the cost of infrastructure sharing on the best data on local current practices that we have

available. This is because we believe this is most representative of the conditions the hypothetical efficient operator will face.

461. Attachment D provides a detailed discussion of how we have reached our final decisions on network deployment.

**Determining the cost of the modelled network**

462. Having decided how we will build the modelled network, we then determined the cost of the modelled network.

*Asset valuation*

463. Asset valuation is an important step in costing the network elements that are involved in supplying the regulated UCLL service.

464. We have had to determine an appropriate methodology to use for valuing assets, in particular civil engineering assets that are potentially reusable and difficult to replace. A common example of such an asset is a duct. A number of regulators overseas have in recent years been moving towards valuing such assets on the basis of their historic cost.

465. For the purposes of this final determination, we have used optimised replacement cost (ORC) to value all assets used in our TSLRIC model for the UCLL service. While we have explored a range of alternative asset valuation methodologies, we consider that ORC is consistent with our regulatory framework for carrying out the UCLL pricing review determination. In particular, ORC is consistent with the concept of the hypothetical efficient operator who builds a new network from scratch.

466. We also consider that ORC is consistent with the forward-looking and long run features of TSLRIC, and with our TSLRIC objectives/outcomes, in particular encouraging efficient build/buy decisions, allowing for efficient cost recovery and incentivising the regulated entity to minimise its costs.

467. We have therefore applied ORC to all assets.

468. Attachment E provides a detailed discussion of how we have reached our final decisions on asset valuation.

*Weighted average cost of capital*

469. We are required to set forward-looking cost-based access prices for the UCLL service using a TSLRIC methodology. The weighted average cost of capital (WACC) is one of the key inputs to the TSLRIC model for UCLL, and represents the expected return investors require.

470. We have determined a forward-looking post-tax WACC estimate of 5.56% for our UCLL final determination.

471. The parameters used to generate our mid-point post-tax WACC estimate of 5.56% for UCLL are summarised in Table 3.1 below.

**Table 3.1: UCLL and UBA WACC estimates**

| Parameter | Estimate for December 2014 draft | Estimate for July 2015 further draft | Estimate for December 2015 final |
|---|---|---|---|
| Risk-free rate | 4.19% | 3.26% | 2.74% |
| Debt premium | 1.85% | 1.75% | 1.85% |
| Leverage | 43% | 37% | 38% |
| Asset beta | 0.40 | 0.45 | 0.43 |
| Debt beta | 0.00 | 0.00 | 0.00 |
| TAMRP | 7.0% | 7.0% | 7.0% |
| Corporate tax rate | 28.0% | 28.0% | 28.0% |
| Investor tax rate | 28.0% | 28.0% | 28.0% |
| Debt issuance costs | 0.25% | 0.25% | 0.25% |
| Cost of executing interest rate swaps | 0.04% | 0.08% | 0.08% |
| Equity beta | 0.70 | 0.71 | 0.69 |
| Cost of equity | 7.92% | 7.32% | 6.80% |
| Cost of debt | 6.33% | 5.34% | 4.92% |
| **Post-tax WACC (mid-point)** | **6.47%** | **6.03%** | **5.56%** |

472. The WACC is estimated as at 1 September 2015, which is approximately three months prior to the date of the final determination for UCLL. This was necessary to enable us to complete modelling and other work prior to finalising our final determination.

473. Compared to the July 2015 UCLL further draft determination:

473.1 the risk-free rate has reduced from 3.26% to 2.74%, and the debt premium has increased from 1.75% to 1.85%, to reflect current interest rates on government and corporate bonds as at 1 September 2015;

473.2 we have decreased the asset beta from 0.45 to 0.43, reflecting further analysis of asset beta estimates for Oxera's refined comparator sample, including updated data to 1 September 2015; and

473.3 we have updated our leverage estimate to reflect data over the most recent 10 year period, to be consistent with the approach to estimating asset beta. This has resulted in an increase in leverage from 37% to 38%.

474. A detailed discussion of how we estimated the WACC is set out in the Cost of Capital for the UBA and UCLL pricing reviews paper, published alongside our final determination paper.

*Asymmetric risk*

475. We are required to set a TSLRIC price for the UCLL service. There are a range of factors in the future which may affect costs, the settings of which are uncertain. We do not adjust the price for all of the uncertain factors (risks) because sometimes these factors are equally likely to decrease costs as to increase them. However, some factors will only have the potential to increase the price. These factors, collectively known as asymmetric risk, will change the expected cost to the hypothetical efficient operator.

476. We must consider how to adjust the single price (or otherwise incorporate this risk into the modelled cost). If we fail to take into account the fact that even a hypothetically efficient operator would face these risks, this would cause us to undercompensate this operator. This would be a barrier to the development of a robust telecommunications network.

477. Our final decisions in respect of asymmetric risks are:

 477.1 To provide for an *ex ante* allowance for the asymmetric risk of catastrophic events. This allowance is based on Chorus' costs of catastrophic risk (eg, insurance) but appropriate efficiency adjustments are applied (as discussed in Attachment M, regarding the efficiency adjustments we apply to opex);

 477.2 To provide for an *ex ante* allowance for the asymmetric risk of asset stranding due to technological change by adopting asset lives that recognise the risk of asset stranding; and

 477.3 To not provide any *ex ante* allowance for the asymmetric risks of asset stranding due to competitive developments or future regulatory decisions.

478. Attachment F provides a detailed discussion of how we have reached our final decisions on asymmetric risk.

*Depreciation*

479. Depreciation determines the amount of its asset base that the hypothetical efficient operator can recover each year through the regulated access prices. As telecommunications networks, and in particular the UCLL and UBA services, are capital intensive, depreciation is a significant component of these services' forward-looking cost-based prices. Therefore, decisions about the choice of depreciation methodology and the inputs into the depreciation formula in the TSLRIC model can directly affect these prices. In particular, these decisions can affect whether the hypothetical efficient operator's costs are recovered from current or future users of the hypothetical efficient operator's network.

480. Due to a combination of physical deterioration, technical obsolescence, and contract terms, most of the hypothetical efficient operator's network and related assets have finite commercially-useful lives. As these assets age, their future productive capacity

and market value declines.[383] This loss of value is a cost that needs to be recovered over the life of these assets as part of the forward-looking cost-based prices charged for the service(s).

481. Our final decision is to maintain the view that the tilted annuity method is the appropriate methodology for regulatory depreciation.[384] This approach combines an allowance for depreciation with the return on capital.

482. Tilted annuities are consistent with the principles of financial capital maintenance and provide efficient incentives for build-buy decisions over time.

483. A tilted annuity calculates an annuity charge that changes between years at the same rate as the expected change of the asset value. Because of this feature, the tilted annuity approach is an approximation of economic depreciation as annual charges are brought in line with the expected value of the asset at each time of its economic life. As with a standard annuity, the tilted annuity should still result in charges that, after discounting, recover the asset's purchase price and financing costs.

484. Attachment G provides a detailed discussion of how we have reached our final decisions on depreciation.

*Asset lives*

485. Asset lives are the economic lives of the hypothetical efficient operator's assets. We use these asset lives to depreciate the hypothetical efficient operator's assets which determines how much of the cost of these assets is recognised each year. In effect, the asset life of an asset is the amount of time an asset can be used until it is replaced.

486. In order to set a TSLRIC price that promotes efficient investment, it is important that we set asset lives that are our best estimate of the economic lifetime of assets. If asset lives understate the economic lives of assets, the TSLRIC price will be set too high. This would mean that consumers would pay more than they need to. Similarly, if asset lives overstate the economic lives of assets, the TSLRIC price would be too low. This would mean that there would not be sufficient incentives for the hypothetical efficient operator to invest.

487. Our final decision is to set the hypothetical efficient operator's assets lives equal to Chorus' except where:

487.1 Chorus' asset lives are out of line with international benchmarks; or

383 Charles R. Hulten and Frank C. Wykoff (1996) "Issues in the measurement of economic depreciation: introductory remarks", *Economic Inquiry* 34, p. 10–23.

384 For calculating the hypothetical efficient operator's notional taxation, we have used diminishing value taxation.

487.2 no Chorus data is available. In these cases we used international benchmarks to adjust/set asset lives or, in the case of FWA spectrum, domestic settings (ie, the period management rights are auctioned for).

488. The main reasons for our final decision are:

488.1 we consider that the accounting asset lives supplied by Chorus provide a reasonable estimate of the economic lives of the hypothetical efficient operator's assets;[385] and

488.2 we believe that international benchmarks provide the most appropriate check for Chorus' asset lives except in the case of FWA spectrum, where we believe that domestic settings are most appropriate.

489. Attachment H provides a detailed discussion of how we have reached our final decisions on asset lives.

*Price trends*

490. Price trends are estimates of expected price changes for components of the TSLRIC model during and beyond the regulatory period. The price trends are used in the TSLRIC model to forecast costs, and are applied as part of the tilted annuity depreciation formula to spread capital costs over the lifetime of the asset.

491. The price trends we have chosen would apply to a hypothetical efficient operator in New Zealand. They are the most accurate estimate of long-term price trend over the lifetime of the modelled assets and for expenses. These have been chosen to reflect international costs where we think they will apply and New Zealand-specific costs where relevant.

492. Our final decisions are to use the following price indices and approaches to determine the long-term price trend for the following cost drivers.

[385] Chorus provided a list of asset categories and its estimation of the corresponding lives, as required by our section 98 Notice. TERA has allocated all of the assets in the model into one of these categories.

**Table 3.2: Price indices and approaches to determine long-term price trends**

| Cost driver | Appropriate price index | Basis of price trend | Price Trend (annual percentage change) |
|---|---|---|---|
| Non-recurring charges (NRC) | Labour Cost Index (LCI) - all industries | Due to the predominant use of a wide variety of labour used in non-recurring activities | Annual change in index[386] |
| Trenching costs | A Statistics New Zealand Producers' Price Index for the Heavy and Engineering Civil Construction sector | Relationship to construction sector labour costs and general all sector producer input price inflation | 3.3% |
| Wages/labour | Labour Cost Index (LCI) - all industries | Relationship to general inflation | 2.0% |
| Non-labour opex | Consumer Price Index (CPI) | The expectation that the gains and losses across all activities in this category will lead to a stable price trend of 0% | 0.0% |
| CPI | Consumer Price Index (CPI) | Current requirements of the RBNZ's policy target agreement with the Minister of Finance | 2.0% |
| Building costs | Capital Goods Price Index (CGPI) for non-residential buildings | Relationship to general inflation | 1.9% |
| Fabricated steel | Producer Price Index for Outputs of the metal fabrication industry (PPI-O) | Relationship to international steel prices, aluminium prices and domestic labour costs | 2.9% |
| Copper | London Metals Exchange (LME) prices for Copper | Average of historical growth and forecast based on LME futures plus Consensus Economics consensus forecasts | 5.0% |
| Fibre optic cabling | A US Bureau of Labour Statistics Producer Price Index (US PPI) for wholesale prices of fibre optic cable | Historical trend including currency effects | -1.3% |

386 The percentage change observed in the LCI (all industries) during the preceding calendar year will be applied to non-recurring charges in November each year.

493. We consider these price trends are the best available price trends and methodologies taking into account our own analysis, expert advice and evidence provided in submissions and cross submissions.

494. We have introduced a price trend for core non-recurring charges (NRC).[387] Core NRC prices will now be adjusted each calendar year in November on the basis of the change in the Labour Cost Index (LCI, all industries) in the year to November for that given year.

495. The price adjustment for sundry NRC will now also be based on LCI (all industries) rather than LCI (communication services), the way it will be applied is consistent with the new price adjustment mechanism for core NRC. [388]

496. Attachment I provides a detailed discussion of how we have reached our final decisions on price trends.

*Trenching costs*

497. Trenching involves the techniques used to deploy telecommunications infrastructure underground; specifically, the ducts and cables which are deployed along roadways and into homes and workplaces to deliver telecommunications services, such as UCLL.

498. Trenching is a critical input when establishing the TSLRIC of the UCLL service. Chorus' UCLL service is provided over a fixed line access network. Cabling of a fixed line access network tends to be a mix of aerial (on poles above the ground) and underground (in trenches).

499. As discussed above, we have decided that we will deploy the network aerially where electricity distribution businesses (EDBs) have existing poles. The remainder of the modelled network will be deployed underground, specifically:

499.1 53% of the distribution cable routes (shared communal trench); and

499.2 54% of the lead-in cables (dedicated trench to building).

500. As part of our TSLRIC exercise for trenching, we carried out three phases of work:

500.1 soil type analysis;

500.2 trenching methodologies; and

500.3 representative trenching costs.

501. Under each phase we have made a series of decisions to determine the representative costs for trenching.

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387 Core NRC are charges associated with the main features of the service.

388 Sundry charges are additional charges that may arise in the course of provisioning the services ancillary to the main features of the service.

502. Our final decisions and reasons are below.

502.1 Based on advice from Beca we have identified:

502.1.1 five rural soil types and a single soil type for urban areas; and

502.1.2 several accepted trenching methodologies that are used in New Zealand for consideration in our model.

502.2 We have decided to deploy a fully ducted network as this approach is consistent with New Zealand and international best practice.

502.3 In our view the hypothetical efficient operator would not deploy ducts larger than necessary, therefore the size of ducts being deployed would be 50 mm for the FTTH network and 110 mm for the FTTN network.

502.4 In our view the hypothetical efficient operator would not use sub-ducts in its network. As set out in Attachment A, we have assumed constant demand, therefore the benefits of sub-ducting will not be realised for our hypothetical efficient operator. As such, the hypothetical efficient operator would not incur the additional expense of sub-ducting its network.

502.5 Based on current New Zealand practice and advice from TERA, we have provided for network resilience of critical trenches (5000 or more lines) by double trenching rather than trench reinforcement.

502.6 We have relied on Beca for the setting of trenching costs. We consider that the Beca costs are based on objective and independent data that used:

502.6.1 historical data held by Beca from previous tenders;

502.6.2 limited supplier pricing;

502.6.3 indicative “cover-all” rates; and

502.6.4 pricing methodologies received from contractors from throughout New Zealand.

502.7 We asked Beca to review trenching costs supplied by Chorus and the local fibre companies (LFCs). Beca noted there were challenges on comparing its data with the Chorus data as the Chorus data was not as granular as the Beca data and was therefore difficult to rely on for the purpose of modelling trenching costs.

502.8 However, Beca has used the data received from Chorus’ UFB roll-out and data from LFCs, as a cross-check of its trenching cost data.

502.9 Beca concluded that its costs were not dissimilar to the Chorus’ UFB data and the LFCs data with its trenching costs. We are therefore satisfied that Beca has provided us with an independent, robust, and representative estimate of trenching costs the hypothetical efficient operator would incur.

502.10 We have used a weighted set of trenching methodologies, provided by Beca. We consider that this ensures the trenching methodologies used in our approach are representative of what the hypothetical efficient operator would likely encounter.

502.11 We are not applying any discount over and above Beca's cost estimates. We do not consider the hypothetical efficient operator would be able to achieve any discount further to the trenching costs set by Beca.

503. Attachment J provides a detailed discussion of how we have reached our final decisions on trenching costs.

*The treatment of capital contributions*

504. Capital contributions arise because network providers can require end-users or third parties to provide elements of their network (such as lead-in trenches) or to pay a cash contribution towards the cost of an asset. Where this occurs, we need to determine how to treat capital contributions as part of this pricing review determination.

505. In considering how to treat capital contributions in this pricing review determination, we have been guided by several factors: real-world practice; the Act's general intention that Chorus should not over-recover its costs; and our view that it would not promote competition for the long-term benefit of end-users to permit Chorus to recover a cost that would be borne by end-users or third parties.

506. Our final decisions are:

506.1 In relation to the network which lies inside the TSO boundary (that is, the notional boundary drawn around all end-users in situ and being provided service by Telecom as of December 2001):

506.1.1 except as described below, we have included the cost of all lines within the TSO boundary (that is, both TSO lines and lines within the boundary that were built since December 2001);

506.1.2 we have excluded the cost of lead-in trenches, on the basis that Chorus/Telecom required the trench to be provided by the end-user, and that the hypothetical efficient operator would receive a similar contribution;[389]

506.1.3 we have made no deductions in respect of the costs of aerial lead-ins;

506.1.4 we have excluded the cost of trenching and reinstatement for subdivisions built after December 2001 (ie, groups of lines that are

[389] A lead-in trench is the trench between the end-user's boundary and the External Termination Point (ETP) on the building. Lead-in trenches are the subset of trenches that lie on private property.

within the TSO boundary but were not connected at December 2001);[390] and

506.1.5 we have made no deductions in respect of the cost of capacity from the exchange to the TSO boundary required to provide service to end-users outside the TSO boundary.

506.2 In relation to the network which lies outside the TSO boundary, we have excluded the capital costs of this part of the network. We have done this on the basis that the hypothetical efficient operator would be likely to receive a capital contribution from more remote end-users in order to extend its network. This decision is informed by Chorus' general practice.

507. We have made no deductions to UCLL in respect of the Government's contribution to UFB or RBI funding.

508. Attachment K provides a detailed discussion of how we have reached our final decisions on capital contributions.

*Modelling basis for taxation*

509. The modelling basis for taxation describes how we treat corporate income tax in our TSLRIC model. As the hypothetical efficient operator would be subject to corporate income tax on its earnings, how we estimate and treat its tax obligations in our TSLRIC model will impact the TSLRIC price. It is important that we adopt a realistic approach to taxation to avoid setting a TSLRIC price which is too high or too low.

510. As the hypothetical efficient operator's network is capital intense, it will be able to significantly reduce its tax obligations by deducting depreciation expenses (depreciation tax shield). Hence we have considered how our TSRIC model should account for the tax benefits of depreciation deductions.

511. Our final decision is that the TSLRIC-based price we derive will be a pre-tax amount. Given that the price we derive will be a pre-tax amount, our final decision is to adjust the tilted annuity capital charges for each type of asset by taking into account an appropriate tax depreciation rate. This will ensure that the TSLRIC-based price does not over-estimate the tax position of the hypothetical efficient operator, which would occur if the tax model adopted a simple pre-tax calculation that assumed the corporate tax rate.

512. Attachment L provides a detailed discussion of how we have reached our final decision on taxation.

*Operating expenditure*

513. Operating expenditure (opex) relates to costs that are incurred in the ongoing operation of a business.

390 The cost of connecting infill lines is however included. See Attachment K for more detail.

514. Our TSLRIC model seeks to reflect all of the forward-looking long run incremental costs of the telecommunications network that we model. This includes the ongoing costs of operating the telecommunications network on a day-to-day basis, and the costs of operating the telecommunications company itself. Accordingly, determining the appropriate level of this opex is an important input in to the TSLRIC model.

515. Our final decisions and reasons in respect of opex for the UCLL service are below.

515.1 Our starting point to determine opex is:

515.1.1 on the hypothetical efficient operator's FTTH network, we use Chorus data on network opex for its copper network, as we consider this provides the best objective starting point for estimating the network opex for a nationwide fixed line telecommunications network in New Zealand;

515.1.2 on the hypothetical efficient operator's FWA network, we use Vodafone data on network opex for its RBI network, as we consider this provides the best objective starting point for network opex on a fixed wireless network in New Zealand; and

515.1.3 for the non-network opex associated with operating the telecommunications business of the hypothetical efficient operator itself, we use Chorus data on its non-network opex, as we consider this provides the best objective starting point for estimating the non-network opex of a nationwide telecommunications company in New Zealand.

515.2 We made no further adjustments to Chorus' non-network opex, as we consider that this provides an appropriate estimate of the non-network opex of our hypothetical efficient operator.[391]

515.3 We also made no further adjustments to the Vodafone RBI opex, as we consider that this also provides an appropriate estimate of the opex level for the FWA network opex of our hypothetical efficient operator.

515.4 In respect of Chorus' network opex, we applied an upwards adjustment to Chorus' network maintenance opex by a multiplier of 111%, based on line fault indexes (LFIs). We consider that this adjustment is warranted because our hypothetical efficient operator's FTTH network has a larger proportion of aerial deployment relative to Chorus' copper network, which would likely lead to higher line faults. The LFI data that we have used to make this adjustment is the best objective evidence that we have available.

[391] This addresses a letter we received from Chorus regarding the Telecommunications Development Levy (TDL) (Chorus letter dated 22 September 2015). The letter stated that the TDL would be subject to the opex efficiency adjustment in our TSLRIC model. This is not correct.

516. We have then scaled down the adjusted maintenance opex[392] and the remainder of Chorus' network opex by a factor of 40%, because we consider that this adjustment is required to reflect the likely lower network opex that can be achieved on our hypothetical efficient operator's new FTTH access network as compared to Chorus' copper access network. The 40% figure that we have used to determine the 111% and make this adjustment is based on the best objective evidence that we have available.

517. Attachment M provides a detailed discussion of how we have reached our final decisions on opex.

**Cost allocation**

518. The Act's definition of TSLRIC includes reference to "a reasonable allocation of forward-looking common costs". The Act defines "forward-looking common costs" as "those costs efficiently incurred by the service provider in providing the service that are not directly attributable to providing an additional unit to that service".

519. Cost allocation is concerned with the nature and quantum of these forward-looking common costs, and an appropriate methodology to provide for a reasonable allocation of these costs to be included in our TSLRIC model.

520. Our final decisions and reasons in regard to how we allocate forward-looking common costs in our TSLRIC model for the UCLL service are as follows.

520.1 For forward-looking common costs that are incurred in providing services associated with the telecommunications network itself (network costs), we use a capacity-based allocation approach, with specific allocation keys identified for different categories of network costs. We consider that this provides a reasonable allocation of network costs because of the use of this approach by regulators elsewhere, its greater objectivity and transparency (relative to alternative approaches), and the support for this approach by submitters; and

520.2 For forward-looking common costs that are required to operate a telecommunications company but are not associated with the telecommunications network (non-network costs), we use the method of equi-proportional mark-up (EPMU). We consider that this provides a reasonable allocation of non-network costs because of the use of this approach by regulators elsewhere, its greater simplicity (relative to alternative approaches), and the support for this approach by submitters.

520.2.1 For the allocation of non-network costs between the UCLL and UBA (in aggregate) and other services (for example, co-location and non-recurring charges), we allocate costs in proportion to the share of revenue across these services. This is referred to as "modified EPMU", as it differs from the standard EPMU approach which

392 Overall the net effect on Chorus' maintenance opex is a downwards adjustment. That is, the downwards adjustment for a new FTTH more than offsets the upwards adjustment for aerial deployment.

allocates costs in proportion to the share of total attributable costs across the services. In this case, we do not have appropriate data to undertake a standard EPMU approach.

520.2.2 For the allocation of non-network costs between the regulated services (UCLL and UBA), we do have the appropriate data so we use the standard EPMU approach where costs are allocated in proportion to each service's share of total attributable costs

521. Attachment N provides a detailed discussion of how we have reached our final decisions on cost allocation.

**Cross-checking the total TSLRIC-based price**

522. Setting the TSLRIC price for UCLL and UBA has been complex and contentious. In light of the strong views expressed by submitters that the price we were setting would not accurately reflect a neutral TSLRIC estimate (and noting submitters disagreed on whether we were setting a price that was too high or too low), we carried out a final cross-check at the end of the pricing exercise.

523. Overall, our goal has been to make unbiased decisions for each of the TSLRIC inputs, which we then combined to form our best estimate of the TSLRIC price. By unbiased, we mean a best or neutral estimate that does not tend to understate or overstate the true or most reasonable value of the relevant parameter.

524. As a check on the individual decisions we made, and bearing in mind the section 18 purpose, we then considered whether there were any indicators of bias in the overall price, ie, that the modelled price was not in fact the best estimate of TSLRIC. This check was not a decision in itself, but rather we have looked at the aggregate modelled price (UCLL and UBA) for signs of bias that would give us cause to relook at the individual decisions. In our view there are no indicators of bias.

525. There is no one specific indicator that provides a directly comparable, objective cross-check on the aggregate modelled price. However, in forming our view that the overall price did not show signs of bias, we took the following into account.

525.1 Our review of wholesale service charges in comparable countries, as set out in Attachment P. Contrary to suggestions from some submitters prior to the July 2015 further draft determination, these comparator prices did not provide evidence that the Commission's modelled price was biased upwards. Rather a proper analysis highlighted some contextual differences, and once these were taken into account, the comparators did not suggest that our TSLRIC price was unreasonable.

525.2 The opposing views of submitters on the direction and causes of any possible bias in individual decisions that could then bias the TSLRIC price up or down. We have looked back at some of the more material and more difficult decisions in this process. While in each case we made our best estimate, we wanted to ask whether there was any consistent pattern of favouring one side of the argument. We do not think that any such pattern exists. Submitter views on these modelling decisions included:

525.2.1 Possible downward bias.

(a) The "spot" risk-free rates we have used in calculating the WACC in the model are low compared to historic averages.

(b) We have based modelled demand on a fully-loaded network with instantaneous demand take-up.

(c) Our approach to setting non-recurring charges uses the lowest of a number of possible comparator rates from other countries, rather than the median or mean.

525.2.2 Possible upward bias.

(a) Our UCLL network deployment is constrained by having to at least meet the existing line speed on each current copper line. This has led to a mostly fibre deployment, with little FWA in the model.

(b) We have determined the MEA by taking a modified scorched node approach to network layout, consistent with how other regulators have approached similar price tasks, rather than trying to directly determine a scorched earth MEA.

(c) We have not allowed for any re-use of existing Chorus or LFC infrastructure assets, such as ducts.

525.3 Many key inputs into our TSLRIC model take account of actual Chorus UFB or LFC cost data ie, the costs of currently building a modern replacement fibre network.

526. So based on our conception of our task under the Act – to price a modern replacement network – we found, and were presented with, no compelling evidence that our aggregate TSLRIC price was biased up or down. It is the best estimate.

527. We further considered whether the section 18 purpose in the Act should cause us to make an upward or downward adjustment from the best estimate to promote particular benefits to end-users, such as the benefits of migration from copper to fibre. Our analysis and reasons for not making such an adjustment are set out in Chapter 5.

528. Finally, while we have not used UFB pricing as a cross-check, we have discussed the comparison between the aggregate TSLRIC price to the entry-level UFB price in the Executive Summary.

# Chapter 4: Calculating the TSLRIC-based price for UCLL and SLU

## Purpose

529. We are required to determine prices to update each of the UCLL and SLU STDs. The UCLL STD relates to the unbundled copper local loop between the end-user and the exchange.[393] The SLU STD relates to the unbundled copper local loop between the end-user and the active cabinet.[394]

530. Having modelled the total annualised TSLRIC for the full local loop network, we need to ensure that these costs are mapped to monthly unit prices to be included in the UCLL and SLU STDs.

531. However, the model itself will not produce separate costs for the UCLL and SLU services because the model does not equate to the current network that actually exists. Instead, it models the cost of a hypothetical, optimised network with a FTTH/FWA MEA that does not contain any active cabinets.

532. In light of this, the purpose of this Chapter is to set out our final decision regarding our approach to transforming the total annualised TSLRIC we have modelled for our hypothetical network into monthly unit prices for the UCLL and SLU services, to update the prices in the UCLL and SLU STDs.

533. In particular, in this Chapter we:

    533.1 outline our final decisions for calculating a TSLRIC-based price for the UCLL and SLU services;

    533.2 describe how we have converted total annualised TSLRIC figures to monthly unit TSLRIC figures;

    533.3 explain how we have allocated the monthly unit TSLRIC to the UCLL and SLU services;

    533.4 describe the price profile we have determined in each year over a five-year regulatory period; and

    533.5 discuss our cross-checks on the level of TSLRIC-based prices using international comparators.

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393 Commerce Commission "Standard Terms Determination for the designated service Telecom's unbundled copper local loop network" 7 November 2007, Decision 609.

394 Commerce Commission "Standard Terms Determination for the designated services of Telecom's unbundled copper local loop network service (Sub-loop UCLL), Telecom's unbundled copper local loop network colocation service (Sub-loop Co-location) and Telecom's unbundled copper local loop network backhaul service (Sub-loop Backhaul)" 18 June 2009, Decision 672.

**Our final decisions**

534. Our final decisions for calculating a TSLRIC-based price for the UCLL and SLU services follow.

535. We began with the total annualised TSLRIC figures for the unbundled local loop (ULL). The ULL is the FTTH/FWA network that we have modelled. The TSLRIC for the ULL includes an allocation of common costs and shared costs between other services. That cost allocation is discussed in Attachment N – Cost allocation.

536. We also used our TSLRIC model for the UBA service to estimate TSLRIC for the proportion of the UBA backhaul cost between the exchange and the active cabinet. We will refer to this as the cost of the "fibre feeder". This allowed us to derive the UCLL and SLU prices from the TSLRIC of ULL, as will be explained in more detail in this Chapter.

537. To allow us to convert the annualised TSLRIC ULL costs to monthly unit costs for UCLL and SLU we used the following steps.

 537.1 We first estimated the annualised TSLRIC for ULL for each of the five years during the regulatory period.

 537.2 To arrive at average monthly unit TSLRIC for ULL and the fibre feeder for each of the five years, we then divided the annualised TSLRIC by the number of months in a year, ie, 12, and by demand.

 537.3 We then calculated the monthly unit TSLRIC for each of the UCLL and SLU services based on an aggregation approach. For that approach, we set the UCLL and SLU prices such that the efficient costs incurred for access between the end-user and the exchange are the same, irrespective of whether the line is cabinetised or non-cabinetised. This is explained in more detail in this Chapter and Attachment O – Implementation of aggregation.

 537.4 We used a price profile over the regulatory period with varying prices for UCLL and SLU for each year over the regulatory period.

538. The prices for UCLL and SLU are summarised in Table 4.1 below.

**Table 4.1: Nominal monthly unit prices for UCLL and SLU, (NZ$)**

| | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 |
|---|---|---|---|---|---|
| UCLL | $29.75 | $30.22 | $30.70 | $31.19 | $31.68 |
| SLU | $15.52 | $15.70 | $15.89 | $16.07 | $16.26 |

*Source: Commission's TSLRIC model for final determination*

**Converting total annualised TSLRIC for ULL and fibre feeder to monthly unit TSLRIC**

539. In this section we explain how we converted the total annualised TSLRIC determined in our model to monthly unit TSLRIC for each of the five years of the regulatory period.

540. Our model provided the total annualised TSLRIC ULL costs and total annualised TSLRIC for the fibre feeder for each of the years during the regulatory period, as shown in Table 4.2 below. These figures are after we have allocated common costs and shared costs between other services, as discussed in Attachment N – Cost allocation.

**Table 4.2: Total annualised TSLRIC-based on our TSLRIC model for ULL and fibre feeder, (NZ$, millions, nominal)**

| | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 |
|---|---|---|---|---|---|
| Total TSLRIC for ULL | $507.51 | $514.99 | $522.60 | $530.35 | $538.23 |
| Total TSLRIC for fibre feeder | $120.15 | $122.58 | $125.07 | $127.63 | $130.24 |

*Source: Commission's TSLRIC model for final determination*

541. To calculate the monthly TSLRIC for ULL for each of the five years, we divided the annualised TSLRIC costs by the number of months in a year, ie, 12. To determine a "per unit" monthly TSLRIC for ULL, we divided the monthly TSLRIC by ULL demand. A description of the demand profile is set out in Attachment A – Network footprint and demand.

542. We also converted the total annualised TSLRIC for the fibre feeder to monthly unit TSLRIC, because, as we explain further below, we require monthly unit fibre feeder costs to allocate the cost between UCLL and SLU. To convert the total annualised cost for the fibre feeder to monthly unit costs we divided by 12 and by a measure of demand.[395] For the measure of demand, we used the number of UBA connections at an active cabinet.

543. Table 4.3 below shows the monthly unit TSLRIC for the fibre feeder, for each of the five years during the regulatory period.

**Table 4.3: Monthly unit TSLRIC for the fibre feeder (NZ$, nominal costs)**

| | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 |
|---|---|---|---|---|---|
| Fibre feeder | $14.23 | $14.52 | $14.81 | $15.12 | $15.43 |

*Source: Commission's TSLRIC model for final determination*

395 We use the term "demand" in respect of the fibre feeder loosely – it is not intended to imply the final demand for services using the fibre feeder, but rather refers more generally to the relevant measure of output over which the costs of lines using the fibre feeder are recovered.

**Allocating total ULL TSLRIC to UCLL and SLU services**

*Our choice of approach to allocate costs to the UCLL and SLU services*

544. We are required to determine prices to update each of the UCLL and SLU STDs. The UCLL STD relates to the unbundled copper local loop between the end-user and the exchange.[396] The SLU STD relates to the unbundled copper local loop between the end-user and the active cabinet.[397]

545. As noted above, although our FTTH/FWA model determines the total cost of the full local loop network, we must determine separate UCLL and SLU prices. Because our FTTH/FWA model does not include active cabinets, our model cannot distinguish between UCLL and SLU costs. This means we must find a way of deriving UCLL and SLU prices (to be included in the separate STDs) from our modelled cost of the full local loop.

546. Throughout our FPP pricing review determination process we have considered an approach for deriving UCLL and SLU prices that we refer to as "aggregation".[398] Aggregation means that we set the UCLL and SLU prices such that our modelled estimate of the efficient costs incurred for access between the end-user and the exchange are the same, irrespective of whether the line is cabinetised or non-cabinetised. In contrast, a disaggregated approach would set prices such that the costs incurred by access seekers are different for cabinetised and non-cabinetised lines between the end-user and the exchange.

547. Aggregation is based on the principle that the price for UCLL = the price for SLU + the modelled TSLRIC price for the fibre feeder. In this way, an unbundler on a non-cabinetised line would face the UCLL price. This would be the same as the efficient cost incurred by an unbundler on a cabinetised line facing the SLU price plus the efficient cost of UBA backhaul between the exchange and the cabinet. Note that a non-unbundler would face the total UBA price (UCLL price plus UBA increment) regardless of whether the line is cabinetised or not.

548. Most submissions on our FPP process agreed with an aggregation approach to set prices for UCLL and SLU, including Vodafone,[399] Spark,[400] and Chorus.[401] Spark noted

[396] Commerce Commission "Standard Terms Determination for the designated service Telecom's unbundled copper local loop network" 7 November 2007, Decision 609.

[397] Commerce Commission "Standard Terms Determination for the designated services of Telecom's unbundled copper local loop network service (Sub-loop UCLL), Telecom's unbundled copper local loop network colocation service (Sub-loop Co-location) and Telecom's unbundled copper local loop network backhaul service (Sub-loop Backhaul)" 18 June 2009, Decision 672.

[398] Commerce Commission "Consultation paper outlining our proposed view on regulatory framework and modelling approach for UBA and UCLL services" 9 July 2014, paragraph [205]; Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014, paragraph [381]; Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 2 July 2015, paragraph [417].

[399] Vodafone "Submission to the New Zealand Commerce Commission – Comments on Consultation paper outlining Commission's proposed view on regulatory framework and modelling approach for UBA and UCLL services" 6 August 2014, paragraph [G3.1(a)].

that the UCLL and SLU services “are substitutes for each other and any price differentials will see access seekers rapidly migrate to lowest cost access”.[402] WIK submitted that it is common international practice to follow an aggregation approach, and to do otherwise would result in the individual characteristics of each line determining prices.[403]

549. However, Wigley and Company argued that an aggregation approach is not legally open to us, and we need to determine the TSLRIC-based prices for UCLL and SLU on a standalone basis using the TSLRIC modelling approach.[404, 405]

550. We disagree with the contention that we must calculate standalone TSLRIC-based prices for UCLL and SLU. We have applied the TSLRIC approach required by the Act to determine ULL costs, but we are not able to determine TSLRIC for SLU because of our choice of an FTTH/FWA MEA (which, as noted, does not include active cabinets). Other submitters have agreed that aggregation is a practical response to the difficulties of calculating a SLU price using a FTTH/FWA MEA.[406]

551. Further, we are also required under the Act to consider the section 18 purpose statement. Even if we were able to calculate separate prices for UCLL and SLU using the TSLRIC modelling approach, this could likely lead to differences in the overall cost to unbundlers of access to cabinetised and non-cabinetised lines. In our view, such an approach would be unlikely to best give effect to the section 18 purpose statement for the following reasons.

551.1 Separate overall access costs between cabinetised and non-cabinetised lines are unlikely to provide neutral incentives for unbundling across those

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400 Telecom “UCLL and UBA FPP: consultation on regulatory framework and modelling approach – Submission Commerce Commission” 6 August 2014, paragraph [133].

401 Chorus “Submission for Chorus in response to Draft Pricing Review Determinations for Chorus’ Unbundled Copper Local Loop and Unbundled Bitstream Access Services (2 July 2015)” 13 August 2015, paragraph [145].

402 Telecom “UCLL and UBA FPP: consultation on regulatory framework and modelling approach – Submission Commerce Commission” 6 August 2014, paragraph [133]; Spark New Zealand "UCLL and UBA FPP: consultation on regulatory framework and modelling approach - Cross-submission Commerce Commission" 20 August 2014, paragraph [140].

403 WIK-Consult "Report for Telecom New Zealand and Vodafone New Zealand - Submission - In response to the Commerce Commission’s “Consultation paper outlining our proposed view on regulatory framework and modelling approach for UBA and UCLL services (9 July 2014)”" 5 August 2014, paragraph [50].

404 Wigley and Company "Cross submissions as to draft UCLL and UBA FPP determinations" 20 March 2015, paragraph [13.10-13.12] and [13.20]; and Wigley and Company “Submission on Further Draft Pricing Review UCLL and UBA Determinations” 13 August 2015, paragraph [1.12].

405 Wigley and Company also submitted that we had not dealt with its previous submissions criticising the aggregation model (Wigley and Company “Submission on Further Draft Pricing Review UCLL and UBA Determinations” 13 August 2015, paragraph [8.1]). This is not correct – we dealt with Wigley and Company’s previous submissions on this issue in our July 2015 UCLL further draft determination – see Commerce Commission “Further draft pricing review determination for Chorus’ unbundled copper local loop service” 2 July 2015, paragraphs [422]-[424].

406 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and Process and Issues Update Paper for the UCLL and UBA Pricing Review Determinations" CONFIDENTIAL, 20 February 2015, paragraph [192].

lines (unless the UBA price is also differentiated between cabinetised and non-cabinetised lines).[407] For example, if the SLU price plus the cost of the fibre feeder is higher than the UCLL price, then this may result in a higher price being paid by an unbundler on a cabinetised line. This may materially discourage sub-loop unbundling where it would otherwise be efficient.

551.2 There is a risk that separate prices between cabinetised and non-cabinetised lines may adversely impact on retail prices. In particular, the higher-priced service may act as a cost floor to retail pricing where, as appears to often be the case, access seekers are constrained in differentiating their retail prices (ie, between cabinetised versus non-cabinetised lines.

552. In contrast, an aggregation approach gives best effect to the section 18 purpose statement and relativity requirement in the Act, by ensuring that unbundlers are faced with the relevant unbundling costs in both the cabinetised and non-cabinetised settings, rather than prices being distorted by different access prices. Aggregation therefore provides neutral incentives for unbundling. It ensures that unbundling is incentivised where it is efficient to do so, and not incentivised where it would be inefficient to do so, which promotes competition for the long-term benefit of end-users.

553. Accordingly, our final decision is to adopt an aggregation approach to setting prices for the UCLL and SLU services. For the above reasons, we consider that the aggregation approach best promotes competition for the long-term benefit of end-users.

*Implementation of the aggregation approach*

554. The implementation of our aggregation approach is explained and set out in Attachment O – Implementation of aggregation. In summary, our approach allocated the modelled TSLRIC of the ULL between UCLL and SLU such that the UCLL cost equals the SLU cost plus the modelled TSLRIC of the fibre feeder.

555. We consider that this implementation of our aggregation approach best ensures that the efficient costs incurred for access between the end-user and the exchange are the same, irrespective of whether the line is cabinetised or non-cabinetised. An alternative approach proposed earlier in our FPP process by WIK was to base the UCLL and SLU prices off cost ratios from an FTTN model.[408] However, we rejected this approach as it is unlikely to provide the same price for cabinetised and non-

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407 The UBA price on cabinetised lines would reflect sub-loop backhaul costs, while those sub-loop backhaul costs would be excluded from non-cabinetised lines.

408 WIK-Consult "Report for Telecom New Zealand and Vodafone New Zealand - Submission - In response to the Commerce Commission’s “Consultation paper outlining our proposed view on regulatory framework and modelling approach for UBA and UCLL services 9 July 2014” 5 August 2014, paragraph [49]; and Chorus "Cross-submission in response to the Commerce Commission’s Consultation paper outlining its proposed view on the regulatory framework and modelling approach for UBA and UCLL services” 9 July 2014, 20 August 2014, paragraph [145].

cabinetised lines, and therefore will result in disaggregation.[409] In its recent submission on this issue, Spark submitted that it agrees with our approach to implementing aggregation.[410]

556. In our July 2015 UCLL further draft determination, this implementation approach resulted in a negative price for SLU services in rural areas.[411] Submitters were critical of this result. For example, Network Strategies submitted that this result “raises concerns about the model’s approach and calculations”.[412] WIK submitted that the negative SLU price in rural areas is “highly irrational”, and shows that the aggregation approach is “implausible, incorrect and represents a model error”.[413]

557. We note that our TSLRIC model for this final determination no longer produces a negative SLU price in rural areas. As explained below, even if it did, we would not consider this a concern.

558. The negative SLU price in rural areas can occur because the aggregation approach is based on independent calculations. That is, the ULL costs are derived from the modelled fibre network, while the costs of the fibre feeder are derived from the modelled UBA network (with an underlying copper access network). In its cross submission, Analysys Mason explained how these independent calculations can result in the negative SLU price.[414] In particular, Analysys Mason noted that in rural areas, our decision to exclude the capital costs of that part of the network that lies outside the TSO boundary often eliminates all lines on a cabinet, so the modelled fibre network does not extend into areas where this occurs. However, this does not happen with the fibre feeder in the modelled UBA network, because the UBA network requires those lines to carry UBA traffic. This can result in a low ULL cost, and a high fibre feeder cost, leading to a negative SLU price.

409 Commerce Commission “Draft pricing review determination for Chorus’ unbundled copper local loop service” 2 December 2014, paragraph [398].

410 Spark "Further draft pricing review determination for Chorus’ UBA and UCLL services" CONFIDENTIAL, 13 August 2015, paragraph [308b].

411 Commerce Commission “Further draft pricing review determination for Chorus’ unbundled copper local loop service” 2 July 2015, footnote [255].

412 Network Strategies “Final report for Spark New Zealand and Vodafone New Zealand - Revised draft determination for the UCLL and UBA price review” 13 August 2015, p. 24.

413 WIK-Consult “Submission In response to the Commerce Commission’s “Further draft pricing review determination for Chorus’ unbundled bitstream access service” and “Further draft pricing review determination for Chorus’ unbundled copper local loop service” including the revised cost model and its reference documents” 12 August 2015, paragraphs [384]-[385].

414 Analysys Mason “Report for Chorus - UCLL and UBA FPP further draft determination cross-submission” CONFIDENTIAL, 22 September 2015, section 2.6.

559. Accordingly, to the extent that there is a negative SLU price in rural areas, this does not reflect a model error. In addition, in any model with a large degree of averaging (eg, geographically) analysis at a disaggregated level may not necessarily produce plausible results. It is the average results that concern us, and the SLU price in rural areas is not used as a price for the SLU service.

560. Overall, for the reasons explained above, our final decision is to adopt the aggregation approach set out in Attachment O – Implementation of aggregation to set prices for UCLL and SLU.

*Our monthly TSLRIC unit costs determined for UCLL and SLU*

561. Table 4.4 below shows the monthly unit TSLRIC determined for UCLL and SLU based on our aggregation approach as explained in the previous sections.[415]

**Table 4.4: Monthly unit TSLRIC (NZ$, nominal costs)**

| | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 |
|---|---|---|---|---|---|
| UCLL | $29.75 | $30.22 | $30.70 | $31.19 | $31.68 |
| SLU | $15.52 | $15.70 | $15.89 | $16.07 | $16.26 |

*Source: Commission's TSLRIC model for final determination*

### Price profile

562. In this final decision we are required to determine prices for the UCLL and SLU services in each year over a five-year regulatory period. We have therefore considered what the appropriate profile of prices should be over that five-year period.

563. Throughout our FPP pricing review determination process we have considered two possible options for the price profile: a constant (levelised) nominal price that remains unchanged for each year of the five-year regulatory period; or a varying price profile in which we set different prices for each year over the regulatory period.

564. Our final decision is for a price profile of different prices for each year over the regulatory period. We explain our reasons for this decision in more detail below.

*Our choice of the appropriate price profile*

565. In considering the choice of either a constant or varying price profile, we note that it is possible to ensure that both approaches are equivalent in net present value (NPV) terms. That is, a constant price profile can be determined in such a way so that the stream of cash flows arising from the constant levelised price has the same NPV as the stream of cash flows arising from the increasing nominal prices over the

[415] When we first determined a STD for SLU (and other sub-loop services) in June 2009, we set the price for SLU based on a benchmarked proportion of 60.4% of the full-UCLL price. When we re-determined SLU prices in December 2012, we also applied the 60.4% proportion of sub-loop to full-loop prices to determine the SLU price. By way of comparison, the SLU prices that we set out in Table 4.4 are approximately 51-52% of the UCLL prices in Table 4.4 (with the exact percentage depending on the relevant year of the regulatory period being considered).

regulatory period.[416] As a result, both approaches achieve efficient cost recovery (consistent with our TSLRIC objectives/outcomes) in present value terms over the regulatory period.

566. However, the advantage of a varying price profile is that it is likely to reduce the size of price changes at the start and end of the regulatory period, because changes in prices are spread out over the regulatory period. In contrast, using a price path based on nominal prices for each year over the regulatory period would result in a larger price change at the start of the regulatory period, as well as at the end of the regulatory period when prices are reset.

567. Submitters generally agreed with this point. WIK submitted that a constant price profile approach can be disruptive to the market at the start and end of the regulatory period if there is a steady cost trend.[417] Similarly CallPlus submitted that a constant levelised price creates problems for unbundlers by effectively increasing the price they pay in years 1 and 2 of the regulatory period.[418] Spark agreed that a varying price profile will mitigate the risk of price shocks, and added that “it will also avoid one set of access seekers and end-users (those who purchase services at the beginning of the period) subsidising a different set (those who purchase services at the end)”.[419]

568. We note also the submissions by Spark and WIK, that a constant price over the regulatory period provides price signals that risk distorting efficient choices.[420,421] To some extent we agree – a varying price more closely reflects costs in each year over the regulatory period. Even so, this is not a major factor in choosing a price profile. This is because averaging within the TSLRIC model and the requirement to determine a geographically averaged price undermines, to some extent, the ability for prices to closely reflect costs.[422]

416 A formula for ensuring this was set out in Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014, paragraph [412].

417 WIK-Consult "Submission in response to the Commerce Commission's Draft pricing review determination for Chorus' unbundled bitstream access and unbundled copper local loop services including the cost model and its reference documents" CONFIDENTIAL, 20 February 2015, paragraph [91].

418 CallPlus "Submission on the Commerce Commission's Draft determinations for UBA and UCLL services" CONFIDENTIAL, 20 February 2015, paragraphs [58-63].

419 Spark "Further draft pricing review determination for Chorus’ UBA and UCLL services" CONFIDENTIAL, 13 August 2015, paragraph [315].

420 Spark "Further draft pricing review determination for Chorus’ UBA and UCLL services" CONFIDENTIAL, 13 August 2015, paragraph [312].

421 WIK-Consult "Submission in response to the Commerce Commission's Draft pricing review determination for Chorus' unbundled bitstream access and unbundled copper local loop services including the cost model and its reference documents" CONFIDENTIAL, 20 February 2015, paragraph [91]; and WIK-Consult "Submission In response to the Commerce Commission’s “Further draft pricing review determination for Chorus’ unbundled bitstream access service” and “Further draft pricing review determination for Chorus’ unbundled copper local loop service” including the revised cost model and its reference documents" 12 August 2015, paragraph [194].

422 Sapere made a similar point – see Sapere Research Group Limited "Report for Chorus - Economic Comment on UCLL and UBA Pricing Issues" 11 August 2015, paragraph [125].

569. While most submitters supported a varying price profile,[423] at the conference Chorus indicated it had a "slight preference" for a constant levelised price over the regulatory period. Chorus stated that setting constant levelised prices is a pragmatic approach that will provide stability over the regulatory period.[424] Chorus also submitted that a constant price profile has the advantage of simplicity.[425]

570. While we agree with Chorus that a constant price profile can provide price stability, it does so only within the regulatory period. A constant price profile does not provide stability between regulatory periods due to the increased likelihood of price shocks when prices are reset. In contrast, as noted above, such price shocks are mitigated to a greater extent with a varying price profile. In any case, we do not believe that price stability within the regulatory period is beneficial enough to outweigh the detrimental impacts of a constant levelised price.

571. Regarding the simplicity of a constant price, given the complexity of TSLRIC modelling, any additional simplicity added by a constant nominal price (relative to a price that varies over the regulatory period) is unlikely to be material. Indeed, we agree with the submissions of Trustpower, who noted that an annual adjustment to prices is "hardly onerous",[426] and Wigley and Company, who suggested that an annual adjustment is relatively simple.[427]

*Our final decision regarding the price profile*

572. Our final decision is for a price profile of different prices for each year over the regulatory period. We consider that this approach best reduces the size of price changes at the start and end of the regulatory period. This implies that the prices determined from our TSLRIC model in each year of the regulatory period and taking into account the other adjustments explained in this Chapter (as set out in Table 4.4 above), are our final prices for the UCLL and SLU services.

573. To implement our preferred approach we factored in the effect of price trends on the network build. Our TSLRIC model uses cost data collected in 2014, the most recently available data when we began to collect data and implement our model. However our final decision is issued in December 2015. To account for this timing

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423 Sapere made submissions that it stated related to the price profile within the regulatory period (Sapere Research Group Limited "Report for Chorus - Economic Comment on UCLL and UBA Pricing Issues" 11 August 2015, paragraph [120]-[121]). However, Sapere's arguments appeared to relate to the implementation of the price profile on the assumption that backdating to December 2014 occurs. Therefore we do not consider Sapere's submissions relevant to our choice of either the constant price profile or varying price profile.

424 Commerce Commission "UBA and UCLL pricing review determination conference transcript" 15-17 April 2015, p. 283.

425 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services (2 July 2015)" 13 August 2015, paragraph [281].

426 Trustpower "Trustpower cross submission: Further draft pricing review determinations" 24 September 2015, paragraph [10.3.1].

427 Wigley and Company "Cross-submission in relation to UCLL and UBA draft pricing review determinations" 24 September 2015, paragraphs [11.6]-[11.7].

difference, the prices shown as Year 1 in our price path have factored in a year's price trend (so Year 1 in our price path is the second year in the TSLRIC model).

**Cross-checks on the level of TSLRIC prices**

574. In response to the December 2014 draft determination, Spark provided a comparison of the draft TSLRIC prices for the UCLL service with international benchmarks and submitted:[428]

> These facts, and the magnitude of the divergence from past estimates and overseas prices – which would have the effect of transferring between $500 million and $1.5 billion dollars from New Zealand end-users to Chorus over the course of the next five years – should have been sufficient to cause the Commission to delve more deeply than it has into the reasons for this divergence and to think more carefully about making the number of decision it has to favour predictability and investment incentives over lower prices. Surprisingly the draft determinations do not comment on or explore the significant divergence from previous pricing estimates, and international experience.

575. We considered the evidence provided by Spark and the evidence collected in previous IPP benchmarking exercises in our July 2015 UCLL further draft determination. We found that our draft prices were within the broad range indicated by the full set of relevant international comparator data we had available.[429] We noted our significant concerns that any available comparator data can act as a cross-check on the FPP modelling. Nonetheless, having considered this evidence we did not believe it led us to take any other action.

576. Given the FPP is being determined as a process that involves modelling New Zealand-specific costs as a requested alternative to the existing IPP based on international comparators, such comparators have a limited role to play in the FPP.

577. This concern is highlighted in the case of the UCLL price, where our IPP process found only one comparable country, Sweden. To determine a price, we therefore had to use alternatives to our previous benchmarking methodology.[430] In particular, the 2007 issue of US comparators being significantly higher than other comparators, and whether New Zealand costs are more like US costs or not, is masked by using currently available data that will exclude the US states. The lack of US comparators in the Spark dataset was a significant drawback to its use as a cross-check on the draft FPP prices.

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[428] Spark "UBA and UCLL FPP pricing review draft decision submission", 20 February 2015 paragraph [14], p. 9. Several other submitters have also referred to this comparison for example Wigley and Company "Cross submissions as to draft UCLL and UBA FPP determinations" 20 March 2015 paragraph [1.1(a)] and Vodafone New Zealand Limited "Cross Submission to the New Zealand Commerce Commission" 20 March 2015 paragraph [(v)]. Chorus submitted that this evidence should be rejected (Chorus, "Cross submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services", 20 March 2015, paragraph [5]).

[429] We have limited our considerations here to the usefulness of available data and evidence as a cross-check rather than repeating the IPP exercise. This is because the FPP for the UCLL service is TSLRIC.

[430] In this IPP we used both benchmarking the change in regulated prices and econometrically adjusting benchmarks to improve comparability.

578. To accompany our July 2015 UCLL further draft determination, we requested TERA examine the New Zealand model against other regulatory decisions for which public information is available.[431] These comparators are Ireland, France, Denmark, and Sweden.[432] Based on this analysis, TERA advised us that the main factors driving different costs for New Zealand are the spatial dispersion of end-users driving a higher network length for each line and, higher trenching costs (when compared with Sweden and Denmark). In effect, customers in New Zealand tend to be more spread out and so it costs more to provide the infrastructure to reach them. Even in Sweden which, on a national basis, has a similar population density to New Zealand, the population is not so dispersed.[433] TERA has found that the network length for each line is 64.9 metres for New Zealand compared to 41.2 for France, 51.2 for Sweden and 55 for Denmark. For trenching costs, we have sought and received advice from Beca, local civil engineering experts, on the expected costs for New Zealand. While the modelled average trenching costs are higher in New Zealand ($84 per metre) than Sweden ($52) or Denmark ($34), New Zealand trenching costs are lower than for France ($88).

579. In response to our July 2015 further draft determination, we received submissions suggesting that more countries should be compared, chosen overseas comparator data is outdated and Sweden is more geographically dispersed based on urbanisation levels. We have analysed these submissions, as has TERA, and have found that the comments are either unfounded or do not have a material impact on TERA's analysis. In its submission, WIK provided a new New Zealand benchmark price that it produced by putting New Zealand capital costs into the Swedish TSLRIC model. However, subsequent corrections to this analysis by TERA and Analysys Mason brought the benchmark price up to a price similar to the FPP, reducing the impact of WIK's analysis.

580. Attachment R – International comparators of this final decision provides our analysis of international comparators including more detailed analysis of submissions and cross submissions. TERA has also published a report in which it responds to critiques of its international comparator modelling. That report accompanies this final decision.[434]

431 See TERA, "International comparison of TSLRIC UCLL and UBA costs and prices", June 2015.

432 While the French regulator does not use a TSLRIC model to set prices, and so its regulated price is not comparable to our TSLRIC estimate, a TSLRIC model is available for France.

433 The intuitive story for this is that Sweden has large areas where no one lives.

434 TERA Consultants "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services: Analysis of the critiques of the international comparator report" December 2015.

# Chapter 5: Price adjustments for UCLL and SLU

**Purpose**

581. In this Chapter, we set out our consideration of the following concepts.

581.1 Whether the mid-point estimate of the weighted average cost of capital (WACC) used to determine the TSLRIC price for the UCLL service is likely to best give effect to the section 18 purpose statement.[435]

581.2 Whether the central estimate of the TSLRIC price for the UCLL service is likely to best give effect to the section 18 purpose statement.[436]

581.3 Whether a specific adjustment should be made to the central estimate of the TSLRIC prices for the UCLL or UBA services to give effect to the relativity requirements of the Act.

582. Relativity is important, as it is a mandatory consideration under the Act. Yet it is considered last as our focus is on relativity between the prices we intend to apply.

583. Our main considerations on moving above or below the mid-point for the WACC or the central estimate of the TSLRIC price relate to asymmetric costs of under- or over-estimation. Where feasible and useful, we have sought to quantify such effects. Throughout this FPP process, we have engaged independent expert academic and consultancy support in doing this, and we have consulted on our quantification framework, as discussed further below.

584. We note that we have considered a specific adjustment to the WACC, which is one parameter used to estimate the TSLRIC-based price, and adjusting the TSLRIC-based price for the UCLL service. Our specific consideration of whether the WACC parameter should be adjusted focuses on investment effects and, in particular, investment in innovative new telecommunications services. This is because of the potential signal our decision about the allowed WACC may send to investors in telecommunications services more generally. Our analysis of a TSLRIC price adjustment focuses on the migration effects of such an adjustment, as the UCLL price is likely to directly affect retail prices for copper-based services. This, in turn, will influence substitution between copper and fibre.

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[435] The discussion of a WACC uplift (below) is a summary of a more detailed analysis that appears in the separate cost of capital report for the UCLL and UBA pricing reviews, released with this final determination.

[436] By "central estimate", we mean the unadjusted estimate produced by our TSLRIC model.

**Our final decision**

585. Based on the analysis that we have undertaken (including quantitative modelling), the submissions received on that analysis, and our consideration of other relevant contextual factors, our final view is that neither our mid-point WACC estimate nor our central estimate of the TSLRIC-based price for the UCLL service needs adjusting.

586. Our final decision is that it is appropriate to use the mid-point estimate of the WACC to determine the TSLRIC price for the UCLL service in this pricing review determination. In our view, the link between a WACC uplift and incentives to invest is not sufficiently robust to support an uplift in this case.

587. We also consider that the central estimate of the TSLRIC price for the UCLL service is likely to best give effect to the section 18 purpose statement. Having considered the potential consequences of increasing the regulated price of the UCLL service above our central TSLRIC estimate, we consider that such an uplift would not promote competition for the long-term benefit of end-users.

588. We have also considered whether adjusting down the WACC in particular and/or the TSLRIC price generally is appropriate. We have concluded that it would not be consistent with section 18 to set a price below our best estimate of the TSLRIC price for the UCLL service.

589. On relativity, our final view is that we should be neutral towards unbundling and should not try to either promote or hinder it. Also, we should allow for unbundling to occur to the extent that it is efficient. Accordingly, we have not adjusted our central estimates of the TSLRIC-based prices of the UCLL and UBA services on the grounds of relativity.

**Why did we consider adjusting the final price?**

*Estimating TSLRIC prices is uncertain*

590. As we have explained in Chapter 2, we are directed by the Act to determine a TSLRIC-based price for the UCLL service. The nature of a TSLRIC modelling exercise means that we have had to make a number of judgement calls as to how to model the service and which parameters to use. We note that TSLRIC modelling faces a degree of uncertainty. As such, people may disagree with one or more options given in a range of options for any decision made. We have provided further details on our judgement and views on modelling decisions in this final determination.

591. We also consider over-estimating or under-estimating the regulated price may produce asymmetric effects. In particular, the costs of setting a regulated TSLRIC price that is too high would include the welfare losses to end-users from higher retail prices for copper-based services. The costs of setting a price that is too low could include losses from less investment in innovative new services and slower migration to fibre-based services. The potential that the costs of setting a price that is too low might exceed the costs of setting a price that is too high led us to consider whether an uplift might be justified.

592. Given this asymmetry and the uncertainty inherent in estimating a TSLRIC-based price, we have examined the potential welfare consequences of moving from our

mid-point WACC estimate and our central estimate of the TSLRIC price for the UCLL service. In this assessment we have tried to quantify the changes in welfare that could arise from an uplift to either the WACC or the TSLRIC price produced by our model.[437] Throughout the FPP process, we have engaged a number of international experts to assist us in this exercise, and have separately published their reports.[438]

593. We undertook the quantitative analysis (further described below) to develop our view on whether an uplift is likely to give best effect to section 18. In addition, we have looked at some contextual considerations that we believe should be examined in any case for an uplift. These are also set out in the following sections.

594. We have not explicitly modelled a move below our WACC mid-point or our central TSLRIC estimate, as we consider that, in the current case, setting a regulated price below what we expect to be the TSLRIC of supplying the UCLL service is unlikely to best give effect to the section 18 purpose statement of the Act. Although setting such a regulated price would likely lead to lower prices for consumers in the short term, it would not allow for the recovery of our best estimate of the efficient "forward-looking" costs of supplying the UCLL service. It is therefore likely to send a strong negative signal for investment in new network infrastructure in the future. In addition, setting a regulated price that is below our central estimate is likely to distort demand and slow migration to fibre.

595. Wigley and Company disagreed with our approach, arguing that we should consider a downward movement in TSLRIC and WACC, and that "if there is room to move up, relative to the central estimate … there must be room to move down within a plausible range. But the Commission has always thought of this issue in terms of up not down movement."[439]

596. Our final decision is that reducing a regulated price below our best estimate of the efficient cost of supplying the regulated service would create significant risk to the expectation of cost recovery by investors in the telecommunications sector and, potentially, more broadly.[440] While we recognise that such a TSLRIC exercise risks an

437 A number of submissions on the December 2014 draft determinations argued that we should try and quantify these welfare effects. For example, Spark "Submission on UBA and UCLL FPP pricing review determination" CONFIDENTIAL, 20 February 2015, paragraph [112].

438 See Vogelsang, I. "Reply to Comments on my November 25, 2014, paper "Current academic thinking about how best to implement TSLRIC in pricing telecommunications network services and the implications for pricing UCLL in New Zealand"" 23 June 2015; Cambini, C. "Potential welfare gains and losses from an uplift to copper prices: A Reply to Companies' comments" 19 May 2015; Cambini, C. "Economic aspects of migration to fibre and potential welfare gains and losses from an uplift to copper prices" 16 March 2015; Dobbs, I. "Welfare effects of UCLL and UBA uplift: Comments on the Application of the Dobbs 2011 model" 29 May 2015; and Oxera "Is a WACC uplift appropriate for UCLL and UBA?" June 2015.

439 Wigley and Company "Submission on Further Draft Pricing Review UCLL and UBA Determinations" 13 August 2015, paragraph [5.12(e)].

440 Although we set a price below the mid-point of the voice benchmark set in the mobile termination access services standard terms determination, this was primarily due to comparability factors. In particular, we stated: "the 25th percentile of the voice benchmark set is appropriate as the price point as there are a range of comparability factors that suggest the efficiently incurred costs of providing the voice MTAS services in 2011 are below the median of the voice benchmark set". Commerce Commission "Standard Terms Determination for the designated services of the mobile termination access services (MTAS) fixed-

over-estimation, we do not consider that it would promote competition for the long-term benefit of end-users of telecommunications services to set a price lower than what we consider most likely to be the efficient "forward-looking" cost of providing the service. Further, given the wide range of investments that would potentially be impacted by the negative signal referred to above, we consider that there is little value in attempting to model the costs and benefits of a downwards adjustment.

597. We also note that according to Wigley and Company, "[i]n the apparent drive for prices to be increased, it seems little regard is had as to the real world in which Chorus operates, implying that there should readily be a downward price movement."[441] Wigley and Company claimed that the section 18 consideration of a price adjustment is a "real world, fact-based analysis", which is distinct from the TSLRIC modelling "which is deliberately hypothetical. Concepts such as a price high enough to ensure 'the recovery of the efficient "forward-looking" costs' have no place in the s 18 analysis, as that is a real-world analysis."[442]

598. We disagree with Wigley and Company's submission that having determined a TSLRIC price based on the efficient "forward-looking" costs of deploying a new network, we should then adjust the price down to reflect what Wigley and Company refers to as Chorus' prudent and efficient investment in copper. In our view, while such an approach might be appropriate where the regulated price is to be based on Chorus' actual costs, our framework is based on a hypothetical efficient operator. As noted by Wigley and Company elsewhere, submitters widely agreed on the framework for determining a TSLRIC-based price:[443]

> The one element of common ground between Chorus and our RSP [retail service provider] and consumer representative clients is that "The historic costs of network deployment … are irrelevant in calculating a "forward-looking" long run incremental total cost of the service … "forward-looking" costs reflect the costs that a network operator would incur if it built a new network today using assets collectively referred to as the modern equivalent asset."

599. According to Wigley and Company, this framework "counts against" the use of Chorus' actual costs.[444] Spark and Vodafone agreed that a TSLRIC model will inevitably depart from Chorus' actual investment and that the hypothetical efficient operator cannot be defined simply on the basis of Chorus' current position.[445,446]

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to-mobile voice (FTM), mobile-to-mobile voice (MTM) and short messaging services (SMS)) - Decision 724" 5 May 2011, paragraph [ix].

441 Wigley and Company "Submission on Further Draft Pricing Review UCLL and UBA Determinations" 13 August 2015, paragraph [5.12(h)].

442 Ibid, paragraph [5.11(i)].

443 Wigley and Company "Cross-submission in relation to UCLL and UBA draft pricing review determinations" 24 September 2015, paragraph [6.11].

444 Ibid.

445 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" 24 September 2015, paragraph [21].

446 Vodafone "Submission to the New Zealand Commerce Commission on further draft pricing review determination for Chorus' unbundled copper local loop service and further draft pricing review determination for Chorus' unbundled bitstream access service" 13 August 2015, paragraph [A4.2].

600. In our view, considering whether to adjust down our central TSLRIC estimate for the reasons claimed by Wigley and Company would depart from what we consider is a "forward-looking" TSLRIC-based price. Wigley and Company appeared to acknowledge this, noting that "there is such a departure from using TSLRIC, using for example building blocks etc" for copper-based services.[447] It is not open to us to depart from TSLRIC pricing, as we are required to determine a regulated price for the UCLL service according to the FPP of TSLRIC.

601. Wigley and Company also referred to a number of our modelling decisions that it claimed have resulted in an uplift to the TSLRIC price, such as the choice of modern equivalent asset (MEA) (including the use of fixed wireless access (FWA)) and the use of replacement cost to value so-called "reusable" assets.[448] In this regard, we note that for each modelling decision we have chosen what is in our view the most appropriate option for implementing the TSLRIC FPP without trying to err on the high or low side. We also note that these decisions are aligned with the conceptual framework of a hypothetical efficient operator, rather than Chorus' actual costs. As discussed further in Attachment E, while Wigley and Company referred to modelling choices that might be expected to move the TSLRIC price up, other submitters have pointed to individual modelling choices which they claimed do not adequately compensate Chorus.[449] Such potential gains and losses are to be expected when determining a TSLRIC price based on the "forward-looking" costs of deploying an MEA network, rather than Chorus' actual costs.

*We have not derived a plausible range of TSLRIC*

602. The final output of the model represents our central estimate of the "forward-looking" TSLRIC for the UCLL service, as determined in accordance with the framework set out in Chapter 2. In other words, the final output reflects the various modelling choices, many of which have a range of reasonable options. For this reason, we consider that more than one reasonable TSLRIC is available for the UCLL service. Any assertion that a properly conducted TSLRIC modelling exercise automatically produces the "true TSLRIC" is misconceived. Accordingly, in the present context, we consider our TSLRIC output as a central estimate which could be said to lie within a "plausible range".

603. We note that actually quantifying such a plausible range would be a complicated and, ultimately, uncertain process. In particular, this could involve modelling a large number of combinations of different modelling choices and consolidating those into some kind of range. Even then, the nature of some of those modelling choices means that determining a plausible range is not achievable.[450]

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[447] Wigley and Company "Submission on Further Draft Pricing Review UCLL and UBA Determinations" 13 August 2015, paragraph [5.12(h)(v)].

[448] Ibid, paragraphs [6.7], [6.10].

[449] For example, L1 Capital has listed the modelling choices that it considers undercut the actual costs faced by Chorus and LFCs. See L1 Capital, 13 August 2015, pp. 2-4.

[450] An example is the modelling choice relating to the selection of the MEA. Modelling choices relating to some input parameters (such as for example the WACC) may be subject to distributions that could in

604. CEG suggested that we consider the use of Monte Carlo simulation to address uncertainty in the estimation of TSLRIC prices.[451] We have previously noted that such an approach is informationally demanding and that it was unclear how to apply such an approach for individual parameters such as an asset life or unit costs, where the sample of observations might be relatively small.[452]

605. Professor Vogelsang also raised concerns, which we share, about how to implement CEG's proposal:[453]

> My only comment on CEG's section 6, which covers a suggested empirical approach via Monte Carlo simulations, is that it appears to be totally unworkable in the current proceeding. It would require probability assessments for various parameters that are not available at all.

606. Although for these reasons we have not tried such a quantitative approach, we consider that our central estimate of the TSLRIC price sits within a plausible range, and we believe that it is appropriate to consider whether there are good reasons to move away from this central estimate. Our starting point is that setting a price based on our best estimate of the TSLRIC price will meet our section 18 purpose statement. Accordingly, before setting a different price, we would need to be satisfied that moving above or below our central estimate would best meet our section 18 purpose statement to promote competition in telecommunications markets for the long-term benefit of end-users of telecommunications services.

607. We have therefore considered the potential welfare consequences of over- or under-estimating the TSLRIC price.

*What did we try to measure?*

608. In considering whether there is a case for a potential uplift, we have focused on the incremental benefits and costs to end-users of telecommunications services that could reasonably be attributable to the uplift. Professor Vogelsang noted that it is the incremental benefits and costs arising from an uplift that are important:[454]

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principle be used to establish a range. In contrast, other choices, such as those relating to the MEA, are more discrete.

451 CEG "Uplift asymmetries in the TSLRIC price" February 2015, Section 6.

452 Commerce Commission "Agenda and topics for the conference on the UCLL and UBA pricing reviews" 2 April 2015, from paragraph [93].

453 Ingo Vogelsang "Reply to Comments on my November 25, 2014, paper "Current academic thinking about how best to implement TSLRIC in pricing telecommunications network services and the implications for pricing UCLL in New Zealand"" 23 June 2015, paragraph [97]. Houston Kemp also noted that CEG's proposed approach would rely on probability distributions for these input variables. If such were not available, "the value of undertaking a Monte Carlo exercise will be greatly reduced." Houston Kemp "Comment on the Commerce Commission's paper: Agenda and topics for the conference on the UCLL and UBA pricing reviews" 11 May 2015, p. 38.

454 Ingo Vogelsang "Reply to Comments on my November 25, 2014, paper "Current academic thinking about how best to implement TSLRIC in pricing telecommunications network services and the implications for pricing UCLL in New Zealand"" 23 June 2015, paragraph [3].

Hausman seems to suggest that the benefits from the deployment of high-speed broadband (such as the UFB) are at stake; but irrespective of what the Commission decides on the uplift question, the UFB is committed and hence the benefits from UFB will emerge anyway. Relevant would be the innovation effects that could be attributed to the uplift, not the aggregate innovation effects that would occur anyway.

609. The potential welfare losses arising from an uplift to the UCLL price would be in the form of higher retail prices for copper-based services. Such losses would flow in a relatively direct manner from any uplift and would depend primarily on the extent to which the uplift (either to the TSLRIC price or to the WACC) is passed through into the retail prices paid by end-users.

610. In terms of the potential welfare benefits from an uplift, we considered a range of possible benefits, including:

610.1 faster migration of customers from copper to fibre, which could generate consumer benefits in the form of positive network externalities;[455]

610.2 improved quality of service;

610.3 expansion of existing networks; and

610.4 investment in innovative new telecommunications services.

611. In terms of what we are measuring in this context, we consider that consumer surplus and total surplus are both relevant to promoting competition for the long-term benefit of end-users under section 18.[456] In particular, while consumer surplus might appear to be the economic concept most closely connected to the language of section 18, we consider total surplus is relevant where it incorporates long-term benefits to end-users not otherwise captured. In practice, we are not convinced, in the quantitative models provided, that the differences between the total welfare and consumer welfare estimates were due to factors other than a transfer of wealth from consumers to producers. This leads us to the view that the consumer welfare standard is more relevant in this case. This is consistent with the approach that we have taken in the regulation of electricity lines and gas pipeline businesses.[457] We note that we have previously considered consumer welfare and total welfare.[458]

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[455] Network externalities refer to the increased utility that other subscribers enjoy from having additional subscribers join the network. In the case of migration to fibre, such network externalities might arise from being able to communicate with a wider customer base using services that fibre supports, or to the extent that higher penetration of fibre stimulates more innovative applications over fibre.

[456] Further discussion about whether to use a consumer welfare standard or total welfare standard is in the separate WACC report released with this final determination. Commerce Commission “Cost of capital for the UCLL and UBA pricing reviews: Final decision” 15 December 2015.

[457] Commerce Commission “Amendment to the WACC percentile for price-quality regulation for electricity lines services and gas pipeline services, Reasons paper” 30 October 2014, Attachment A. We acknowledge that the purpose statement for Part 4 of the Commerce Act differs slightly from that of the Telecommunications Act.

[458] Commerce Commission “Report on access to the unbundled elements of Telecom’s local loop network and access to the unbundled elements of and interconnection with Telecom’s fixed Public Data Network

612. Chorus submitted that section 18 requires us to apply a total welfare standard, as this best secures the long-term benefit of end-users by incentivising investment and innovation.[459] According to Chorus, the long-term benefit of end-users is served by promoting economic efficiency, which requires a total welfare standard. Chorus referred to Sapere's advice that promoting competition within a total welfare standard leads to long-term benefits for consumers and is well-accepted by economists.[460]

613. Sapere also submitted that section 18 was intended to have the same meaning as section 1A of the Commerce Act, and that the concept of long-term benefit of end-users in section 1A has been interpreted as a total welfare standard. Sapere drew a contrast between section 18 of the Act and Part 4 of the Commerce Act, noting that the former does not include an explicit provision to limit the ability of suppliers to extract excessive profits. As a result, Sapere saw no reason to interpret section 18 as requiring anything other than a total welfare standard.

614. Other submitters supported using a consumer welfare standard. Vodafone, "along with our expert advisors Network Strategies, WIK, and DotEcon, submit that the consumer welfare standard is more appropriate than a total welfare standard in the present context."[461] Wigley and Company submitted that section 18(1) is "solely about end users and therefore consumer welfare and consumer surplus", while Spark disagreed with Sapere's claim that the Act only references a total welfare standard.[462,463]

615. We do not agree with the view of both Chorus and Sapere that section 18 requires us to apply a total welfare standard. We have approached section 18 on the basis that promoting competition for the long-term benefit of end-users of telecommunications services is the dominant provision, and that efficiency considerations and incentives to invest help us consider whether competition is being promoted to this end.

616. We acknowledge that a static assessment of consumer welfare may not capture efficiency or other benefits to consumers that occur over the long term through, for

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under section 64 and Schedule 3 of the Telecommunications Act 2001" 22 December 2003, paragraphs [30]-[59]; Commerce Commission "Reconsideration Final Report on whether mobile termination should become a designated or specified service" 21 April 2006, paragraphs [51]-[54].

459 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services (2 July 2015)", 13 August 2015, paragraph [240].

460 Ibid, paragraph [241].

461 Vodafone "Cross submission to the New Zealand Commerce Commission on further draft pricing review determination for Chorus' unbundled copper local loop service and further draft pricing review determination for Chorus' unbundled bitstream access service" 24 September 2015, paragraph [B5.2].

462 Wigley and Company "Supplementary Submission on Commission's "Analytical Frameworks for Considering and Uplift to the TSLRIC Price and/or WACC" 11 May 2015, paragraph [4.19]; Wigley and Company "Cross-submission in relation to UCLL and UBA draft pricing review determinations" 24 September 2015, paragraph [1.5] and section 2.

463 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" 24 September 2015, paragraph [197].

example, innovation or quality improvements. Accordingly, where the estimates of consumer and total welfare differ, we have considered whether this is due to factors that may provide long-term benefits to end-users that would not otherwise be captured in the analysis. However, where the differences reflect a transfer of wealth from consumers to producers due to higher prices without inducing innovation and investment, we consider that consumer welfare provides a better basis for assessing the long-term benefit of end-users. Our assessment of the probability and scale of investment and migration effects that an uplift might induce is not sufficient to justify the cost to end-users. So, in this case, we have placed more weight on the consumer welfare standard.

617. Sapere claimed that the view that a total welfare standard is consistent with the long-term benefit to consumers is well-accepted in economic literature. This view is at odds with Professor Hausman's submission for Chorus, where he stated that "Economists have determined that consumer welfare should be the goal of regulation" and that "The consumer welfare standard of economists is very similar to the "long-term benefit of end-users" (LTBE) approach used in the NZ Telecommunications Act."[464] Professor Hausman later repeated his view "that the consumer welfare standard is the correct standard to evaluate telecommunications policy and regulation", adding that it is crucial that consumer welfare is evaluated over the correct timeframe.[465]

> In my view in [sic] concept of the "long-term benefit of end-users" (LTBE) the word "long-term" is very important because it incorporates the effects of investment. In economics "long-term" means taking into account a period long enough so that the capital stock changes, and is not fixed, as it is in the short-term.

618. We have noted previously that we broadly agree with Professor Hausman's view that it is appropriate to focus on the potential changes to consumer welfare when implementing regulation through a cost-based pricing determination.[466] We also agree that in determining a "forward-looking" TSLRIC-based price, the "long-term" must be considered to ensure that regulated prices take into account the efficient "forward-looking" costs of supplying the regulated service and provide incentives for investment. We discuss the importance of evaluating efficient costs over the long run in more detail in Chapter 2 of this final determination, as well as in Attachment E in the context of asset valuation. In particular, we note that the TSLRIC pricing principle is a long run incremental cost standard, and in implementing this standard for the current determination we have considered the "forward-looking" costs that would be incurred over the long run by a hypothetical efficient operator deploying a MEA network.

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464 Professor Hausman "Response to the Commerce Commission's Draft Determination on Uplift" 18 February 2015, paragraphs [16], [17].

465 Professor Hausman "Clarification as to what welfare standard I think is required for the Commission's analytical framework of potential TSLRIC and/or WACC uplifts" 1 May 2015, paragraphs [4], [5].

466 Commerce Commission "Cost of capital for the UCLL and UBA pricing reviews" 2 July 2015, paragraphs [239], [241].

619. In our view, this addresses the concerns raised by Professor Hausman about the situation in which regulated prices are set so as to increase short-term consumer welfare. Consumer welfare could be maximised in the short term by setting regulated prices on the basis of short-run marginal cost although, as Professor Hausman noted, this could be detrimental to investment and the long-term benefit of end-users. However, as noted above, TSLRIC is a long run cost standard, and we have implemented the "forward-looking" TSLRIC FPP accordingly in this pricing review determination.[467]

620. Professor Vogelsang also characterised a total welfare standard that includes significant wealth transfers from consumers to producers as being inconsistent with the long-term benefit of end-users. In his review of CEG's modelling of the potential impact of an uplift, Professor Vogelsang commented that:[468]

> … by using total surplus as the yardstick CEG misses the LTBEU objective. In applying the Frontier-Dobbs model it directly estimates the consumer welfare uplift from new products being supplied (something which can usually be missed in a static analysis), but the total welfare estimates effectively ignore large transfers of wealth from consumers to producers – not something which usually fits with the long term benefit of end-users.

621. In his review of submissions on the July 2015 further draft determination, Professor Vogelsang refuted Sapere's arguments for a total welfare objective, noting that a consumer welfare standard has substantial support, including by Professor Hausman in the context of the FPP.[469] Professor Vogelsang also noted that regulation is applied to markets not currently subject to workable competition so as to protect consumers from being exploited by firms with market power.[470]

622. We agree with Professor Hausman and Professor Vogelsang that it is appropriate to have regard to changes in consumer welfare within the context of the regulatory provisions of the Act. The Act addresses concerns about monopoly rents and the lack of competition to drive them out by establishing an access regime to promote competition for the long-term benefit of end-users. This means that distributive issues ought to be considered since relying on the interplay of competitive forces to ensure appropriate treatment of any surplus seems unlikely.

623. As noted in Chapter 2, one objective of TLSRIC-based regulation is to constrain monopoly pricing. This is consistent with the view of considering the consumer

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467 DotEcon has also noted that the "important differentiation between short-term and long-term effect seems to be largely absent from Sapere's discussion (for example when one of the arguments why section 18 is not tractable as a consumer benefit test is that in doing so one might ignore the "*potential loss of dynamic efficiency benefits from innovation or improvements to service quality.*")". See DotEcon "A review of "Economic Comment on UCLL and UBA Pricing Issues" by Sapere Research Group" - Prepared for Spark and Vodafone" September 2015, p. 14-15.

468 Professor Vogelsang "Reply to Comments on my November 25, 2014, paper "Current academic thinking about how to best implement TSLRIC in pricing telecommunications network services and the implications for pricing UCLL in New Zealand" " 23 June 2015, paragraph [41].

469 Ingo Vogelsang "Review of some Submissions on the Commerce Commission's July 2, 2015, draft determination on UCLL/UBA pricing", 26 November 2015, paragraph [36].

470 Ibid, paragraph [39].

welfare standard, particularly as incentives for efficient investment and innovation are maintained through the long run nature of the TSLRIC pricing principle.

624. In this sense, the setting of access prices under the Act involves similar considerations to the regulation of existing market power under Part 4 of the Commerce Act and it is appropriate for us to consider and give weight to distributional effects.

625. We also note that the promotion of competition for the long-term benefit of end-users of telecommunications services is relevant. In this regard, while wider economic benefits and costs (such as the impact of fibre adoption on economic growth) are possible, we have focused on the direct welfare consequences for end-users of telecommunications services. We also note that this view is conceptually supported by Professor Vogelsang in the context of the UBA:[471]

> Spillover effects from UFB investments come in two forms. Most direct are spillovers in the form of network effects on new applications that directly benefit the UFB subscribers. Such effects are not taken into consideration in the subscription decisions of potential new subscribers, leading to too few subscribers. In contrast, more indirect spillovers affect the economic growth of a country via improvements in productivity and the like. While one can argue that the latter indirect effects should be the concern of the central government, a case can be made for the former direct effects to be the concern of the Commerce Commission both with respect to the LTBEU and efficiencies gained for the telecommunications sector. As a result innovation incentives and risks faced by investors could potentially justify a UBA price above the true cost. In contrast, a UBA price below true cost has to be seen as conflicting with the goals of s 18.

626. The network effects to which Professor Vogelsang referred are the effects that we have tried to identify in our consideration of a potential uplift to the TSLRIC price, as further discussed below.

*Consideration of an adjustment*

627. Some submitters have contended that we do not have discretion to move away from the central estimate to promote migration to fibre. For example, Spark argued that our task is to determine a TSLRIC price for the regulated service, and that we do not have the power to apply a separate uplift to promote migration to fibre.[472] Wigley and Company also submitted that our legal obligation is to determine the "true" TSLRIC and not to set a different price for non-cost reasons (such as to promote migration to fibre).[473]

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471 Ingo Vogelsang "What effect would different price point choices have on achieving the objectives mentioned in s 18, the promotion of competition for the long-term benefit of end-users, the efficiencies in the sector, and incentives to innovate that exist for, and the risks faced by investors in new telecommunications services that involve significant capital investment and that offer capabilities not available from established services? - Paper Prepared for the New Zealand Commerce Commission" 5 July 2013, paragraph [56].

472 Spark "Analytical framework for considering an uplift to FPP prices" 11 May 2015, paragraphs [8], [16].

473 Wigley and Company "Commentary on behalf of consumer interests on Commerce Commission paper dated 2 April 2015 as to TSLRIC and WACC uplifts" 13 April 2015, paragraph [2.9].

628. According to Vodafone, an uplift above TSLRIC costs is inconsistent with our task under section 18 of the Act,[474] which is best served by setting the UCLL and UBA prices at our central estimate of TSLRIC. Vodafone argued that any adjustment to the TSLRIC price must be based on strong and compelling evidence that such an adjustment is necessary to promote competition for the long-term benefit of end-users and that the magnitude of adjustment made will achieve that outcome.[475]

629. Vodafone also noted that we have previously rejected arguments by Chorus to prioritise migration to UFB (under section 18(2A)).[476]

630. Network Strategies argued that the role of regulatory pricing is to set efficient prices under the TSLRIC approach, while the issue of uplifts to achieve policy goals is the role of the policy maker.[477]

631. We do not agree with submitters in this regard, due to the potential asymmetric effects from over-estimating versus under-estimating the regulated price. For example, if the evidence demonstrates that incentivising migration to fibre (by way of moving to a different point within a plausible range) would promote competition in telecommunications markets for the long-term benefit of end-users of telecommunications services, then we have the discretion to make this adjustment. Indeed, some submitters acknowledged the wider point that the TSLRIC estimate can be adjusted if doing so would best achieve the section 18 purpose statement. It is unclear to us why some submitters have sought to “carve out” migration benefits from this wider point. Doing so overly limits the application of section 18, which applies to “telecommunications markets” and “telecommunications services” as a whole.

632. In our view, the potential for an uplift to promote migration to fibre is a relevant consideration that could achieve the section 18 purpose statement. As noted by Vodafone, in our UBA initial pricing principle (IPP) determination we previously disagreed with Chorus that section 18(2A) requires us to prioritise migration to UFB. However, we also noted that we had elaborated on our thinking in relation to dynamic efficiency, migration, and section 18(2A) in the UBA IPP update paper:[478]

474 Vodafone “Submission to the Commerce Commission on Commission paper: Analytical Frameworks for considering an uplift to the TSLRIC price and/or WACC” 11 May 2015, paragraph [iii].

475 ibid, paragraph [C1.12].

476 ibid, paragraph [C2.4].

477 Network Strategies “Analytical frameworks for an uplift to the TSLRIC price and WACC” 11 May 2015, Section 2.

478 Commerce Commission “Unbundled Bitstream Access Service Price Review - Update on matters relevant to the UBA price review” 13 August 2013, paragraphs [123-125].

We use 'migration' as a summary term to describe the dynamic efficiency features of the UFB, embracing network effects and the critical mass of end-users that will help promote development and uptake of new applications, software, and content (innovative services).

While we recognise that many of the applications that will drive take-up of UFB are already available internationally, we consider there are still potentially important applications, content and services where introduction into the New Zealand market will depend on when a threshold take up of UFB is reached.

The Government is providing a substantial subsidy for the UFB, which may address the risks facing LFCs in the delay between the capital investment in the UFB and the build-up of end-users and revenue. However, even if the subsidy addresses these risks, there remains a direct benefit to end-users from accelerated migration where that would bring forward availability of highly valued innovative services (ie, the subsidy may not fully internalise the benefits of accelerated migration).

633. In the UBA IPP update paper we noted that migration effects are relevant considerations when determining the price for the UBA service under the IPP. We consider that these effects are still relevant in the current context. In addition to migration effects, in the following sections we consider the potential implications for investment.

634. As noted earlier in this Chapter, we have carefully considered the potential asymmetric effects from over-estimating or under-estimating the regulated price. Setting a regulated TSLRIC price that is too high would generate welfare losses to end-users from higher retail prices for copper-based services, while setting a price that is too low could damage investment incentives and lead to welfare losses. Those losses could be due to lower or deferred investment in innovative new services (both in the telecommunications sector and potentially more broadly), as well as slow migration to fibre-based services.

635. In the following sections, we set out our consideration of the welfare consequences of a potential uplift and whether such an uplift is likely to promote competition for the long-term benefit of end-users. We also set out our final views on the implications of adjusting down our central estimate of the TSLRIC price.

**Our approach to considering an uplift to the mid-point estimate of the WACC**

636. This section considers whether or not to apply an uplift to our mid-point estimate of WACC for the UCLL and UBA services. We have considered applying an uplift to the mid-point WACC estimate given:

636.1 the inherent uncertainty in estimating WACC. The WACC we apply is an estimate as the actual cost of capital is not observable. Therefore, our WACC estimate could be higher or lower than the true WACC; and

636.2 WACC is likely to be an important parameter in promoting efficient investment for the long-term benefit of consumers. The allowed WACC for UCLL and UBA could potentially send a signal to investors in telecommunications services more generally about the allowed rate of return for regulated telecommunications services.

637. Consistent with our 2014 review of the WACC uplift for electricity lines and gas pipeline businesses, we consider that two primary questions must be answered when considering whether to apply a WACC uplift:[479]

637.1 Is there any reason to depart from the mid-point WACC estimate (ie, the best parameter based estimate we have of the cost of capital)?

637.2 If so, what is the most appropriate percentile?

638. We have considered possible sources of asymmetry from under- and over-estimating the WACC for UCLL and UBA. However, based on our analysis, we consider that there is no strong justification for departing from the mid-point WACC estimate.

639. In reaching this conclusion we have explored available quantitative evidence about whether a WACC uplift should be applied for UCLL and UBA. This evidence includes a report prepared by Oxera on this topic (and associated submissions).[480] We consider that the quantitative evidence is consistent with our view that no uplift should be applied.

640. More detailed discussion of our analysis about whether or not apply a WACC uplift for the UCLL and UBA services is in the separate cost of capital report released with this final determination.[481] That document and this document should be read together and combined to form our final determination.

*Quantitative evidence about the appropriate WACC percentile*

641. In our view, the strongest justification for departing from the mid-point WACC relates to incentives to invest in innovative new telecommunications services. Applying a WACC uplift for UCLL and UBA could potentially send a signal to investors that the risk of under-estimating the allowed WACC is lower. This in turn could mean the risk of delaying deployment of new telecommunications services in New Zealand is reduced. This is an important consideration, due to the rate of technological development in the telecommunications industry, and potential benefits to consumers associated with investing in innovative new services.[482]

642. The main quantitative model used for considering whether to apply an uplift to the mid-point WACC estimate for UCLL and UBA was developed by Oxera in its June 2015 report. This model is based on an amended version of the framework used in our 2014 review of the WACC percentile for electricity lines and gas pipeline

[479] Commerce Commission “Amendment to the WACC percentile for price-quality regulation for electricity lines services and gas pipeline services: Reasons paper” 30 October 2014, p. 28, paragraph [2.6].

[480] Oxera “Is a WACC uplift appropriate for UCLL and UBA?” June 2015.

[481] Commerce Commission “Cost of capital for the UCLL and UBA pricing reviews: Final decision” 15 December 2015.

[482] Section 18(2A) of the Act requires us to consider the incentives to innovate that exist for, and the risks faced by, investors in new telecommunications services, when conducting our overall consideration of competition for the long-term benefit of end-users.

businesses.[483] Two other quantitative models were also discussed in the July 2015 further draft determinations, but submissions on the July draft focused on Oxera's June 2015 model.[484]

643. The quantitative models have been useful for exploring the question of whether to apply a WACC uplift. Even so, we consider that they suggest that under a TSLRIC pricing principle the connection between a WACC uplift for UCLL/UBA and increased incentives to invest in innovative new telecommunications services is too uncertain to justify an uplift (compared to the increased cost to consumers, which is relatively certain). As Oxera noted: [485]

> …the evidence [in support of an uplift] is not strong, and requires significant speculation about the nature and scale of benefits of future innovation, and, therefore, does not contradict the continued use of a midpoint WACC for UCLL/UBA.

644. In particular, the potential benefits from applying a WACC uplift under a TSLRIC pricing principle are very uncertain. This uncertainty, associated with measuring the potential benefits of an uplift, reflects:

644.1 the uncertain connection under a TSLRIC pricing principle between applying a WACC uplift for UCLL/UBA and incentives to invest in new telecommunications technologies more generally (as discussed in paragraphs 653 to 655 below); and

644.2 a lack of information about key relationships and input values when attempting quantitative modelling (eg, the impact of the allowed regulatory WACC on the timing of investment in new technologies, and yearly benefits to consumers associated with new telecommunications services).

645. Several submissions commented on the technical aspects of Oxera's modelling, but we consider that the proposed amendments do not materially change the weight that should be placed on the quantitative modelling, or the conclusions made from it. We consider that the key deficiency in the argument for an uplift is the significant uncertainty associated with measuring the potential benefits of a WACC uplift.

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483 Oxera "Is a WACC uplift appropriate for UCLL and UBA?" June 2015.

484 The two other quantitative models discussed in the July 2015 draft determinations were: (i) the model discussed in Attachment C of the April 2015 pre-conference paper, which we constructed by adapting the approach Oxera used during the 2014 Part 4 WACC percentile review; and (ii) the model submitted by CEG (for Chorus), which is based on an amended version of the model originally developed by Professor Ian Dobbs in 2011. Further discussion of these models is in paragraphs 285 to 305 of the cost of capital report published with the July 2015 further draft determinations.

485 Oxera "Is a WACC uplift appropriate for UCLL and UBA?" June 2015, p. 37.

646. When evaluating the submissions, Oxera found no compelling evidence that would lead it to change the assumptions in its June 2015 report:[486]

> As noted in our June report, while it is intuitive that there is a link between a WACC uplift and investment in general, the link between a WACC uplift for UCLL/UBA specifically and innovation is more difficult to establish with certainty. This uncertainty is one of the reasons why we interpreted the results of our modelling with caution. Specifically, we concluded that although there may be a case for a modest uplift, the evidence overall was not strong. We continue to stand by this conclusion in light of the comments received.

647. After reviewing Oxera's model and associated submissions, Professor Vogelsang also found the evidence for applying an uplift was not strong.[487]

648. Further discussion of the Oxera model is contained in the separate cost of capital report for UCLL and UBA, released with this final determination.[488]

*The potential role of a WACC uplift across different categories of investment*

649. When determining any reason to depart from the mid-point WACC estimate, we have considered the potential role of a WACC uplift across different categories of investment. The main categories we considered are:

    649.1 investment in maintaining, upgrading and expanding the copper network; and

    649.2 investment in new telecommunications services.

650. Our view is that a WACC uplift to incentivise further investment in Chorus' copper network is not justified.

651. Although we currently apply an uplift to the mid-point WACC for electricity lines and gas pipeline services regulated under Part 4 of the Commerce Act, the context for regulation of UCLL and UBA is different from price-quality path regulation under Part 4.[489] This includes a difference in the underlying model used, with a TSLRIC pricing principle used for UCLL and UBA, and a regulatory asset base (RAB) model for price-quality path regulation. The services are also of a different nature and have varying levels of alternative services as substitutes.

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[486] Oxera "Review of expert submissions on further draft determinations for UCLL and UBA services: The case for a WACC uplift" 2 November 2015, p. 2.

[487] Professor Ingo Vogelsang "Review of some Submissions on the Commerce Commission's July 2, 2015, draft determination on UCLL/UBA pricing" 26 November 2015, paragraphs [61-71].

[488] Commerce Commission "Cost of capital for the UCLL and UBA pricing reviews: Final decision" 15 December 2015.

[489] Under Part 4 of the Commerce Act, we currently apply a WACC uplift to mitigate the risk of major supply outages on electricity lines and gas pipelines networks (resulting from under-investment). Commerce Commission "Amendment to the WACC percentile for price-quality regulation for electricity lines services and gas pipeline services: Reasons paper" 30 October 2014.

652. We consider that the case for applying a WACC uplift to incentivise further investment is much weaker for UCLL and UBA (relative to electricity lines and gas pipelines). In particular, this is because:

652.1 under TSLRIC pricing, new investment undertaken by Chorus does not affect the regulated price-caps, which suggests that a WACC uplift is less likely to materially affect Chorus' incentives to invest in UCLL/UBA. This differs from the situation under Part 4 of the Commerce Act, where new investment is rolled into the RAB;

652.2 UCLL and UBA outages are likely to be relatively localised, given that these services relate to the access network (rather than backhaul/transmission lines);

652.3 the presence of substitutes (eg, mobile networks) reduces the impact on consumers of outages on the copper network;

652.4 competitive pressure from other networks (such as mobile and fibre) may also help generate incentives to invest in maintaining the copper network, particularly in areas where Chorus is not the LFC; and

652.5 for network expansion, capital contributions help cover the cost of any network new connections.

653. We do recognise that in terms of incentives to invest in innovative new telecommunications services, applying a WACC uplift for UCLL and UBA could potentially send a signal to investors that the risk of under-estimating the allowed WACC is lower. This in turn could mean the risk of delaying deployment of new telecommunications services in New Zealand is reduced.

654. However, as discussed above, we consider that the link between a WACC uplift for the UCLL and UBA services and the benefits associated with reducing the risk of delayed deployment of new telecommunications technologies in New Zealand is too uncertain (taking into account the probability and likely results of the link in terms of advancing investment) to justify the higher costs to consumers.

655. The strength of this link will depend on factors subject to considerable uncertainty, such as:

655.1 the probability of a new telecommunications technology being commercialised, with sufficient demand to be viable in New Zealand, which investors expect to end up being subject to regulation;

655.2 the form of regulation expected to be applied, if the new service is ultimately subject to regulation. As noted in paragraph 652.1 above, under a TSLRIC pricing principle incremental investment does not affect the regulated price-caps. This differs from a RAB-based approach, where new investment is rolled into the asset base; and

655.3 the materiality of a WACC uplift when deciding whether to deploy the new telecommunications service in New Zealand, relative to other factors such as uncertainty around consumer willingness to pay/uptake, and the potential for a response from competitors.

656. In contrast, the costs to consumers of a WACC uplift are relatively certain and material. For example, we estimate that increasing the allowed WACC by 50 basis points (from 5.56% to 6.06%) would increase the combined UCLL and Basic UBA monthly rental prices in the first year of the regulatory period by about $1.68, from $41.19 to $42.87.

657. Further, we disagree with Sapere's submission that applying the mid-point WACC estimate for UCLL and UBA would be "time-inconsistent".[490] In particular, we note that:

657.1 no previous commitment (or precedent) exists for applying an uplift to the mid-point WACC for UCLL/UBA, or telecommunications services in New Zealand more generally;

657.2 as noted in paragraph 636 above, we have followed the same approach used when considering whether to apply a WACC uplift as part of the 2014 IMs WACC percentile review. Although the approach is the same, the outcome is different, reflecting the different context including the key difference between the pricing principles involved and the evidence in each case; and

657.3 in our view, the primary issue when considering any potential time-inconsistency is avoiding expropriation of sunk investments. We do not see any argument that expropriation will occur when the mid-point WACC is used.

658. Overall, we consider that the link between a WACC uplift for UCLL and UBA under the TSLRIC pricing principle and benefits from earlier deployment of new services is too weak to justify an uplift, when compared to the certain (and potentially very large) cost to consumers. Therefore, our view is that a WACC uplift for UCLL and UBA would not best achieve the section 18 purpose statement.

**Consideration of whether our TSLRIC estimate best gives, or is likely to best give, effect to the section 18 purpose statement**

*Assessing the welfare implications of an uplift*

659. This section considers whether or not to apply an uplift to our central estimate of the TSLRIC price for the UCLL service, which takes into account potential migration effects.

[490] Sapere Research Group Limited "Report for Chorus - Economic Comment on UCLL and UBA Pricing Issues" 11 August 2015, p. 18-24.

660. We have previously indicated our view that the unadjusted central estimate of the TSLRIC price is likely to best give effect to the section 18 purpose statement.[491] We stated that an uplift would not be appropriate, as our modelling decisions had provided a central estimate of a TSLRIC price that mitigated concerns over asymmetric costs.[492]

661. We noted that such an asymmetry could develop, as the costs of mistakenly setting a TSLRIC price that is too high would include the welfare losses to end-users from higher retail prices for copper-based services. Yet, setting a TSLRIC price that is too low could slow migration to fibre-based services and would defer potential welfare benefits from such services.[493]

662. Professor Vogelsang also concluded that an uplift on the UCLL price was unlikely to promote competition for the long-term benefit of end-users, although it may create positive network externality effects on other networks. He concluded further that, for UFB subscribers, such effects were likely to outweigh any negative externality effects on the remaining copper subscribers.[494] Professor Vogelsang advised that no empirical analysis of externality effects exists. Even so, he believes that customers migrating to fibre networks will likely have a positive net externality effect, taking into account the likely negative externalities for copper-based services.[495]

663. During the course of the FPP process, we have developed an analytical framework for considering the welfare implications of an uplift to the TSLRIC-based price for the UCLL service. Initially we consulted before the conference about our proposed framework for considering a TSLRIC uplift.[496] This framework provided a more quantitative basis for assessing the potential effects of an uplift, and identified what, in our view, are the key issues relevant to evaluating the consequences for consumer welfare of increasing the price for the UCLL service above the central estimate generated by our TSLRIC model. We engaged Professor Cambini to review our proposed analytical approach, and we incorporated a number of his recommendations, including empirical work on fibre adoption over time.

664. We have however noted that quantifying the potential welfare effects of an uplift is inherently difficult and subject to considerable uncertainty.[497] Professor Vogelsang has advised that as no empirical analysis exists, any analysis would be complex and

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491 Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014, paragraph [453].

492 ibid, paragraph [426].

493 ibid, paragraph [419].

494 Ingo Vogelsang "The effects of the UCLL contribution to the UBA aggregate on competition for the long-term benefit of end-users in New Zealand telecommunications markets" 2 July 2014, paragraphs [43], [44].

495 Ingo Vogelsang "Report on several submissions in the FPP proceeding for UCLL" 6 November 2014, paragraph [3].

496 Commerce Commission "Agenda and topics for the conference on the UCLL and UBA pricing reviews" 2 April 2015.

497 ibid, paragraph [44].

lack a quantitative basis.[498] In its cross submission for Chorus on the December 2014 draft determination, Houston Kemp noted that quantifying such gains is difficult due to limited data being available on households switching from broadband to UFB and, as a consequence, such benefits are typically addressed in a more qualitative way.[499]

665. In assessing the potential welfare implications of an uplift to our central TSLRIC estimate, we have focused on the incremental benefits and costs which could be reasonably attributed to any decision to apply an uplift to the UCLL TSLRIC price. This differs from a full assessment of the costs and benefits of a fibre-to-the-home (FTTH) deployment such as the UFB, as most of these effects are not externalities and will be factored into end-users decisions, ie, will be reflected appropriately in the rate of migration irrespective of whether a UCLL uplift is applied.

666. Our focus here has been on the potential migration effects of an uplift (in terms of faster migration to fibre), rather than on investment effects.[500] We have considered investment effects in the analysis of a possible WACC adjustment.

667. To quantify the potential effects of a TSLRIC price uplift, we assumed that the central estimate of the TSLRIC price was increased by $1 a month, and that this was fully passed through into the retail prices of those services that rely on the UCLL service. The higher retail price for copper-based services (relative to fibre) would lead to customers switching from copper to fibre-based services (based on a cross-elasticity of demand for fibre with respect to copper prices). As a result, under a scenario where an uplift is applied, the number of fibre subscriptions would be higher (and the number of copper-based subscriptions lower) than if no uplift were applied.

668. The potential benefits from faster migration to fibre can be described in terms of positive network externality effects, such as the ability to communicate with more people using ultrafast connectivity, and greater innovation in fibre-based services as a result of the higher customer base. We measured the value of such effects as a proportion of the level of expenditure on UFB services.[501]

669. Our initial estimates of the potential welfare costs to consumers of the $1 increase were about -$93 million in present value terms (over a 15 year period and with a discount rate of 10%). The potential welfare gains ranged from $1.6 million to $38.8 million in present value terms (15 years, 10%). We also referred to a range of other

498 Ingo Vogelsang "Report on several submissions in the FPP proceeding for UCLL" 6 November 2014, paragraph [3].

499 Houston Kemp "Response to Spark New Zealand's Attachment D: Illustrative estimate of social cost of high price, A Report for Chorus" 12 March 2015, p. 7.

500 We have separately considered more generalised investment effects in our analysis of the potential effects from a WACC uplift.

501 In the 2 April 2015 consultation, we noted that the only reference point we were aware of for such effects was derived from Ofcom's Network Externality Surcharge (NES) relating to mobile networks in 2005, which was 2% of expenditure. We also used 25% and 50% as sensitivities.

potential effects that we had not tried to quantify, but which would likely further reduce the net benefits from any uplift.[502]

670. The main issues raised in submissions on our proposed framework were broadly grouped around the model inputs and assumptions we had made, and welfare effects that we had omitted. We made a number of amendments to our analytical framework in light of these submissions, and summarised the resulting estimates in our July 2015 further draft determination.[503] These estimates are presented in Table 5.1 below.

**Table 5.1: Summary of net effects of a TSLRIC uplift**

| | | Network externality as % of UFB expenditure | | |
|---|---|---|---|---|
| | | **2%** | **25%** | **50%** |
| Cross-elasticity | 0.6 | -$105,802,618 | -$96,617,596 | -$86,633,876 |
| | 1.2 | -$104,609,732 | -$86,239,687 | -$66,272,248 |
| | 3.0 | -$101,031,074 | -$55,105,963 | -$5,187,363 |

671. In addition, other factors could affect the net benefits from an uplift to the UCLL TSLRIC price. These factors include the potential for retail prices for UFB-based services to increase in response to the increase in copper-based prices, which would dampen migration to fibre; negative externalities for subscribers remaining on copper-based services; supply-side constraints in connecting UFB customers; and additional welfare losses for individuals who only switch to fibre as a result of the higher copper price.

672. In our July 2015 further draft determination we concluded that an uplift to our central TSLRIC estimate for the UCLL service was not justified, as it would be unlikely to best give effect to section 18. While an uplift to the UCLL price would be likely to accelerate migration from copper-based to fibre-based services, the higher costs faced by subscribers who remain on copper-based services were likely to significantly outweigh the potential benefits from faster migration.

673. Professor Vogelsang agreed that no uplift should be applied in the current case:[504]

> I still agree with the Commission's Draft Determination's conclusions on the lack of a case for an uplift on the UCLL/UBA price, as long as the main parameters are selected in a neutral way, re-use of assets is not given special credit and there is no performance adjustment for the QoS difference between UFB and copper access.

502 Commerce Commission "Agenda and topics for the conference on the UCLL and UBA pricing reviews" 2 April 2015, Table 3 and Table 6.

503 A detailed summary of, and response to, submissions on our proposed framework (as set out in our 2 April 2015 consultation) was set out in Attachment R of our July 2015 further draft determination.

504 Ingo Vogelsang "Reply to Comments on my November 25, 2014, paper "Current academic thinking about how best to implement TSLRIC in pricing telecommunications network services and the implications for pricing UCLL in New Zealand"" 23 June 2015, paragraph [52].

674. In submissions on our July 2015 further draft determination, Spark, Vodafone, and Wigley and Company supported our view of not applying an uplift to the TSLRIC estimate.[505] [506] [507] For example, Spark submitted that:[508]

> We agree with the Commission's further draft decision that no adjustment should be made to either the central TSLRIC price estimate for UCLL or UBA, or the mid-point WACC estimates. We also strongly support the Commission's reasons, on the grounds set out in our submissions and cross-submissions on the UCLL Draft Determination, the accompanying expert reports, and material addressed in the Commission's conference.

675. Network Strategies noted that we had implemented a number of its recommendations into our analysis of the impact of a TSLRIC uplift, and that the welfare losses from an increase in copper prices are still likely to far outweigh any welfare gains from faster migration to fibre or from developing new services.[509]

*Assessing the welfare implications of adjusting the price down*

676. Having welcomed our view of not applying an uplift to the TSLRIC estimate, Wigley and Company set out some concerns about our assessment of the case for an uplift. According to Wigley and Company, we did not adequately address its previous submissions (in particular, its submission dated 11 May 2015) in which it commented on WACC and TSLRIC uplifts.[510]

677. In addition, Wigley and Company submitted that we should also consider the case for adjusting the price down, in particular in light of the following:[511]

    677.1 the asset values for the modelled networks for UCLL and UBA in the July 2015 further draft determinations are significantly greater than Chorus' enterprise value;

    677.2 the use of historic cost rather than optimised replacement cost (ORC) for reusable assets would reduce the UCLL price by 9%;

    677.3 Professor Vogelsang's view on re-use;

    677.4 Chorus receives an advantage by reason of the de-averaging of prices; and

[505] Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" 13 August 2015, paragraph [317].

[506] Vodafone "Submission to the New Zealand Commerce Commission Further Draft Pricing Review Determination for Chorus' Unbundled Copper Local Loop Service and Further Draft Pricing Review Determination for Chorus' Unbundled Bitstream Access Service" 13 August 2015, paragraph [Q1.1].

[507] Wigley and Company "Submission on Further Draft Pricing Review UCLL and UBA Determinations" 13 August 2015, paragraphs [5.1], [5.2].

[508] Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" 13 August 2015, paragraph [317].

[509] Network Strategies "Revised draft determination for the UCLL and UBA price review" 13 August 2015, Section 9.1.

[510] Wigley and Company "Submission on Further Draft Pricing Review UCLL and UBA Determinations" 13 August 2015, paragraphs [5.7]-[5.9].

[511] Ibid, paragraphs [5.10], [5.12].

677.5 TSLRIC over-compensates the operator of a "sunset" copper network, which is why "there is such a departure from using TSLRIC".

678. We note that many of the issues that Wigley and Company raised in its 11 May 2015 submission in relation to the impact of an uplift were addressed in the July 2015 further draft determination and are taken into account in our empirical analysis of whether an uplift to the TSLRIC price is justified.[512]

679. In relation to the possibility of adjusting the price down, Wigley and Company argued that our central TSLRIC estimate is "pre-loaded with decisions based on s 18, involving substantial impacts on the ultimate UCLL and UBA prices". Wigley and Company gave as examples the "decision to go with forward looking costs, and not historical costs, for reusable assets" and the choice of "copper v fibre/FWA MEA".[513] Wigley and Company appeared to be suggesting that some of our individual modelling decisions have been biased upwards to take account of section 18 considerations, and that this has resulted in a TSLRIC price that is higher than what Wigley and Company considers is the proper central estimate of TSLRIC.

680. We have explained in Chapter 2 that the section 18 purpose statement informs our approach to the entire modelling exercise, and its role in relation to individual modelling decisions is not confined to resolving an impasse between two choices. We have kept section 18 in mind throughout. Even so, its main role is in relation to the final price, since it is the overall price (not the separate contributions of individual decisions) that will affect the promotion of competition for the long-term benefit of end-users. In each instance involving the individual modelling decisions, we have exercised our judgement as to the most appropriate option for implementing the TSLRIC FPP within a coherent framework which we have set out in detail in Chapter 2. In doing so, we have not tried to err on the high or low side. Accordingly, we reject the claim that we have produced a price above a neutral or central estimate.

681. We have set out our views earlier in this Chapter on why we consider a move below our TSLRIC estimate to be inappropriate. We have also addressed Wigley and Company's comments on the 9% sensitivity of the decision to use ORC, and on Professor Vogelsang's views on re-use, in Attachment E. We note that while there may have been "a departure from using TSLRIC" in other jurisdictions, we are required under the FPP to determine a "forward-looking" TSLRIC-based price for the UCLL service.

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512 For example, in the July 2015 further draft determination, we explicitly set out our consideration of the cross-elasticity of demand of fibre with respect to copper prices; the appropriate discount rate and timeframe to be used; demand assumptions; and potential migration benefits. We also acknowledged the potential for fibre prices to respond to any increase in UCLL prices, as well as referring to the context in which the Vertigan study in Australia was undertaken. See Commerce Commission " Further draft pricing review determination for Chorus' unbundled copper local loop service" 2 July 2015, especially paragraphs [1852] to [1886].

513 Wigley and Company "Submission on Further Draft Pricing Review UCLL and UBA Determinations" 13 August 2015, paragraphs [6.6], [6.7].

*Our final determination on whether our TSLRIC estimate best gives, or is likely to best give effect to the section 18 purpose statement*

682. In Chapter 4 of this determination, we set out our final estimate of the "forward-looking" TSLRIC-based monthly price for the UCLL service. As noted above, the nature of a TSLRIC modelling exercise requires a number of judgement calls to be made as to how to model the service and which parameters to use. As such, modelling is subject to a degree of uncertainty.

683. Given the asymmetric effects of misestimating the TSLRIC price and the uncertainty inherent in estimating a TSLRIC-based price, we have examined the potential welfare consequences of moving from our central estimate of the TSLRIC price for the UCLL service.

684. In Table 5.1 above we have summarised the net welfare effects that we estimated in the July 2015 further draft determination from a $1 uplift in the TSLRIC price for the UCLL service. These estimates indicate that an uplift would likely produce significant welfare losses.[514]

**Other considerations**

685. In considering the results of the quantitative assessment above, we have considered a number of relevant contextual considerations when assessing the case for an uplift. We provide three considerations below.

686. First, in applying the FPP for the UCLL service, we are required by Clause 4A of Schedule 1 of the Act to determine a geographically averaged price. The costs of deploying and operating a telecommunications network are generally lower in urban areas and higher in non-urban areas. For example, our final geographically averaged TSLRIC price for the UCLL service is $29.75 a month (Year 1), while the urban TSLRIC price is $20.16 a month. The geographically averaged TSLRIC price is therefore 48% higher than the cost of building a replacement network in urban areas. As any new network-based entry is more likely to occur in urban areas,[515] the geographically averaged price provides for a margin. That margin could incentivise such entry.

687. Second, the TSLRIC costs of supplying the UCLL service are modelled using the concept of a hypothetical efficient operator deploying an MEA, rather than using Chorus' actual costs. By setting a UCLL price that is largely independent of Chorus' actual costs, any uplift to either the WACC estimate or the central estimate of the TSLRIC price is likely to have a weaker effect in terms of stimulating investment by Chorus, than it would have under a RAB-based regime. In that type of regime, any

[514] A number of submissions and cross submissions on the July 2015 further draft determination also commented on the issue of a WACC uplift. These issues are addressed later in this section.

[515] This has been the experience observed In New Zealand, both in relation to fixed entry and mobile network-based entry.

new investment by Chorus would more directly lead to an increase in the RAB from which the regulated price is derived.[516]

688. Third, Professor Vogelsang also pointed to a number of features of the TSLRIC modelling and pricing principle that he believes mitigates the need for a further explicit uplift.[517] One such feature is the absence of a performance adjustment to reflect the higher capability where a fibre network is modelled compared to the copper network over which the regulated UCLL service is supplied. Another feature is the decision to follow what Professor Vogelsang refers to as the classical TSLRIC approach to build a new network from scratch rather than incorporating any re-use of existing assets. As we noted in the December 2014 UCLL draft determination paper, we did not take these decisions specifically to err on the high side and do not consider they introduce any biases in our TSLRIC estimate.[518] While we agree that these features of the TSLRIC price are likely to have the effect of promoting some of the benefits discussed above, other modelling decisions that we have taken could arguably offset this effect.

**Consideration of the relativity requirement in the Act**

*Our final determination about the relativity between the UCLL service and the UBA service*

689. Section 19(b) of the Act requires us to consider any additional matters specified in Schedule 1 that focus on the application of the section 18 purpose statement. For both the UCLL service and the UBA services, that additional matter is the relativity between the UCLL service and the UBA service.

690. The UCLL and UBA services relate to each other because access seekers can “unbundle” a cabinet or exchange. To unbundle, access seekers install their own digital subscriber line access multiplexer (DSLAM) in the cabinet/exchange. To provide a broadband service to end-users served by that cabinet/exchange, access seekers who have unbundled only need to purchase the UCLL service from Chorus and not the UBA service. In contrast, access seekers who do not unbundle must purchase the UBA service from Chorus to provide a broadband service to end-users.

691. The relativity of the price of the UCLL service to the price of the UBA service will therefore affect incentives to unbundle. The price of the UBA service is the price of the UCLL service plus the “TSLRIC of additional costs incurred in providing” the UBA

516 Professor Vogelsang made the same point: “TSLRIC simply does not generate an Averch-Johnson effect, because it is based on the HEO and not the RAB.” Ingo Vogelsang “Reply to Comments on my November 25, 2014, paper “Current academic thinking about how best to implement TSLRIC in pricing telecommunications network services and the implications for pricing UCLL in New Zealand”” 23 June 2015, paragraph [82].

517 Ingo Vogelsang “Current academic thinking about how best to implement TSLRIC in pricing telecommunications network services and the implications for pricing UCLL in New Zealand” 25 November 2014, paragraph [118]; Ingo Vogelsang “Reply to Comments on my November 25, 2014, paper “Current academic thinking about how best to implement TSLRIC in pricing telecommunications network services and the implications for pricing UCLL in New Zealand”” 23 June 2015, paragraph [24].

518 Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014, paragraph [421].

service,[519] which we term here “the UBA increment”. The greater the UBA increment is, the greater the incentive on access seekers to unbundle, since the UBA increment is the cost access seekers avoid by unbundling.

692. In considering the relativity requirement of the Act we have assessed whether this provides us with any grounds to adjust our central estimates of the TSLRIC-based prices of the UCLL and UBA services.[520] Our final determination is that relativity does not offer grounds to adjust prices. We elaborate on our reasons for this in the sections below.

*Incentives for unbundling from a higher UBA increment*

693. As noted above, the relativity of the UCLL and UBA prices will affect incentives to unbundle, with a higher UBA increment providing access seekers with stronger incentives to unbundle.

694. An important consideration in respect of relativity is therefore whether providing incentives for unbundling by adjusting the relativity between the UCLL and UBA prices (in particular, from a higher UBA increment) will better promote competition for the long-term benefit of end-users.

695. As a result of the UFB roll-out and the move to a cost-based UBA price the benefits of unbundling for access seekers have been much reduced. Thus, it is no longer clear that trying to directly promote increased unbundling will in fact lead to unbundling.[521] In particular, the roll-out of the UFB network and the migration to fibre may influence access seekers’ investment intentions in such a way that will not necessarily lead to more unbundling. It is therefore uncertain whether access seekers will unbundle widely, particularly if they were to consider instead that the migration of end-users to UFB by access seekers is a preferable competitive strategy.

696. Any increase in the UBA increment to actively promote unbundling will increase prices faced by end-users where the access seeker purchases the UBA service.[522] To the extent that unbundling by access seekers does not occur widely, access seekers increasing their prices without any offsetting benefits from increased unbundling would not promote competition for the long-term benefit of end-users.[523]

519 Subpart 1 of Part 2 of Schedule 1 of the Act.

520 While this final determination relates only to the UCLL service, given the interdependencies between the UCLL service and the UBA service when considering the relativity requirement of the Act, our analysis of relativity jointly relates to both services.

521 We discussed this issue earlier in this FPP process – see Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014, paragraph [473].

522 We discuss below the possibility of promoting unbundling by reducing the UCLL price at the same time as increasing the UBA increment so that the total UBA price remains the same.

523 Professor Vogelsang has previously commented that the detrimental effects of a higher UBA price leading to wasteful duplicate unbundling investments may be mitigated to the extent that the service quality offered by access seekers improves. See Ingo Vogelsang “What effect would different price point choices have on achieving the objectives mentioned in s 18, the promotion of competition for the long-term benefit of end-users, the efficiencies in the sector, and incentives to innovate that exist for, and the risks faced by investors in new telecommunications services that involve significant capital investment and that

697. As a result, we consider that the relativity consideration guides us less towards trying to actively promote further investment in the form of unbundling, and more towards the efficiency aspect of the section 18 purpose statement. That is, rather than directly seeking to promote unbundling, we should be neutral towards it, and allow for unbundling to occur to the extent that it is efficient. Our unadjusted central estimates of the TSLRIC-based prices of the UCLL and UBA services will allow for this neutral approach to unbundling.

698. Throughout our final pricing review determination process several submitters supported this position on relativity, including Chorus,[524] Spark,[525] and Vodafone.[526] Spark submitted, for example, that we should “neither promote nor discourage unbundling”[527] and, at the conference, both Chorus and Vodafone supported our view to be neutral in respect of unbundling.[528]

699. In contrast, CallPlus submitted that relativity is still a critical issue for its unbundling business and so an important consideration for competition in New Zealand.[529, 530] CallPlus’ various submissions on this issue are best summarised in its submission on our December 2014 UCLL and UBA draft determination papers.[531] In that submission,

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offer capabilities not available from established services? - Paper Prepared for the New Zealand Commerce Commission” 5 July 2013, paragraph [42].

524 Chorus ”Submission in response to the Commerce Commission’s Consultation paper outlining its proposed view on the regulatory framework and modelling approach for UBA and UCLL services (9 July 2014)” 6 August 2014, paragraph [210]; and Commerce Commission “UBA and UCLL pricing review determination conference transcript” 15-17 April 2015, p. 77.

525 Telecom “UCLL and UBA FPP: consultation on regulatory framework and modelling approach” 6 August 2014 paragraph [78]; Spark “Submission on UBA and UCLL FPP pricing review determination” CONFIDENTIAL, 20 February 2015, paragraph [183]; and Spark “Further draft pricing review determination for Chorus’ UBA and UCLL services” CONFIDENTIAL, 13 August 2015, paragraph [322].

526 Vodafone “Comments on consultation paper outlining Commission’s proposed view on regulatory framework and modelling approach for UBA and UCLL services” 6 August 2014, paragraph [E1.5]; and Commerce Commission “UBA and UCLL pricing review determination conference transcript” 15-17 April 2015, p. 77.

527 Telecom “UCLL and UBA FPP: consultation on regulatory framework and modelling approach” 6 August 2014 paragraph [78].

528 Commerce Commission "UBA and UCLL pricing review determination conference transcript" 15-17 April 2015, p. 77.

529 CallPlus Limited “Submission on the Commerce Commission’s Consultation Paper: Proposed view on regulatory framework and modelling approach for UBA & UCLL services” 6 August 2014; CallPlus “Submission on the Commerce Commission's Draft determinations for UBA and UCLL services” CONFIDENTIAL, 20 February 2015; and CallPlus Limited “Cross Submission on the Commerce Commission’s Further Draft Pricing Review determinations for UBA and UCLL services” 24 September 2015.

530 In CallPlus’ cross submission dated 24 September 2015, CallPlus submitted that we have not considered or even acknowledged its arguments about the impact of relativity on its unbundling investments (CallPlus Limited “Cross Submission on the Commerce Commission’s Further Draft Pricing Review determinations for UBA and UCLL services” 24 September 2015, paragraphs [4], [5] and [11]). This is not correct; we discussed and assessed these arguments in our July 2015 UCLL further draft determination, see Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 2 July 2015, paragraphs [535]-[539].

531 CallPlus "Submission on the Commerce Commission's Draft determinations for UBA and UCLL services" CONFIDENTIAL, 20 February 2015.

CallPlus set out the key reasoning for the impact of the relativity requirement on its business.

699.1 As a result of its high percentage of unbundled customers, CallPlus is hit particularly hard by an increase in the UCLL price (relative to the IPP price).[532] In contrast, non-unbundlers face a decrease in the UBA increment from the pre-IPP price.

699.2 If unbundlers are unable to offer competitive prices, then CallPlus submitted that this can lead their networks to be underused. Because of economies of scale, CallPlus submitted that underuse can lead to further cost increases. This in turn can lead to an upward spiral of cost for each user, further reducing unbundlers' ability to compete.[533]

700. In response to CallPlus' first point, to the extent that access seekers who are both unbundlers and non-unbundlers purchase the UCLL service, any price rise for the UCLL service affects all access seekers in the same way, whether they are unbundlers or not.

701. In regards to the decrease in the UBA increment relative to that set under the previous retail-minus approach (and held constant under the transitional arrangements through to 2014), it is correct that this may be felt more by those purchasing the UBA service, rather than unbundlers. However, the decrease reflects a move from the previous retail-minus based approach to a cost-based approach. Therefore, to the extent that the price for the UBA increment reflects the efficient costs of providing the UBA service, then the decrease better aligns the price for the UBA increment with efficient costs.

702. CallPlus' second point referred to above is that, to the extent that it is unable to remain competitive, then this can lead to underuse and an upward spiral of costs, further reducing the ability to compete. We note, however, that if an unbundler, considering purchasing the UCLL service and incurring its own unbundling costs, cannot compete with an access seeker purchasing both the UCLL and UBA services, then the unbundler has an option to purchase the UBA service instead.[534]

703. We note also that transitional arrangements (applying until 1 December 2014) protected existing unbundlers significantly. In particular, the arrangements held constant the price for UBA set under the previous retail-minus approach. This provided the opportunity to recover unbundling investments.

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[532] CallPlus "Submission on the Commerce Commission's Draft determinations for UBA and UCLL services" CONFIDENTIAL, 20 February 2015, paragraph [6].

[533] CallPlus "Submission on the Commerce Commission's Draft determinations for UBA and UCLL services" CONFIDENTIAL, 20 February 2015, paragraphs [8] and [16]. See also Wigley and Company "Supplementary Submission on Commission's "Analytical Frameworks for Considering and Uplift to the TSLRIC Price and/or WACC" 11 May 2015, paragraph [2.32].

[534] If an unbundler cannot compete with a non-unbundler, and given that the UBA increment is determined using a framework of efficient costs, then this might also suggest that an unbundler has inefficiently high costs relative to a non-bundler. Providing for competition where efficient is not in the long-term benefit of end-users.

704. Overall, we consider that CallPlus' submissions do not justify taking a different position on relativity with regards to neutrality in respect of unbundling.

*Relativity with no change to the overall UBA price*

705. Wigley and Company submitted that relativity can be achieved by erring on the low side of UCLL prices and the high side for the UBA increment, so that the total UBA price (UCLL plus UBA) is unchanged.[535]

706. In our view, this proposal would require consideration of section 18 issues. It does not appear that the Wigley and Company proposition is based on asymmetric cost/uncertainty considerations.[536] Rather, its proposition appears to be that the UCLL price should be decreased below, and the UBA increment increased above, "forward-looking" efficient costs. We do not consider that doing so would promote competition for the long-term benefit of end-users, for the following reasons:

706.1 Setting the UCLL price below "forward-looking" efficient costs would likely undermine efficient cost recovery and incentives to invest.

706.2 Setting a lower UCLL price would lower input costs to unbundlers. Even so, it is unclear whether this would be passed through to end-users, particularly as unbundlers compete against non-unbundlers who do not receive a corresponding reduction in input costs. We would also be concerned that an increase in the UBA increment and a decrease in the UCLL price undermine competitive neutrality as between unbundlers and non-unbundlers.

706.3 If a lower UCLL price were passed through to end-users served by unbundlers, this might skew incentives for efficient migration of end-users to fibre networks. It might also potentially lead to migration that is slower than is efficient, with consequential impacts on the welfare benefits arising from end-users migrating to fibre networks.

706.4 While an increase in the UBA increment may provide incentives for unbundling, as noted earlier in this section, we cannot be sure that this will in fact lead to unbundling or whether such unbundling would promote competition for the long-term benefit of end-users, particularly in the context of increasing migration to fibre networks.

707. We also note Wigley and Company's most recent (24 September 2015) cross submission stated that an efficient price will "encourage unbundling" and that "any room for movement away from that efficient price is within a limited scope".[537] We

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535 Wigley and Company "Submission on draft pricing review determination for UBA and UCLL services" 20 February 2015, paragraph [16.1]; and Wigley and Company "Supplementary Submission on Commission's "Analytical Frameworks for Considering and Uplift to the TSLRIC Price and/or WACC" 11 May 2015, paragraph [2.37].

536 To the extent that Wigley and Company's proposition is based on asymmetric cost/uncertainty considerations, then the discussion in the earlier sections of this Chapter is relevant.

537 Wigley and Company "Cross-submission in relation to UCLL and UBA draft pricing review determinations" 24 September 2015, paragraph [9.17].

agree insofar as an efficient price will allow unbundling to occur where it is efficient, and that this limits the extent to which we should adjust our central price estimates of the UCLL and UBA services.

708. Overall, after considering the arguments of the various submissions, our final determination is that relativity guides us less towards trying to promote unbundling, and more towards the efficiency aspects of the section 18 purpose statement. We consider that the efficiency aspects are likely to have a greater effect on the promotion of competition for the long-term benefit of end-users. We consider that we should remain neutral towards promoting unbundling, and allow for unbundling to occur to the extent that it is efficient. Accordingly, our final determination is not to adjust our central estimates of the TSLRIC-based prices of the UCLL and UBA services on the grounds of relativity.

**Overall conclusion on whether to adjust our mid-point WACC estimate or our central estimate of the TSLRIC price**

709. For the reasons set out in this Chapter, we consider that our mid-point WACC estimate for the UCLL service is likely to give best effect to the section 18 purpose statement. Our assessment of the likely welfare consequences of a WACC uplift under the TSLRIC pricing principle indicates that the potential benefits arising from new investment are too weak and uncertain relative to the welfare losses from higher prices for copper-based services.

710. We have also set out our final view on the potential consequences of departing from our central TSLRIC estimate for migration between copper and fibre services. Our final view is that such a departure would not give best effect to the section 18 purpose statement of promoting competition for the long-term benefit of end-users. In our view, the positive network effects from faster migration to fibre are unlikely to outweigh the welfare losses from higher prices for copper-based services. So we have not adjusted our central estimate of the TSLRIC-based price for the UCLL service.

711. We have also decided not to adjust our central estimates of the TSLRIC-based prices of the UCLL and UBA services on the grounds of relativity.

712. We have considered whether we would reach a different conclusion if we take into account all of the potential benefits of an uplift at the same time. We have considered different benefits may flow from an uplift to our mid-point WACC estimate (including investment effects) and from an uplift to the TSLRIC estimate (including the promotion of migration to fibre). While we have considered those benefits separately against the costs of an uplift, we have also considered whether those benefits when taken together would lead us to a different conclusion. For the reasons given, we have concluded that even when those benefits are taken together it would not promote the section 18 purpose statement to make an uplift to the regulated price.

# Chapter 6: Non-recurring charges

### Purpose

713. Non-recurring charges (NRC) are the charges levied on access seekers to recover time and material costs that are incurred outside of the UCLL monthly recurring charges. They represent the cost of one-off services, such as connection of a line, that instigate, modify or cancel another aspect of the UCLL service.

714. In this Chapter we set out our decisions on the scope of the NRC we are setting in this pricing review determination, and the modelling choices we have made to set the TSLRIC prices for NRC.

### Decisions

715. All NRC are included in the scope of this TSLRIC pricing review. The price paid by access seekers to Chorus for the UCLL service consists of two components: the monthly recurring charge and NRC. Accordingly, we have reviewed all of the NRC listed within the UCLL STD in this pricing review determination for the purpose of implementing the final pricing principle of TSLRIC.

716. We have modelled NRC based on the efficient costs of providing the relevant services in respect of a copper access network.

    716.1 Whereas we have modelled recurring charges by hypothesising an efficient operator building a network from scratch to supply the regulated service using a MEA, the modelling of NRC is focussed on the recovery of efficient costs associated with one-off processes and transactions.

    716.2 It is therefore important to undertake our modelling of NRC by reference to the efficient costs of providing the relevant services in the copper world of UCLL. Any other approach, for example basing charges on fibre processes, risks producing an unrealistic estimate of the efficient cost of providing the service due to technological differences, and thus setting an inefficient price level (and because the modelled service would bear little relationship to the work being performed, under- or over-compensating Chorus).

717. No new NRC will be introduced as part of this final pricing process.

718. In order to model NRC we have decided that the best data available is data from the third party service companies to which Chorus subcontracts the relevant services. As such, NRC will be priced on a top-down approach with efficiency adjustment.

    718.1 We consider that the costs of these service companies are a likely to be broadly efficient, given that they operate in a competitive market.

    718.2 Nevertheless, we are conscious that a pure top-down approach may not result in efficient cost recovery to the extent that the service companies' costs may not be efficient. Therefore, we have considered that to better reflect efficient outcomes, an efficiency adjustment should be applied where it is reasonable and practical to do so. We have applied an efficiency adjustment based on an international data set.

718.3 The efficiency adjustment is applied to one of the most significant cost components of NRC, the task time. The modelling approach determines the lowest cost estimate of this component by selecting the lowest task time from a dataset including Chorus' service companies and six other comparable jurisdictions. Other NRC cost components are left unchanged because they are considered to be country-specific and not comparable with our international data set.

718.4 We have applied an adjustment to the labour productivity aspect of the task time to compensate for any labour productivity variations between the countries in our data set.

719. We have decided that neither the Chorus overhead nor the Chorus service company overhead require any adjustments for efficiency. Overheads are made up of a range of overriding local factors. These factors differ between operators, both nationally and internationally. These differences mean that there is no appropriate comparable data to test against and we have not received evidence that has convinced us that the present levels are inefficient.

720. Where we cannot apply our top-down with efficiency adjustment approach, NRC will be priced either:

720.1 on an hourly rate plus materials basis, with updated figures based on current New Zealand labour rates taken from Chorus service company contracts; or

720.2 on a Price on Application (POA) basis. All NRC that were set as POA charges in the UCLL STD as published on 30 November 2011 will remain as POA. If any changes are required, they can be made using the annual adjustment mechanism available within the STD.[538]

721. The implications of our decisions on each NRC are listed in Tables 6.1 through 6.4.

**Background**

*What are NRC?*

722. NRC are charges levied on access seekers to recover time and material costs incurred outside of the UCLL monthly recurring charges. They are one-off transactions that instigate, modify or cancel another aspect of the UCLL service.

723. For example, when an access seeker requires a new service to be installed at an end-user's premise, Chorus performs work to complete the installation. Different end-users require different levels of work. In some cases a field technician on a site visit may connect and install extra wiring. In others, service activation may simply be a case of remote work completed internally by Chorus.

538 UCLL STD Sch. 2 7 November 2007, Consequential Amendments 30 November 2011, paragraph [3.1.3].

724. NRC are set out in Schedule 2 of the UCLL STD. There are two categories of charges:

724.1 service transaction charges (numbers beginning with 1); and

724.2 ancillary services (numbers beginning with 3).[539]

725. Within these categories, charges are also categorised as either a Core Charge or a Sundry Charge.[540]

726. Examples of service transaction charges include new connections, cancellations and service transfers.[541] Ancillary services examples include licence fees for software systems, abortive site visit charges and access seeker training charges.

727. The STD pricing structure for NRC is based on the following.

727.1 Fixed rates – this is where a price is set for a specific task with known scope and cost, such as transferring an end-user from one access seeker to another.

727.2 A set hourly charge – this is where the nature of the task is understood but the duration is unknown and therefore cannot be determined ahead of time. An example of this is the provision of training to an access seeker on software systems.

727.3 Price on application (POA) – this is where a price is set following a request for a service where the work required is bespoke. In accordance with the STD, if requested by an access seeker, Chorus is obliged to use all reasonable endeavours to provide two or more competitive quotes from third party service providers.[542] An example of this is a UCLL bulk transfer.

*NRC framework*

728. NRC are a series of one-off transactional charges that recover costs, such as installation, that are additional to the recurring monthly charge. Accordingly, NRC modelling focusses on the efficiency of the tasks and processes related to these transactions. This required us to carry out a separate modelling exercise to the monthly recurring charge modelling.[543] As with our modelling of recurring charges, we have built a model based on the hypothetical efficient operator providing the relevant services.

539 Commerce Commission "Consultation on setting prices for service transaction charges for UBA and UCLL services" 25 September 2014, paragraph [11].

540 UCLL Sch. 2 Price List Consequential Amendments 30 November 2011, paragraphs [2.1]-[2.3]. Core charges are charges associated with the main features of the service. Sundry charges are additional charges that may arise in the course of provisioning the services ancillary to the main features of the service.

541 A service transfer is where an end-user changes their service provider. In these cases Chorus moves the associated UCLL connection from the previous access seeker to the new access seeker providing service to the end-user.

542 UCLL STD Schedule 2, Charges 2.4.

543 Except where we have used the outputs of our opex model.

729. Nevertheless, the modelling of NRC was necessarily based on copper tasks and processes. The services for which NRC are charged are provided in relation to the existing copper access network, and the charges of service companies will be calculated on that basis. Any other approach, for example basing charges on fibre processes, risks producing an unrealistic estimate of the efficient cost of providing the service due to technological differences, and thus setting an inefficient price level (and because the modelled service would bear little relationship to the work being performed, under- or over-compensating Chorus).

730. In particular, we have used Chorus' data (including data from the third party service providers it subcontracts the work to) as a starting point to inform us of overheads, average task times and actual hourly rates for NRC. Where data is available, we have applied efficiency adjustments to establish the costs our hypothetical efficient operator could reasonably expect.

731. We consider that these efficiency adjustments are consistent with an assessment of efficient costs, and with the TSLRIC objective of establishing efficient cost recovery. We consider that they result in a reasonable estimate of the efficient cost of providing the relevant services.. The adjustments applied are discussed in more detail below.

*Process background*

732. In September 2014 we first consulted on the approach to setting TSLRIC-based prices for those transaction charges that were set in the IPP determination.[544]

733. Following initial submissions, we considered the scope of the NRC review and how to implement the TSLRIC methodology for setting NRC prices.

734. At this point, we contracted TERA to assist in developing a cost model for NRC and to advise on other technical aspects of our determination. This cost model has informed our determination for setting a TSLRIC price for the relevant services. Although we relied on TERA's technical expertise in constructing the model, we maintained close oversight of that process. TERA's cost model was ultimately a tool that we used to help us in making our decisions.

735. The July 2015 further draft determination set out our proposed methodology following initial submissions.

**Scope of NRC**

736. We have decided that all NRC listed in the STD are within the scope of this pricing review determination.

737. We consider that this interpretation is in line with section 42(1) of the Act. It means that all charges relevant to the UCLL service have been set in accordance with the TSLRIC pricing exercise.

[544] Commerce Commission "Consultation on setting prices for service transaction charges for UBA and UCLL services" 25 September 2014.

*Initial views*

738. In September 2014, our view was that for the pricing review determinations, we could only set prices for the transaction charges which were set in the IPP determinations. In this regard we said that parties applying for a pricing review determination, in accordance with section 42(1) of the Act, were applying for a review of that part of the determination that relates to that price for the service.[545]

739. This issue arose because in the IPP benchmarking review determination for UCLL, which triggered the parties' requests for a pricing review determination, only the core connection charges were reviewed, and not the sundry charges.[546]

*Submissions*

740. Chorus stated that sundry charges were set on a cost recovery basis, or on a POA cost basis, and therefore agreed with our original position that the review was limited to what was considered and changed as part of the IPP determinations under review.[547]

741. However, all other submitters considered that our view was too narrow an interpretation.

742. Spark, Vodafone, Wigley and Company, and CallPlus all submitted that the correct interpretation of section 42(1) of the Act was to focus on the price for the "designated access service". This included all of the charges, both recurring and non-recurring that were related to it.[548,549,550,551]

743. Wigley and Company argued that it would be unworkable for the Act to be interpreted so that only a subset of transaction charges was reviewed as part of the FPP.[552] The effect would be that multiple prices would never get the benefit of FPP review and would then be left in limbo, whether as IPP determination prices or as POA.

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545 Commerce Commission "Consultation on setting prices for service transaction charges for UBA and UCLL services" 25 September 2014, paragraphs [19]-[22].

546 Commerce Commission "Final determination on the benchmarking review for the unbundled copper local loop service" [2012] NZCC 37, paragraph [85]

547 Chorus "Submission in response to the Commerce Commission's consultation paper 'Consultation on setting prices for service transaction charges for UBA and UCLL services (25 September 2014)'" 9 October 2014, paragraph [17].

548 Spark "Setting prices for service transaction charges for UBA and UCLL services'" 9 October 2014, paragraph [7].

549 Vodafone "Submission on consultation paper on setting prices for service transaction charges for UBA and UCLL services" 9 October 2014, p.2.

550 CallPlus "Submission on the Commerce Commission's Consultation paper: setting prices for service transaction charges for UBA and UCLL" 9 October 2014, paragraph [8].

551 Wigley and Company "Submission on consultation on setting prices for service transaction charges for UBA and UCLL services" 9 October 2014, paragraph [4.2].

552 Wigley and Company "Submission on consultation on setting prices for service transaction charges for UBA and UCLL services" 9 October 2014, paragraph [4.2(e)].

744. Vodafone argued that if the Commission was confined in the scope of its review only to matters that were expressly addressed in the IPP determination or an application for price review, this would exclude relevant matters that ought to be considered as part of the FPP.[553]

745. Spark argued that its interpretation of section 42(1), which did not constrain the Commission in its review of all the charges, was supported by the fact that the FPP is a completely new pricing review process, underpinned in the Act by a completely different costing methodology than the IPP process.[554] Spark stated that the FPP exercise was not a second look at, or correction of, the way the IPP determination was done.

746. Spark and WIK, among others, proposed additional NRC services that should be made available and set a charge for. This included deriving a price for a “Network investigation” service.[555,556,557]

747. Chorus suggested creating an additional three UCLL NRC to provide “consistency” between the UCLL and UBA STDs.[558] However, in its cross submission, Chorus argued that amending the STD fell outside of the pricing review process and that the proposed new services needed to be considered under a section 30R review.[559]

748. Finally, Chorus noted in its submission that Unbundled Copper Low Frequency Service (UCLF) core transaction charges should be included as part of the FPP process and should be reviewed with the benefit of the TSLRIC process.[560]

*Analysis*

749. After consideration of responses received, we revisited our September 2014 preliminary view and decided that all NRC listed in the STD were within the scope of this FPP review.

553 Vodafone “Submission on consultation paper on setting prices for service transaction charges for UBA and UCLL services” 9 October 2014, p.2.

554 Spark “Setting prices for service transaction charges for UBA and UCLL services’” 9 October 2014, paragraph [6].

555 This is where a site visit is undertaken to determine network availability at a premise.

556 Spark "Further draft pricing review determination for Chorus’ UBA and UCLL services" CONFIDENTIAL, 13 August 2015, paragraph [331].

557 WIK “Submission in response to the Commerce Commission’s Consultation on setting prices for service transaction charges for UBA and UCLL services (25 September 2014)’” 8 October 2014, paragraphs [123]-[129].

558 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus’ Unbundled Copper Local Loop and Unbundled Bitstream Access Services (2 July 2015)” CONFIDENTIAL, 13 August 2015, paragraphs [436]-[438].

559 Chorus "Cross-submission for Chorus in response to Draft Pricing Review Determinations for Chorus’ Unbundled Copper Local Loop and Unbundled Bitstream Access Services" CONFIDENTIAL, 24 September 2015, paragraphs [104]-[105]

560 Chorus “Submission in response to the Commerce Commission’s consultation paper ‘Consultation on setting prices for service transaction charges for UBA and UCLL services (25 September 2014)’” 9 October 2014, paragraph [22].

750. In the July 2015 draft determination, we agreed with the submissions received from Spark, Vodafone, Wigley and Company, and CallPlus. We agreed that the correct interpretation of section 42(1) of the Act was the focus on the "designated access service", which included all of the charges that were related to it; recurring and non-recurring.

751. We considered that this interpretation aligned with the identified TSLRIC objectives/outcomes, as set out in Chapter 2. We considered that it ensured that all relevant prices were subject to the TSLRIC review. We further considered that it provided for efficient use of these services.

752. No submissions were received following the July 2015 draft determination on the scope of NRC and we continue to maintain our position; that all NRC listed in the STD are within the scope of the pricing review.

753. We agree with Chorus regarding its submission that UCLF core transaction charges should be included as part of the FPP. As noted in Chapter 2, in accordance with the provisions in the Act and the STD requirements and for the avoidance of doubt, the UCLF prices will change with the equivalent UCLL service prices. Revised prices for the UCLF STD will apply from the same date as the revised prices for UCLL come into effect. The UCLF STD will be updated as soon as practicable following completion of the FPP process.

754. We agree with Chorus' cross submission that proposals for new NRC services or changes to NRC services are outside of the scope of this pricing review. Access seekers can use alternative processes outside of this review to request changes to the STD.[561]

**NRC modelling approach**

755. We have decided to apply a top-down with an efficiency adjustment approach to establish a TSLRIC price for NRC.

*Initial views*

<u>Conceptual modelling consultation</u>

756. For the purposes of modelling NRC, we had to identify an appropriate approach. In September 2014, we consulted on what we considered to be the conceptual TSLRIC modelling options:[562]

756.1 top-down - use Chorus' service company charges and overhead costs as inputs;

756.2 bottom-up - model the time and materials of the relevant activities and overhead costs; or

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561 Issues related to submissions for new NRC specific to the UBA service are set out in full in the UBA December 2015 final determination at Chapter 6 – Non-recurring charges.

562 Commerce Commission "Consultation on setting prices for service transaction charges for UBA and UCLL services" 25 September 2014, paragraphs [31], [33.1], [33.2] and [33.3].

756.3 top-down with cross-checks - the data provided by Chorus will be the starting point and then similar charges in other countries will be used as cross-checks to determine the costs of providing the transactions.

757. In the case of all three options, we noted a reasonable margin for overheads could either be applied to each service, or be part of the general overhead applied to the network costs.

758. We received a range of views in response to our September 2014 consultation.

758.1 Chorus submitted that it is incentivised to minimise costs and that it used a competitive tender process to appoint service companies.[563] Chorus considered its actual costs were efficient and did not require adjustment.

758.2 WIK suggested that if we did not have sufficient time or resources to develop a bottom-up costing approach then we might set charges based on previous charges and apply a formula to represent efficiency gains over time. [564] WIK concluded that is we took this approach we should substitute this approach with a bottom-up approach “as soon as possible”.[565]

758.3 Spark submitted that ideally we should undertake a bottom-up cost study.[566] It recognised this might be difficult in the time available and supported WIK’s “proposed approach to adopt existing prices and apply an efficiency adjustment”.[567]

758.4 Vodafone agreed with WIK that a bottom-up approach would support “a higher quality outcome” but would also support a top-down approach as described by WIK on the basis of the “likely availability of appropriate independent cross-checks”.[568]

759. Submissions broadly, but not universally, preferred a bottom-up approach to setting prices for NRC. However, they also accepted that a top-down approach with cross-checks and efficiency adjustments would be an acceptable alternative approach. Chorus did not support this approach.

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563 Chorus “Submission in response to the Commerce Commission’s consultation paper ‘Consultation on setting prices for service transaction charges for UBA and UCLL services (25 September 2014)’” 9 October 2014, paragraph [36].

564 WIK “Submission in response to the Commerce Commission’s Consultation on setting prices for service transaction charges for UBA and UCLL services (25 September 2014)’” 8 October 2014, paragraph [15].

565 WIK “Submission in response to the Commerce Commission’s Consultation on setting prices for service transaction charges for UBA and UCLL services (25 September 2014)’” 8 October 2014, paragraph [33].

566 Spark “Setting prices for service transaction charges for UBA and UCLL services’” 9 October 2014, paragraph [28].

567 Ibid, paragraph [29].

568 Vodafone “Submission on consultation paper on setting prices for service transaction charges for UBA and UCLL services” 9 October 2014, p. 3 “Question 6: Which option should the Commission take?”.

*Data availability*

760. The selection of an approach to cost modelling can often be determined by the availability of data. Therefore, prior to finalising our initial view on the appropriate modelling approach, we undertook a data gathering phase that looked at what data was available nationally and internationally.

761. We sought information from Chorus, LFCs, and access seekers (Spark, Vodafone, and CallPlus). We also asked TERA to conduct a search of any relevant international data. We requested details of individual transaction activities, task times, hourly rates and material costs.

Chorus data

762. Chorus outsources a significant amount of its network provisioning and maintenance to third party service companies, but retains and undertakes some lower value activities itself.

763. Chorus provided us with breakdowns of its service company costs (task time, hourly rate, transport, and material costs) for tasks it outsources.

 763.1 We found that Chorus aggregates its network provisioning and maintenance tasks into service company codes to minimise administration costs.[569] This means that for a given NRC, the service company may only have to perform some of the tasks that comprise the service code. The mapping of the NRC to service company codes showed that a single code captures multiple NRC. How we mapped NRC to service company codes is detailed in TERA's NRC report.[570]

 763.2 Chorus' aggregation of tasks into service company codes means that the costs for these codes do not align with the actual costs for delivering specific NRC services as listed in the UCLL STD.

764. Chorus did not provide us with detail (task time, hourly rate, etc,) on UCLL tasks that it undertakes itself.[571] Chorus did, however, indicate an average time for similar tasks that occur on UBA NRC.[572]

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569 Service company codes contain an indicative list of tasks that the technician may undertake, but may not depending on the specific circumstances. Chorus is charged the same price for a service code, regardless of how many tasks the technician actually completes.

570 TERA Consultants "TSLRIC price review determination for the UCLL and UBA services non-recurring charges Methodology document" November 2015, paragraphs [4.2]-[4.3].

571 These activities typically require software and records updates using internal labour resources that do not involve the costs of dispatching a service company technician.

572 TERA Consultants "TSLRIC price review determination for the UCLL and UBA services non-recurring charges Methodology document" November 2015, paragraph [1.2.1.2].

RSP data

765. We found that because of Chorus' position in the market, as the only copper network operator, it was challenging to find comparable NRC activity being performed by any other NZ-based operators.[573]

LFC data

766. We received data from [ ]**CCNZCI**.

767. [ ]**CCNZCI** is similar to Chorus in its degree of outsourcing to third party service companies.

International data

768. TERA was able to identify comparable information from seven countries – Denmark, France, Italy, Romania, Spain, UK, and an EU country that requested confidentiality (Country A). TERA discussed the choice of countries in their NRC methodology report.[574]

*Top-down with efficiency adjustment*

769. The results of our data gathering phase determined our initial view to adopt a top-down with efficiency adjustment.

770. Understandably, Chorus had the most relevant and detailed information on NRC activities and costs. However, due to the aggregated nature of its data, we were unable to break down tasks and costs sufficiently to enable a bottom-up approach.

771. Having ruled out a full bottom-up approach, we noted Chorus' submission, in defence of a pure top-down approach, that it is incentivised to minimise costs and that it uses a competitive tender process to appoint service companies. [575]

772. However, we considered a top-down approach that only used Chorus' costs, even those established through competitive tendering, did not in itself provide a sufficient independent efficiency assessment.

773. Having had TERA identify comparable information from seven other countries, our initial view was to utilise this information, where possible, in the form of an efficiency adjustment.

774. In our September 2014 consultation, we proposed an option to perform a top-down with cross-check of similar charges in other countries "to calculate the costs of

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[573] CallPlus and Vodafone were asked to provide similar information but did not do so.

[574] TERA Consultants "TSLRIC price review determination for the UCLL and UBA services non-recurring charges Methodology document" November 2015, p. 12-14.

[575] Chorus "Submission in response to the Commerce Commission's consultation paper 'Consultation on setting prices for service transaction charges for UBA and UCLL services (25 September 2014)'" 9 October 2014, paragraph [36].

providing the transactions".[576] WIK submitted a proposal to use efficiency adjustments based on European NRA approaches.[577] Vodafone and Spark supported the proposed approach.[578,579]

775. Based on the responses to our September 2014 consultation, we decided to adopt a top-down modelling approach with an efficiency adjustment.

*Submissions*

776. Chorus submitted that our top-down approach with an efficiency adjustment was not consistent with the principles of TSLRIC. Chorus considered that benchmarking would not provide an accurate representation of the hypothetical efficient operator's forward-looking costs.[580]

777. Chorus argued that we had adopted a benchmarking methodology, which was inconsistent with our own views on the limitations of benchmarking and our previous approach to benchmarking.[581]

778. Spark submitted that it would prefer a bottom-up modelling approach but accepted that our approach was practical and was "the second best approach".[582] Spark argued that in performing a top-down with efficiency adjustment approach we must conduct an efficiency analysis "on all activities and costs".[583]

779. Vodafone and CallPlus challenged the use of Chorus' actual costs as the correct starting point, suggesting that Chorus' network was old and systems were complex and not necessarily representative of an efficient starting point.[584,585]

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576 Commerce Commission "Consultation on setting prices for service transaction charges for UBA and UCLL services" 25 September 2014, paragraph [37].

577 WIK "Submission in response to the Commerce Commission's Consultation on setting prices for service transaction charges for UBA and UCLL services (25 September 2014)'" 8 October 2014, paragraphs [30]-[31].

578 Vodafone "Submission on consultation paper on setting prices for service transaction charges for UBA and UCLL services" 9 October 2014, p. 3 "Question 6: Which option should the Commission take?".

579 Spark "Setting prices for service transaction charges for UBA and UCLL services'" 9 October 2014, paragraphs [28]-[30].

580 Chorus "Cross-submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services" CONFIDENTIAL ,24 September 2015, paragraphs [74.3] and [83].

581 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services - CONFIDENTIAL version" 2 July 2015, paragraph [334].

582 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" CONFIDENTIAL, 13 August 2015, paragraph [337].

583 Ibid paragraph [342].

584 Vodafone "Submission to the New Zealand Commerce Commission on further draft pricing review determination for Chorus' unbundled copper local loop service and further draft pricing review determination for Chorus' unbundled bitstream access service" CONFIDENTIAL, 13 August 2015, paragraphs [C2.1]-[C2.2].

780. However, in cross submissions Vodafone accepted that the approach proposed was the only feasible method in the available timeframe.[586]

*Analysis*

781. We disagree with Chorus' view that the top-down approach with an efficiency adjustment is not consistent with the principles of TSLRIC.

782. One of our TSLRIC objectives is to establish efficient cost recovery. By applying an efficiency adjustment to current available data we are seeking to ensure that only efficiently incurred costs are recovered through the regulated NRC.

783. While the use of a competitive tender process may mitigate the risk that service company charges are inflated, there remains a risk that because of the aggregation of multiple NRC into service codes, individual NRC are not priced in the most efficient manner.[587]

784. In order to address this, we have had regard to efficiency adjustments based on comparable task times in other jurisdictions.

785. We also disagree with Chorus' view that we have simply taken a benchmarking approach. In applying an efficiency adjustment, we are imposing a check on Chorus' costs using real-world evidence. The efficiency adjustment only applies where Chorus' processes are less efficient than our international comparators. We see this as an appropriate application of our TSLRIC objective to ensure efficient cost recovery.

786. We acknowledge submitters' views that they have a preference for a bottom-up approach, but note they also find our approach to be an acceptable alternative option.[588]

787. We note arguments by Vodafone and CallPlus about whether Chorus' actual costs were efficient; however, we maintain that Chorus' costs are the best objective evidence available to us of the costs of providing the relevant services for a nationwide telecommunications network in New Zealand.

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585 CallPlus "Submission on the Commerce Commission's Further Draft Pricing Review determinations for UBA and UCLL services" CONFIDENTIAL, 13 August 2015, paragraph [5].

586 Vodafone "Cross Submission to the New Zealand Commerce Commission on Further Draft Pricing Review Determination for Chorus' Unbundled Copper Local Loop Service and Further Draft Pricing Review Determination for Chorus' Unbundled Bitstream Access Service" CONFIDENTIAL, 24 September 2015, paragraph [D1.6].

587 This is discussed earlier in this chapter under the heading Chorus data, where the codes that Chorus has used to group service company activities do not align with the tasks associated with NRC.

588 Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 2 July 2015, paragraph [590].

**Implementation of the NRC modelling approach – task time adjustment**

788. In the lead up to our July 2015 decision, we asked TERA to advise on how to implement a top-down with efficiency adjustment approach. Based on TERA's recommendation we implemented the following approach.

788.1 Take Chorus' service company costs and outsourcing model as the starting point.

788.2 Undertake an efficiency adjustment by adopting the lowest observed task time from other jurisdictions, where these were lower than Chorus' time.

788.3 Add in Chorus' service company overhead, plus Chorus' own overhead to calculate a revised cost-based NRC price.

788.4 Undertake a cross-check against New Zealand costs, where the prices calculated above are capped in line with the prices LFC pay for comparable service company activities.

789. Our consideration of how best to implement a task time adjustment is broken down into the steps recommended by TERA above:

789.1 outsourcing;

789.2 task time adjustment;

789.3 overheads; and

789.4 New Zealand cross-check.

*Initial views*

<u>Outsourcing</u>

790. As Chorus outsources the majority of the NRC activities, Chorus costs are by a significant majority derived and based upon its service company costs. As such, an important implication of our modelling approach is to a significant extent our costs are based on a service company's costs.

791. We know that Chorus service company costs have resulted from a competitive tender process. [ ] **CNZCI** [589]

[589] Chorus "Cross-submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services" CONFIDENTIAL, 24 September 2015, paragraph [78].

792. Therefore, we assumed that the hypothetical efficient operator would outsource its network provisioning and fault operations.[590]

Task time adjustment

793. The components that drive individual NRC cost include:

793.1 skilled labour rate;

793.2 time to execute a task;

793.3 materials;

793.4 transport costs;

793.5 design, records and supervision costs;

793.6 vehicle and equipment costs; and

793.7 civil subcontractor and traffic management costs.

794. Many of these components are specific to the New Zealand market, such as labour rates, the cost of materials and transport costs that include travel time, traffic conditions and average distances.

795. Task time is one of the more significant components of the NRC cost.

796. In order to apply an efficiency adjustment, we adopted an international indexation approach that focused on task times. This approach assessed task times in other jurisdictions and compared them with Chorus' service companies' comparable activity.

797. Therefore, based on the international data set, we adjusted the task time of a NRC where we observed a lower task time than Chorus' service companies comparable activity. Later in this Chapter we discuss the removal of Country A from our data set. This decision has not changed the task times selected as part of our efficiency adjustment.

Service company overheads

798. Our initial view was to retain service company overheads without adjustment in our model.

799. We considered that a hypothetical efficient operator would outsource NRC activities and therefore relied on Chorus service company overheads of [ ]**CNZCI** without an adjustment.[591]

590 Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 2 July 2015, paragraph [592].

591 Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 2 July 2015, paragraph [607].

Chorus overheads

800. Our initial view was that TERA had derived an appropriate Chorus overhead for NRC in the recurring charges opex model. We considered it was appropriate to mark-up NRC costs with the Chorus overhead in the same way as had been applied to recurring charges.[592]

New Zealand cross-check

801. Our initial view on cross-checking against New Zealand costs was that including this additional step made best use of available data and increased confidence in our modelled results.[593] We used LFC data for comparison and reasoned that a recently constructed network would be similar to the network of our hypothetical efficient operator.[594]

802. We acknowledged that there were differences between fibre and copper installations, but considered the comparisons would provide a useful empirical check against our modelled results from TERA.[595]

*Submissions*

Outsourcing

803. Submissions were broadly in agreement with the outsourcing assumption and approach.

804. WIK had previously challenged whether employing service companies for this purpose was the efficient starting premise for NRC modelled costs.[596] However, in its cross submission it commented that outsourcing was a usual European practice. It noted the German incumbent outsourced this work and stated that it could see no difference between New Zealand and European countries in this regard.[597]

805. Chorus considered the hypothetical efficient operator would outsource its provisioning and network operations, and argued that a competitive tendering process with tension between service companies ensured efficient costs.[598] Spark concurred that the use of service companies would result in a competitive price

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592 Commerce Commission “Further draft pricing review determination for Chorus’ unbundled copper local loop service” 2 July 2015, paragraph [608].

593 Ibid, paragraph [609].

594 Ibid, paragraph [612].

595 Ibid, paragraph [614].

596 WIK “Submission in response to the Commerce Commission’s Consultation on setting prices for service transaction charges for UBA and UCLL services (25 September 2014)’” 8 October 2014, paragraph [24].

597 WIK-Consult "Cross-Submission in response to the Commerce Commission's Further draft pricing review determination for Chorus' unbundled bitstream access and Further draft pricing review determination for Chorus' unbundled copper local loop service including the revised cost model and its reference documents" CONFIDENTIAL, 22 September 2015, paragraph [185b].

598 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus’ Unbundled Copper Local Loop and Unbundled Bitstream Access Services - CONFIDENTIAL version" 2 July 2015, paragraph [338.2].

overall. Spark noted that this did not inform whether Chorus' individual charges were efficient nor whether the volume of field work required was efficient.[599]

806. CallPlus stated that the current situation with Chorus and third party contractors would not reflect the position of a hypothetical efficient operator.[600] CallPlus did not offer an alternative to our outsourcing assumption.

807. Vodafone agreed that a competitive tender process aimed to achieve efficient costs, although it argued that the existence of a tender process did not necessarily mean efficiency had been achieved.[601]

Task time adjustment

808. Chorus suggested there are a number of New Zealand-specific factors that may drive higher task times than in other countries. These included health and safety obligations, local authority compliance, standards of workmanship, and third party commercial requirements.[602] Such requirements may arise from the use of third party assets, such as lines company poles and RSP equipment.

809. Vodafone and WIK noted that we have only considered adjusting one of seven cost elements in our approach.[603, 604]

810. Analysys Mason argued that WIK "seems to assume that all cost components are potentially comparable" and ignores the role local factors have on cost components such as transport costs and traffic management costs.[605] It further commented that "benchmarking other cost components could make things even worse".

599 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" CONFIDENTIAL, 13 August 2015, paragraph [20].

600 CallPlus "Submission on the Commerce Commission's Further Draft Pricing Review determinations for UBA and UCLL services" CONFIDENTIAL, 13 August 2015, paragraph [11].

601 Vodafone "Cross Submission to the New Zealand Commerce Commission on Further Draft Pricing Review Determination for Chorus' Unbundled Copper Local Loop Service and Further Draft Pricing Review Determination for Chorus' Unbundled Bitstream Access Service" CONFIDENTIAL, 24 September 2015, paragraph [D2.2].

602 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services - CONFIDENTIAL version" 2 July 2015, paragraph [352].

603 Vodafone "Cross Submission to the New Zealand Commerce Commission on Further Draft Pricing Review Determination for Chorus' Unbundled Copper Local Loop Service and Further Draft Pricing Review Determination for Chorus' Unbundled Bitstream Access Service" CONFIDENTIAL, 24 September 2015, paragraph [D1.2].

604 WIK-Consult "Submission In response to the Commerce Commission's "Further draft pricing review determination for Chorus' unbundled bitstream access service" and "Further draft pricing review determination for Chorus' unbundled copper local loop service" including the revised cost model and its reference documents" 12 August 2015, paragraphs [83]-[84].

605 Analysys Mason "Report for Chorus - UCLL and UBA FPP draft determination cross-submission" CONFIDENTIAL, 22 September 2015, paragraph [7.1.10].

811. Spark provided a comparison of health and safety frameworks from all jurisdictions used in TERA's study, except for confidential Country A.[606] Its conclusions indicated that health and safety obligations were comparable in all identified jurisdictions.

812. Spark acknowledged that local authority compliance costs "deserve focus" but that there was no evidence to suggest New Zealand's requirements were "more demanding than approaches in other western countries".[607]

813. WIK observed that it was usual European practice to meet third party requirements such as the use of RSP equipment.[608]

814. Analysys Mason suggested benchmarked countries may "use more experienced labour that take less time to perform certain tasks but cost more".[609]

815. WIK argued that the opposite could be true where a country may have "other factors such as process organisation, tools used etc", which could result in shorter task durations. WIK suggested that such countries may work "with cheaper labour costs".[610] Spark agreed with WIK and proposed we should make a labour productivity adjustment.[611]

816. Chorus disagreed with our approach of selecting the lowest task time. Chorus stated that our approach is unprecedented in any previous benchmarking exercises.[612] It considered our approach imposed an efficiency standard that no hypothetical efficient operator could achieve.[613]

817. L1 Capital disputed the use of "cherry picking" times from different jurisdictions, questioning how it could "be seen as realistic".[614]

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606 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" CONFIDENTIAL, 24 September 2015, paragraphs [211]-[219].

607 Ibid, paragraph [221].

608 WIK-Consult "Cross-Submission in response to the Commerce Commission's Further draft pricing review determination for Chorus' unbundled bitstream access and Further draft pricing review determination for Chorus' unbundled copper local loop service including the revised cost model and its reference documents" CONFIDENTIAL, 22 September 2015, paragraph [185b].

609 Analysys Mason "Report for Chorus - UCLL and UBA FPP further draft determination submission" CONFIDENTIAL, 11 August 2015, paragraph [6.2].

610 WIK-Consult "Cross-Submission in response to the Commerce Commission's Further draft pricing review determination for Chorus' unbundled bitstream access and Further draft pricing review determination for Chorus' unbundled copper local loop service including the revised cost model and its reference documents" CONFIDENTIAL, 22 September 2015, paragraph [183].

611 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" CONFIDENTIAL, 24 September 2015, paragraph [205].

612 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services - CONFIDENTIAL version" 2 July 2015, paragraph [38].

613 Ibid, paragraph [39].

614 L1 Capital "Submission on the further draft pricing determination for Chorus' unbundled copper local loop and unbundled bitstream access services" 13 August 2015, p. 3.

818. Spark and WIK agreed that taking the lowest benchmark point was the correct approach for an efficiency adjustment and that taking a mid-point would be contrary to an efficient TSLRIC approach.[615,616]

819. In terms of the international data, Analysys Mason expressed concerns about the use of Country A and questioned its appropriateness as being unverifiable.[617] Analysys Mason also noted that if Country A was removed the entire benchmark would be reduced to using data from a single country.[618]

820. WIK stated that because Country A was unknown, it could not provide feedback on its suitability for comparisons.[619]

821. Spark proposed removing Spain, Romania and "possible country A" on the basis that it does not have comparable labour productivity or labour costs to New Zealand.[620]

822. Vodafone agreed with WIK that only countries with similar labour productivity and costs should be compared to New Zealand.[621]

823. Chorus provided additional information on specific NRC where TERA had modelled costs on the assumption of Chorus' internal only costs. In its submission, Chorus identified a number of NRC where service company work is performed. Chorus provided the relevant service company codes and descriptions related to these NRC.[622]

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615 WIK-Consult "Cross-Submission in response to the Commerce Commission's Further draft pricing review determination for Chorus' unbundled bitstream access and Further draft pricing review determination for Chorus' unbundled copper local loop service including the revised cost model and its reference documents" CONFIDENTIAL, 22 September 2015, paragraph [190].

616 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" CONFIDENTIAL, 24 September 2015, paragraph [225a].

617 Analysys Mason "Report for Chorus - UCLL and UBA FPP further draft determination submission" CONFIDENTIAL, 11 August 2015, paragraph [6.3].

618 Analysys Mason "Report for Chorus - UCLL and UBA FPP draft determination cross-submission" CONFIDENTIAL, 22 September 2015, paragraph [7.1.11].

619 WIK-Consult "Submission In response to the Commerce Commission's "Further draft pricing review determination for Chorus' unbundled bitstream access service" and "Further draft pricing review determination for Chorus' unbundled copper local loop service" including the revised cost model and its reference documents" 12 August 2015, paragraph [92].

620 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" CONFIDENTIAL, 13 August 2015, paragraph [345b].

621 Vodafone "Submission to the New Zealand Commerce Commission on further draft pricing review determination for Chorus' unbundled copper local loop service and further draft pricing review determination for Chorus' unbundled bitstream access service" CONFIDENTIAL, 13 August 2015, paragraph [C3.3b].

622 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services - CONFIDENTIAL version" 2 July 2015, paragraphs [414]-[419], [422]-[430] and [439]. Affected NRC are UCLL 3.3, 3.4, 3.8 and SLU 3.8.

824. Finally, Chorus noted in submissions that some NRC which were equivalent between UCLL and UBA had priced differently between the UCLL and UBA price tables as published in our July 2015 further draft determination.[623]

Service Company overheads

825. Vodafone agreed that the Chorus tender process may have achieved an "efficient market outcome for the contract as a whole". Vodafone contended that it cannot be assumed this resulted in efficient individual prices.[624] Vodafone further argued that we had been inconsistent by not making efficiency adjustments to service company overheads compared to "other areas of TERA's model".[625]

826. Spark contended that Chorus sought the "best overall price" rather than "optimising for individual price points".[626] Chorus noted that it was obliged to compensate service companies for real-world costs such as field managers, dispatch centres, corporate office rental and other indirect costs.[627] Analysys Mason agreed with TERA's use of actual service company overheads.[628]

Chorus overheads

827. Chorus argued that to reduce its overheads through greater levels of IT automation and integration would require a higher cost reflected in the recurring charges model. It considered its systems to be fit for purpose.[629]

828. Vodafone stated that Chorus had aging infrastructure and recorded costs that were not reflective of an efficient operation.[630]

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623 Ibid, paragraphs [420], [431] UCLL 3.6, 3.8.

624 Vodafone "Submission to the New Zealand Commerce Commission on further draft pricing review determination for Chorus' unbundled copper local loop service and further draft pricing review determination for Chorus' unbundled bitstream access service" CONFIDENTIAL, 13 August 2015, paragraph [C4.1].

625 Vodafone "Submission to the New Zealand Commerce Commission on further draft pricing review determination for Chorus' unbundled copper local loop service and further draft pricing review determination for Chorus' unbundled bitstream access service" CONFIDENTIAL, 13 August 2015, paragraph [C4.1c].

626 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" CONFIDENTIAL, 24 September 2015, paragraph [202].

627 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services - CONFIDENTIAL version" 2 July 2015, paragraph [374].

628 Analysys Mason "Report for Chorus - UCLL and UBA FPP further draft determination submission" CONFIDENTIAL, 11 August 2015, paragraph [6.5].

629 Chorus "Cross-submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services" CONFIDENTIAL, 24 September 2015, paragraphs [90]-[92].

630 Vodafone "Submission to the New Zealand Commerce Commission on further draft pricing review determination for Chorus' unbundled copper local loop service and further draft pricing review determination for Chorus' unbundled bitstream access service" CONFIDENTIAL, 13 August 2015, paragraph [C2].

829. WIK argued that overhead efficiency gains were driven mainly from IT automation and IT integration.[631] It had not observed any IT system analysis in TERA's work and contended that Chorus account values had been used except where they were "completely implausible".[632]

830. Analysys Mason contended that Chorus overhead would be under-recovered due to the manner in which overhead had been calculated as a percentage of reduced NRC revenue.[633]

831. Vodafone, Spark and CallPlus submitted data on the volume of NRC transactions, in particular "truck rolls", they encountered which they believed were unnecessary and pointed to Chorus inefficiencies.[634,635,636] Chorus disputed the relevance of this on the basis that the volume of truck rolls had no bearing on the efficient cost of a truck roll.[637,638]

832. Chorus suggested that RSPs had not been exposed to these costs prior to December 2014.[639] Chorus also stated that it had responded to RSPs' concerns and undertaken a review, resulting in process changes and issued credits resulting from "system faults".[640]

New Zealand cross-check

833. In addition to the concerns raised by some submitters regarding reliance on Chorus data, all submissions and cross submissions did not support the comparison between the LFC transaction costs and Chorus' NRC costs.

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631 WIK-Consult "Submission In response to the Commerce Commission's "Further draft pricing review determination for Chorus' unbundled bitstream access service" and "Further draft pricing review determination for Chorus' unbundled copper local loop service" including the revised cost model and its reference documents" 12 August 2015, paragraph [153].

632 WIK-Consult "Submission In response to the Commerce Commission's "Further draft pricing review determination for Chorus' unbundled bitstream access service" and "Further draft pricing review determination for Chorus' unbundled copper local loop service" including the revised cost model and its reference documents" 12 August 2015, paragraph [154].

633 Analysys Mason "Report for Chorus - UCLL and UBA FPP further draft determination submission" CONFIDENTIAL, 11 August 2015, paragraph [6.5].

634 Vodafone "Submission to the New Zealand Commerce Commission on further draft pricing review determination for Chorus' unbundled copper local loop service and further draft pricing review determination for Chorus' unbundled bitstream access service" CONFIDENTIAL, 13 August 2015, paragraph [C2].

635 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" CONFIDENTIAL, 13 August 2015, paragraphs [23]-[24], [97]

636 CallPlus "Submission on the Commerce Commission's Further Draft Pricing Review determinations for UBA and UCLL services" CONFIDENTIAL, 13 August 2015, paragraphs [5]-[9], [14]-[37].

637 A "truck roll" refers to the physical dispatch of a technician to a site, whether an exchange, cabinet or end-user's premises.

638 Chorus "Cross-submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services" CONFIDENTIAL, 24 September 2015, paragraph [98]

639 Ibid, paragraph [99].

640 Ibid, paragraph [100].

834. WIK listed a range of differences between copper and fibre tasks including materials and labour requirements.[641]

835. Analysys Mason noted that there were no alternative copper operators in New Zealand, making it “unclear what alternative is being proposed”.[642]

836. Spark argued the cross-check failed comparability criteria and had been applied asymmetrically.[643] Vodafone also commented that fibre deployment was significantly more complex than copper and agreed with Spark’s view that the cross-checks were applied asymmetrically.[644]

*Analysis*

Outsourcing

837. We recognise that some operators choose to insource their provisioning and fault operations. Such decisions may be made for many reasons, for example, a desire to retain intellectual property. They may also be influenced by external factors such as labour unions, or political pressures where operators are state owned.

838. We considered the position of the international jurisdictions that we have used in our data set.

839. The Spanish and Romanian regulators confirmed that their respective incumbent operators outsource network provisioning and faults services to third parties. In Denmark this is not the case. We do not have information on why the Danish incumbent insources this work.[645] We could not confirm the situation in Italy, France or the United Kingdom.

840. Submissions from Chorus, Spark, Vodafone, and WIK broadly supported outsourcing as an efficient model. We know that in New Zealand all major access seekers engage service companies to perform field work. In addition, we acknowledge Chorus’ submission that its service companies are appointed following a competitive tendering process.

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641 WIK-Consult "Cross-Submission in response to the Commerce Commission's Further draft pricing review determination for Chorus' unbundled bitstream access and Further draft pricing review determination for Chorus' unbundled copper local loop service including the revised cost model and its reference documents" CONFIDENTIAL, 22 September 2015, paragraph [195]-[196].

642 Analysys Mason "Report for Chorus - UCLL and UBA FPP draft determination cross-submission" CONFIDENTIAL, 22 September 2015, paragraph [7.1.12].

643 Spark "Further draft pricing review determination for Chorus’ UBA and UCLL services" CONFIDENTIAL, 13 August 2015, paragraphs [346a] and [346b].

644 Vodafone "Submission to the New Zealand Commerce Commission on further draft pricing review determination for Chorus’ unbundled copper local loop service and further draft pricing review determination for Chorus’ unbundled bitstream access service" CONFIDENTIAL, 13 August 2015, paragraphs [C3.4] and [C3.6].

645 TERA advised us that the Danish incumbent proposed to outsource in 2011, but chose to continue with an insourced model. TERA also noted that in Denmark, external contractors are used for new network deployments. We consider this type of work is a form of network build and is not the same as activities performed for NRC transactions.

841. While not a universal choice, as seen in the case of Denmark, outsourcing is the choice of all major New Zealand telecommunication operators in New Zealand and in certain European countries. TERA advised that Romania moved to an outsourced model in 2011/2012 and we note from WIK's submission that the German incumbent also outsources its NRC activities.[646,647,648]

842. In any event, TERA advises that in terms of any difference between the outsourcing and insourcing approach, that it "should not have material impact on the times required to perform the different NRC activities as even in the case of a subcontractors, the operator will provide all required information / training so that the subcontractor can work in an efficient fashion."[649]

843. Based on the fact that all major New Zealand operators outsource NRC activities, as well as this being the case in certain European countries, and given that there is no material difference between the task times of the two approaches, we consider that a hypothetical efficient operator in New Zealand would also outsource its NRC activities.

Task time adjustment

844. We note that it is not always straightforward to make cross-country comparisons.[650]

845. TERA provides further details in its report as to how we have compared the service activities between countries to ensure that the activities we are comparing are appropriate.

846. We agree with Analysys Mason's view that additional factors such as transport costs should not be compared because they are subject to country-specific cost drivers. Examples include local fuel prices, physical traffic conditions and local tax requirements. This was also described in TERA's methodology where it noted that other cost components are specific to individual countries.[651]

847. By focussing on Chorus' service company task time budgets, we are implicitly retaining other New Zealand-specific cost factors, such as labour rates and travel time. These cost factors are not comparable to other jurisdictions as we noted in our

646 TERA Consultants "TSLRIC price review determination for the UCLL and UBA services non-recurring charges Methodology document" November 2015, p. 23.

647 WIK-Consult "Cross-Submission in response to the Commerce Commission's Further draft pricing review determination for Chorus' unbundled bitstream access and Further draft pricing review determination for Chorus' unbundled copper local loop service including the revised cost model and its reference documents" CONFIDENTIAL,22 September 2015, paragraph [185b].

648 We note that while Romania has moved to an outsourced approach, the data relied on from Romania as part of the task time assessment, was taken from the time when an insourced approach was in place.

649 TERA Consultants "TSLRIC price review determination for the UCLL and UBA services non-recurring charges Methodology document" November 2015, p. 23.

650 TERA has been as transparent as possible in their NRC report on its inputs and assumptions to enable the industry to review it.

651 TERA Consultants "TSLRIC price review determination for the UCLL and UBA services non-recurring charges Methodology document" November 2015, p. 12.

initial views. For example, travel time is affected by traffic conditions and average distances travelled, factors that are specific to individual cities and countries.

848. We have reviewed Spark's assessment as to the comparability and similarity between the New Zealand and European health and safety standard frameworks. We agree with Spark's assessment. Similarly, we agree with WIK's views that third party requirements, such as access rules to third party sites or connection to third party network equipment, are common elsewhere.

849. Further, no evidence has been presented that suggests New Zealand has materially higher task times because of compliance requirements.

850. Based on this, we have not included any adjustment or control for these aspects that could impact the task time.

851. However, based on the submissions, we considered the merits of applying a labour productivity adjustment on the task times. We acknowledge that controlling for differences between the skill level of technicians completing the task makes the efficiency adjustment more robust.

852. We asked the national regulatory authorities (NRA) in our data set (Denmark, France, Italy, Romania, Spain and the United Kingdom) for details on technical resource qualifications.

853. Information received from Spain and Romania showed that there was a range of educational levels from under-graduate to graduate qualified technicians.

854. The NRA in Romania and Spain advised that field resources were a mixture of graduate and under-graduate qualified staff. Although requested, comparative data was not available from Italy, France or the United Kingdom. Denmark did not have any information of this type.

855. We understand from discussions with staff from one of the New Zealand service companies that New Zealand technicians are typically qualified with either a Level 3 or Level 4 New Zealand Qualifications Authority (NZQA) National Certificate in Telecommunications. Under the NZQA's framework, a Bachelor's degree or a Graduate Diploma/Certificate is a level 7 qualification. Based on the NZQA framework, Level 4 qualifications and below equate to under-graduate level qualifications.[652]

856. We asked TERA to consider the potential for variations in labour productivity. TERA compared labour rates and observed task times for the six jurisdictions considered in its modelling. TERA found a correlation between labour rates, after adjusting for purchasing parity, and observed task times. In general, countries with higher paid workforces had lower task times.

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[652] The NZQA Framework is published at http://www.nzqa.govt.nz/studying-in-new-zealand/understand-nz-quals/.

857. To compensate for labour productivity variations TERA proposed an adjustment to task times.[653] The adjustment first calculates the difference between average labour costs in New Zealand and average labour costs in each country studied, which establishes the labour cost ratio. This labour cost ratio is calculated by dividing an individual national average wage by the New Zealand national average wage.

858. The labour cost ratio is then applied to each country's national technician wages to establish the relativity between New Zealand labour rates and other countries. Each country's technician wage is multiplied by the applicable labour cost ratio. The resulting adjusted labour rates are then compared to establish a labour productivity ratio.

859. The labour productivity ratio is then applied to task times to reach an adjusted task time. Where a jurisdiction has a higher adjusted technician wage than New Zealand, task times from that jurisdiction are increased by the delta. Conversely, where an adjusted technician wage is lower than New Zealand's, task times are reduced by the corresponding amount. Finally, by adopting an approach that assesses task times in other jurisdictions, we are testing labour productivity. As labour costs form a significant component of NRC costs, we have controlled for differences to make our comparisons valid and to seek an efficient outcome.

860. In terms of our selection of the lowest adjusted task time, we acknowledge Chorus' submission that this is different from a conventional benchmarking exercise. In a typical benchmarking exercise, whole processes are compared which include country-specific variables. These variables are not individually adjusted for and are compensated for by using the median of results after excluding extremes at each end of the data range.

861. Having considered submissions discussing selection of task times, we have decided to continue to choose the lowest time as our measure of efficiency instead of a median. In our methodology we have attempted to exclude the known country-specific variables and focused on a single process element, task time, which we consider to be comparable between jurisdictions. As part of this task time assessment we have further considered variations in labour skills and have applied an adjustment to normalise the data used. We consider the lowest task time is the best estimate of what our hypothetical efficient operator would aim to achieve.

862. We disagree with Spark's proposal to remove Spain and Romania from our international data set. Spark argued that these countries do not have comparable labour productivity or labour costs.[654] We have considered relative labour productivity and labour costs across the jurisdictions considered and have discussed adjustments to task time data earlier in this Chapter.

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653 For full details of TERA's calculations refer to TERA Consultants "TSLRIC price review determination for the UCLL and UBA services non-recurring charges Methodology document" November 2015, p. 23-26.

654 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" CONFIDENTIAL, 13 August 2015, paragraph [344b].

863. However, we agree with submissions from WIK and Analysys Mason that data from Country A cannot be independently verified. In order to be transparent in our approach, we have decided to remove Country A from our set of international data sources. We note that Country A did not produce any of the lowest task times, therefore, its removal has not impacted on our task time efficiency adjustment.

864. Finally, we accept the information provided by Chorus regarding service company involvement in certain NRC. TERA has analysed the service company codes provided and modelled prices for these NRC using the top-down with efficiency adjustment model. Prices for these NRC have been updated accordingly.

865. We acknowledge the pricing differences noted by Chorus between equivalent UCLL and UBA NRC and have corrected these, as noted in the price tables.

<u>Service Company overheads</u>

866. Following submissions, we considered whether an adjustment should be made to service company overheads.

867. We asked TERA to review and comment on the Chorus service companies' overhead component. TERA noted that service company overheads (of [ ]**CNZCI**) can be seen as a separate monthly billing element, rather than as a mark-up against individual charges. This means that Chorus has visibility of actual service company overhead costs, allowing it to challenge these costs with its suppliers. This allows Chorus to consider total contract cost when selecting the most efficient service company as part of the tender process.

868. TERA advised that this approach to pricing service contracts is not always used in other jurisdictions. Without similar pricing transparency, comparing New Zealand service company overheads against other jurisdictions is not appropriate.

869. In the European jurisdictions considered, only Denmark has a population and urban density with a degree of similarity to New Zealand's. However Denmark's incumbent insources its field services, so there is no comparable contract or overhead to test against.

870. Service companies internationally are subject to varying cost considerations. Outside of labour efficiency, which we have used for our efficiency adjustments, other factors may vary considerably. Examples of such factors include, amongst others:

870.1 travel and transport costs;

870.2 local taxation

870.3 compliance with labour laws;

870.4 financial reporting; and,

870.5 scope of work types, geography and service level obligations.

871. These factors have been specifically excluded from our task time comparison, as they are not relevant to the task time assessment. However, for overheads, these factors do have a direct impact on overhead costs.

872. We have concluded that it is impractical to find a satisfactory comparable service company contract in the European countries we have considered.

873. In addition, we found that it was not possible to find comparable outsourcing contracts in other international telecommunications markets. To be comparable, the service company would need to be operating in a similar market (structurally separated wholesale access provider) with similar operational scale (serving a small population base with wide variations in population density).

874. In New Zealand we could not identify a telecommunications operator of sufficient scale or scope of operations to be reasonably compared with Chorus. In the absence of a comparable telecommunications operator, it was not possible to identify service company contracts that were sufficiently comparable to those held by Chorus' service companies.

875. We do not consider it is practical or reasonable to apply an adjustment to Chorus' service company overheads due to the absence of comparable national or international service company contract data.

Chorus overheads

876. We have decided to use Chorus' actual non-network opex costs with no further adjustments as we consider this provides the appropriate level of overhead cost to be applied to our NRC model.[655] Non-network opex are the ongoing costs that are not directly incurred in providing network services, but are nonetheless required to operate a telecommunications company. This is described further in Attachment M - Operating Expenditure.

877. TERA has derived an appropriate overhead of [ ]**CNZCI** for NRC in the (recurring charges) opex model. The model breaks down overall overhead costs based on revenues, ie, the same equi-proportional mark-up (EPMU) cost allocation basis as used for recurring charges. We agree with the approach taken by TERA.

878. We considered whether a cross-check could be made to confirm the validity of Chorus' overhead costs. We could not find a sufficiently similar network operator in New Zealand. Local Fibre Companies are wholesale only but do not operate copper networks and do not have the scale of operations that Chorus does. Vodafone and Spark have sufficient scale of operations but are vertically-integrated with substantial retail and wholesale operations.

879. Internationally we could find comparable scale operations running copper networks, however there are no structurally separated former incumbents and we consider this an important element of comparability. We also note that local factors such as local

[655] Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 2 July 2015, paragraph [608].

taxation, compliance with labour laws, financial reporting and service level obligations have a direct impact on overhead costs.

880. Therefore we consider there are no telecommunications operations, either in New Zealand or internationally, comparable enough to enable a valid assessment of Chorus overheads. In the absence of other objective evidence, we are not able to apply an adjustment to the Chorus overhead values.

881. We maintain our view, as expressed in Attachment M – Operating Expenditure, that Chorus' operating costs are the best objective evidence of opex for a nationwide telecommunications network provider in New Zealand.

882. We acknowledge WIK's views on IT system improvements and recognise that improved systems may deliver process efficiencies. We also note Chorus' comment on the impact that IT integration costs could have on overheads and recurring charges.

883. In determining that Chorus' non-network opex is an appropriate level for the hypothetical efficient operator, we have made no adjustments to the IT systems that make up some of these costs (refer to Attachment M for further discussion on non-network opex).

884. Finally we agree with Chorus that transaction volumes are not relevant to setting an efficient cost for an individual transaction. We acknowledge access seekers' concerns about potential inefficiencies. However we note Chorus' submission regarding their process review to address these concerns. We have no evidence to suggest that any process review has changed Chorus' overhead costs.

<u>New Zealand cross-check</u>

885. We agree with submissions and cross submissions received on the LFC cross-check. LFC/fibre network requirements are insufficiently comparable to a copper network environment in which NRC are performed. We have decided to abandon the use of a New Zealand LFC cross-check

886. The removal of the LFC cross-check results has meant that some NRC task times are no longer adjusted on the basis of LFC data. These NRC have still been subject to task time assessment based on the international data set.

**Implementation of the NRC modelling approach - hourly rates**

887. For those NRC that are charged on a per hour basis, no efficiency adjustment for task time could be made. Where this was the case, we calculated a revised service company hourly rate using the available and up-to-date New Zealand-based data.

*Initial views*

888. An hourly rate pricing mechanism is used for NRC where the scope of work is simple but has an indeterminate duration. A fixed charge would be inappropriate because costs for such work are subject to variable scale and unforeseen circumstances.

889. There are seven sundry NRC that are charged on an hourly rate basis. This pricing structure does not fit within the top-down with efficiency adjustment approach. Because they have no fixed time element, as such no efficiency adjustment for the duration of task time can be made.

890. In the July 2015 draft determination we proposed to update New Zealand hourly labour rates using current Chorus service company data. We noted that the only adjustment made to these labour rates since they were set in 2007 was the annual Labour Cost Index (LCI) adjustment, which is required on only certain NRC by the STD. (For further discussion on the LCI adjustment on NRC please see Attachment I – Price Trends).

*Submissions*

891. Chorus noted that our proposed hourly rate adjustment did not impact price review mechanisms in the STD.[656]

892. Analysys Mason agreed with our use of labour rates provided by Chorus in the Service companies' costs sheet.[657]

*Analysis*

893. Following submissions and having received current labour costs for service company contracts from Chorus, we have decided to update New Zealand hourly labour rates using this current data. We consider this is consistent with our regulatory framework that evidential matters often drive our modelling decisions. As we have up-to-date data we should rely on this. We consider that it provides a more accurate result than using 2007 data that has been modified using an adjustment index.

894. We consider it appropriate to set NRC priced on an hourly rate basis using updated rates based on current data. This ensures that the NRC which use an hourly rate pricing mechanism are a fair reflection of the actual service company contract rates relevant in 2015.

895. Accordingly, we asked TERA to calculate a revised service company hourly rate based on Chorus' latest service company cost data. The result is a new hourly rate for NRC priced on an hourly basis.

896. Consequently we are updating the LCI adjusted labour rates with Chorus' latest service company data. We consider that this produces a reasonable estimate of the costs our hypothetical efficient operator could negotiate.

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[656] Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services (2 July 2015)" CONFIDENTIAL, 13 August 2015, paragraph [387].

[657] Analysys Mason "Report for Chorus - UCLL and UBA FPP further draft determination submission" CONFIDENTIAL, 11 August 2015, paragraph [6.4].

**Implementation of the NRC modelling approach - POAs**

897. For those NRC that are charged on a POA basis, no efficiency adjustment for task time could be made. We have retained all POA charges and will continue to rely on the annual price review mechanism in the UCLL STD.

*Initial views*

898. POA is a charging approach that has been a feature of the UCLL STD Price List since its inception. A POA is a charging mechanism that requires Chorus to use all reasonable endeavours to provide the access seeker with two or more competitive quotes for the requested service.[658]

899. POA are typically used for service components where a fixed fee or per hour charge is hard and impractical to establish and doing so may lead to under or over-recovery by the access provider. The UCLL STD expresses POA as a charge "to reflect the underlying cost of providing the resources and project management skills required to provide the ancillary service".[659] The key attributes supporting a POA classification are that the activity is low volume and customised to the access seeker's specific needs at the time.

900. In order to safeguard access seekers, there are requirements in the STD on how POAs can be charged, and an annual review process that assesses whether a fixed price could be established.[660]

*Submissions*

901. Submissions received on POA showed a general preference for less POA charges.

902. Chorus noted a general preference for fixed charges and that the STD required Chorus to review POA charges annually and provide a fixed price where practicable.[661]

903. WIK considered it was critical to determine fixed prices or a price formula to promote the long-term benefit of end-users.[662]

904. Wigley and Company argued that POA charges were "problematic" and there should be "some form of clear metric which is directly cost-based".[663]

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658 For more detail, refer section 2 of Schedule 2 of UCLL STD.

659 UCLL STD Sch. 2 7 November 2007 Consequential Amendments 30 November 2011, paragraph [2.3.3}.

660 Ibid, paragraphs [3.1.3].

661 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services - CONFIDENTIAL version" 2 July 2015, paragraphs [457-458].

662 WIK-Consult "Submission In response to the Commerce Commission's "Further draft pricing review determination for Chorus' unbundled bitstream access service" and "Further draft pricing review determination for Chorus' unbundled copper local loop service" including the revised cost model and its reference documents" 12 August 2015, paragraph [116].

663 Wigley and Company "Submission on Further Draft Pricing Review UCLL and UBA Determinations" 13 August 2015, paragraph [19.1].

*Analysis*

905. We acknowledge the preference for less POA charges and have reviewed the POA charges as set out in the UCLL STD.

906. We have also considered TERA's views on POA charges as set out in its report on NRC methodology.[664]

907. After considering submissions and TERA's views, we have decided not to make any changes to POA charges for NRC. We have found that transaction volumes for these charges are very low and that they remain bespoke and complex in nature. Where transaction volumes are low, the task is complex and variable, establishing a fixed charge using average task times, could result in either under- or over-recovery of cost.

908. In the absence of more detailed information we believe the current price change mechanisms within the STD are sufficient for the time being. These mechanisms are noted in our decisions at the beginning of this Chapter.

**Final pricing for UCLL NRC**

909. We have documented final pricing in the tables below. The tables contain the former STD prices, transaction volumes, new prices and any specific considerations relevant to the new price. Where these considerations have been addressed by TERA we have reviewed their assessment. Where we agree with TERA we refer to TERA's NRC report for detailed information. Where we disagree we make note and provide our reasoning.

*Structure of price tables*

910. We have established a set of reasons for our pricing decisions. For each NRC the decisions resulting in the final price can generally be categorised into one of the following reasons:

    910.1 Reason 1 - This NRC price is set using a fixed pricing approach with an efficiency adjustment applied. This NRC was set on a fixed pricing approach in the UCLL STD. The modelling details are set out in the TERA NRC report.[665]

    910.2 Reason 2 – This NRC price is based on the POA pricing approach. This is the same pricing approach used for this NRC as in the UCLL STD. We discuss POA in this Chapter in the "Implementation of the NRC modelling approach" section.

    910.3 Reason 3 – This NRC price is set based on the hourly rate pricing approach. The hourly rate has been adjusted using updated New Zealand service company labour rates. This is the same pricing approach used for this NRC in

[664] TERA Consultants "TSLRIC price review determination for the UCLL and UBA services non-recurring charges Methodology document" November 2015, pp. 38-42.

[665] TERA Consultants "TSLRIC price review determination for the UCLL and UBA services non-recurring charges Methodology document" November 2015, paragraph [1.2.1.1].

the UCLL STD. We discuss hourly rates in this Chapter under section "Implementation of the NRC modelling approach".

910.4 Reason 4 – This NRC price is unchanged. We maintain our reasoning as set out in the UCLL STD.

910.5 Reason 5 – This NRC price is changed. The original reasoning in the UCLL STD established pricing on the basis of cost recovery of software systems which were developed to deliver this NRC service. System costs are discussed under Chorus overheads in this Chapter. In order to avoid double recovery of systems costs we have not included additional IT costs into our model. On that basis NRC which were originally priced to recover system costs are now priced at nil charge.

**Price tables**

**Table 6.1: UCLL core charges**

| **Transaction name** | **Service component** | **Transaction volume** All volumes **CNZCI** | **Former STD price** | **Final STD price** | **Considerations** |
|---|---|---|---|---|---|
| MPF new connection - individual new connection where site visit required | 1.1 | [ ]**CNZCI** | $155.10 | $131.27 | Reason 1. |
| MPF new connection - individual new connection where no site visit required | 1.1 | [ ]**CNZCI** | $70.46 | $45.35 | Reason 1. |
| MPF new connection (bulk) - where no site visit required | 1.1 | [ ]**CNZCI** | $52.84 | $31.21 | Reason 1. |
| MPF transfer - individual transfer | 1.2 | [ ]**CNZCI** | $70.46 | $54.62 | Reason 1. |
| MPF transfer (bulk) | 1.2 | [ ]**CNZCI** | $52.84 | $31.21 | Reason 1. |
| Other service to MPF transfer - individual transfer | 1.3 | [ ]**CNZCI** | $70.46 | $54.62 | Reason 1. |
| Other service to MPF transfer (bulk) | 1.3 | [ ]**CNZCI** | $52.84 | $31.21 | Reason 1. |
| MPF relinquishment | 1.7 | [ ]**CNZCI** | $0.00 | $0.00 | Reason 4. |

**Table 6.2: UCLL sundry charges**

| **Transaction name** | **Service component** | **Transaction volume**<br>All volumes **CNZCI** | **Former STD price** | **Final STD price** | **Considerations** |
|---|---|---|---|---|---|
| Bulk transfer | 1.4 | [ ]**CNZCI** | POA | POA | Reason 2. |
| Exception to BAU support | 1.5 | [ ]**CNZCI** | POA | POA | Reason 2. |
| Bulk line transfer for a single end-user support | 1.6 | [ ]**CNZCI** | POA | POA | Reason 2. |
| MPF move address | 1.8 | [ ]**CNZCI** | $26.85 | $8.21 | Reason 1. |
| Remote tie cable service installation | 1.9 | [ ]**CNZCI** | POA | POA | Reason 2. |
| Unauthorised automatic address pre-qualification order | 3.1 | [ ]**CNZCI** | $0.77 | $0.00 | Reason 5. |
| Authorised automatic address pre-qualification order | 3.2 | [ ]**CNZCI** | $0.77 | $0.00 | Reason 5. |
| Special manual pre-qualification investigation order | 3.3 | [ ]**CNZCI** | $118.78 per hour | $117.60 per hour | Reason 3. |
| Manual line testing | 3.4 | [ ]**CNZCI** | $99.66 per hour | $117.60 per hour | Reason 3. |
| MPF tie pair change or re-termination | 3.5 | [ ]**CNZCI** | $61.25 | $45.35 | Reason 1. |

| Transaction name | Service component | Transaction volume<br>All volumes **CNZCI** | Former STD price | Final STD price | Considerations |
|---|---|---|---|---|---|
| No fault found | 3.6 | [ ]**CNZCI** | $112.63 | $88.34 | Reason 1.<br>We acknowledge the pricing for this NRC and its equivalent in UBA were different in our July 2015 further draft determination. This was made in error and we have now corrected this. |
| Third party interference investigation | 3.7 | [ ]**CNZCI** | POA | POA | Reason 2. |
| Abortive end-user site visit | 3.8 | [ ]**CNZCI** | $99.66 | $32.01 | Reason 1.<br>We acknowledge the pricing for this NRC, and its equivalent in UBA, were different in our July 2015 further draft determination. This was made in error and we have now corrected this. |
| Cancellation of bulk transfer service request | 3.9 | [ ]**CNZCI** | POA | POA | Reason 2. |
| Additional OO&T training | 3.1 | [ ]**CNZCI** | $112.32 per hour | $58.70 per hour | Reason 3. |
| Additional OFM training | 3.11 | [ ]**CNZCI** | $112.32 per hour | $58.70 per hour | Reason 3. |
| OO&T licence fee | 3.12 | [ ]**CNZCI** | $24.00 per month | $0.00 | Reason 5. |

| Transaction name | Service component | Transaction volume<br>All volumes **CNZCI** | Former STD price | Final STD price | Considerations |
|---|---|---|---|---|---|
| OFM licence fee | 3.13 | [ ]**CNZCI** | $24.00 per month | $0.00 | Reason 5. |
| Additional copies of invoice | 3.14 | [ ]**CNZCI** | $112.32 per invoice | $0.00 | Chorus submitted that it is able to provide copies of electronic invoices at "relatively low cost" but noted that if required to provide physical copies it would incur "significant administrative cost".[666] Chorus proposed a staggered charge regime with nil charge for electronic copies of bills and an hourly rate to provide additional physical copies.<br><br>We recognise there are merits to Chorus' proposal however we note this would require a change to the structure of NRC charges and consider this is out of scope of this final pricing review.<br><br>Therefore we maintain our position that there is no charge for this NRC. |
| Additional billing information | 3.15 | [ ]**CNZCI** | POA | POA | Reason 2. |

[666] Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services - CONFIDENTIAL version" 2 July 2015, paragraphs [433-435].

| Transaction name | Service component | Transaction volume<br>All volumes **CNZCI** | Former STD price | Final STD price | Considerations |
|---|---|---|---|---|---|
| Tie cable maintenance charge | 3.16 | [ ]**CNZCI** | POA | POA | Reason 2. |
| Fixing fault which access seeker no right of access | 3.17 | [ ]**CNZCI** | POA | POA | Reason 2. |

**Table 6.3: SLU core charges**

| Transaction name | Service component | Transaction volume<br>All volumes CNZCI | Former STD price | Final STD price | Considerations |
|---|---|---|---|---|---|
| SLU MPF new connection - individual new connection where site visit required | 1.1 | [ ]**CNZCI** | $258.94 | $131.27 | Reason 1. |
| SLU MPF new connection - individual new connection where no site visit required | 1.1 | [ ]**CNZCI** | $108.77 | $45.35 | Reason 1. |
| SLU MPF new connection (bulk) - where no site visit required | 1.1 | [ ]**CNZCI** | $81.57 | $31.21 | Reason 1. |
| SLU MPF transfer - individual transfer | 1.2 | [ ]**CNZCI** | $108.77 | $54.62 | Reason 1. |
| SLU MPF transfer (bulk) | 1.2 | [ ]**CNZCI** | $81.57 | $31.21 | Reason 1. |
| Other service to SLU MPF transfer - individual transfer | 1.3 | [ ]**CNZCI** | $108.77 | $54.62 | Reason 1. |
| Other service to SLU MPF transfer (bulk) | 1.3 | [ ]**CNZCI** | $81.57 | $31.21 | Reason 1. |
| SLU MPF relinquishment | 1.8 | [ ]**CNZCI** | $0.00 | $0.00 | Reason 4. |

**Table 6.4: SLU sundry charges**

| Transaction name | Service component | Transaction volume<br>All volumes **CNZCI** | Former STD price | Final STD price | Considerations |
|---|---|---|---|---|---|
| Exchange based unbundled or resale services to SLU UCLL migration | 1.4 | [ ]**CNZCI** | POA | POA | Reason 2. |
| Bulk transfer or SLU migration management | 1.5 | [ ]**CNZCI** | POA | POA | Reason 2. |
| Exception to BAU support | 1.6 | [ ]**CNZCI** | POA | POA | Reason 2. |
| Bulk line transfer or migration for a single end-user support | 1.7 | [ ]**CNZCI** | POA | POA | Reason 2. |
| SLU MPF move address | 1.9 | [ ]**CNZCI** | $26.85 | $8.21 | Reason 1. |

| **Transaction name** | **Service component** | **Transaction volume**<br>All volumes **CNZCI** | **Former STD price** | **Final STD price** | **Considerations** |
|---|---|---|---|---|---|
| UCLL MPF to SLU MPF move address | 1.10 | [ ]**CNZCI** | $26.85 | $8.21 | Reason 1.<br><br>There is no direct UCLL equivalent.<br><br>However, this NRC is similar to *SLU MPF move address (Service Component 1.9)* where project management of a coordinated MPF relinquishment and MPF new connection is performed. As the nature and volume of tasks being managed are technically similar to the UCLL or SLU MPF move address, the level of project management is also similar and so the same cost has been established for this NRC. Note that STD pricing was the same for this NRC, *SLU MPF move address (Service Component 1.9) and UCLL MPF move address (Service Component 1.8)*. |
| SLU tie cable service installation | 1.11 | [ ]**CNZCI** | POA | POA | Reason 2. |
| Unauthorised automatic address pre-qualification order | 3.1 | [ ]**CNZCI** | $0.77 | $0.00 | Reason 5. |
| Authorised automatic address pre-qualification order | 3.2 | [ ]**CNZCI** | $0.77 | $0.00 | Reason 5. |

| **Transaction name** | **Service component** | **Transaction volume**<br>All volumes **CNZCI** | **Former STD price** | **Final STD price** | **Considerations** |
|---|---|---|---|---|---|
| Special manual pre-qualification investigation order | 3.3 | [ ]**CNZCI** | $118.78 per hour | $117.60 per hour | Reason 3. |
| Manual line testing | 3.4 | [ ]**CNZCI** | $99.66 per hour | $117.60 per hour | Reason 3. |
| SLU MPF tie pair change or re-termination | 3.5 | [ ]**CNZCI** | $61.25 | $45.35 | Reason 1. |
| No fault found | 3.6 | [ ]**CNZCI** | $112.63 | $88.34 | Reason 1. |
| Third party interference investigation | 3.7 | [ ]**CNZCI** | POA | POA | Reason 2. |
| Abortive end-user site visit | 3.8 | [ ]**CNZCI** | $99.66 | $32.01 | Reason 1. |
| Cancellation of bulk transfer service request | 3.9 | [ ]**CNZCI** | POA | POA | Reason 2. |
| Additional OO&T training | 3.10 | [ ]**CNZCI** | $112.32 per hour | $58.70 per hour | Reason 3. |
| Additional OFM training | 3.11 | [ ]**CNZCI** | $112.32 per hour | $58.70 per hour | Reason 3. |
| OO&T licence fee | 3.12 | [ ]**CNZCI** | $24.00 per month | $0.00 | Reason 5. |
| OFM licence fee | 3.13 | [ ]**CNZCI** | $24.00 per month | $0.00 | Reason 5. |

| Transaction name | Service component | Transaction volume<br>All volumes **CNZCI** | Former STD price | Final STD price | Considerations |
|---|---|---|---|---|---|
| Additional copies of invoice | 3.14 | [ ]**CNZCI** | $112.32 per invoice | $0.00 | Chorus submitted the same arguments for a staggered charging regime as for UCLL Additional copies of invoice *(Service Component 3.14).*[667,668]<br>Our decision on this NRC is as per *UCLL Additional copies of invoice (Service Component 3.14).* |
| Additional billing information | 3.15 | [ ]**CNZCI** | POA | POA | Reason 2. |
| SLU Tie cable maintenance charge | 3.16 | [ ]**CNZCI** | POA | POA | Reason 2. |
| Fixing fault which access seeker no right of access | 3.17 | [ ]**CNZCI** | POA | POA | Reason 2. |
| SLU MPF normalisation | 3.18 | [ ]**CNZCI** | POA | POA | Reason 2. |
| SLU grooming | 3.19 | [ ]**CNZCI** | POA | POA | Reason 2. |

667 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services - CONFIDENTIAL version" 2 July 2015, paragraph [440].

668 We note in Chorus submission paragraph [440] it refers to "3.10 Additional copies of invoices". In the Sub-loop UCLL price list this service component is listed as "3.14 Additional copies of invoice". We conclude from the title and context of this submission that Chorus is discussing service component 3.14 Additional copies of invoice in relation to sub-loop UCLL NRC.

## Monthly space rental charge

*Initial views*

911. Different to NRC, but also modelled separately are the prices we have set for a unique recurring charge, that are not captured elsewhere.

912. The UCLL and SLU STDs include a monthly space rental charge to connect Chorus' MDF and the network cable to remotely located access seeker equipment.[669] Accordingly, this charge applies only when the access seekers equipment is not co-located in Chorus' exchange or cabinet. As such, this is not a charge that is levied against every end-user connection but its applicability varies depending on an access seeker's equipment location.

913. We noted that the materiality of this charge is minimal as there are few access seekers who locate their equipment outside Chorus' exchange or cabinet.

*Submissions*

914. No submissions were received on UCLL and SLU space rental charges.

*Analysis*

915. To set the forward-looking incremental long run cost for this service we have sought up-to-date costs for providing a tie cable. TERA has been able to identify the cost of 25 m and 50 m tie-cables. TERA has then computed a linear extrapolation in order to determine the cost of a 100 m tie cable. We have then calculated the cost of the SLU tie cable service by multiplying the UCLL price by the ratio of the SLU to UCLL tie cable IPP prices. We have reviewed TERA's analysis and agree with the results.

916. Accordingly, we have set the following prices for the remote tie cable space rental service:

**Table 6.5: Remote tie cable space rental charges**

| | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 |
|---|---|---|---|---|---|
| UCLL Remote Tie Cable Service space rental charge | $11.06 | $11.37 | $11.69 | $12.01 | $12.35 |
| SLU Remote Tie Cable Service space rental charge | $2.72 | $2.80 | $2.87 | $2.95 | $3.04 |

[669] Service component 2.2 Remote Tie Cable Service space rental charge.

# Chapter 7: Backdating

## Purpose

917. In this Chapter we set out the Commission's final decision regarding whether to commence the UCLL FPP regulatory period after the Commission's final determination, or at an earlier date, ie, to backdate the determination.

918. Some of the key considerations in our backdating decision have been:

918.1 what guidance we can draw from previous consideration of backdating by the Courts;

918.2 what impact backdating is likely to have on investment incentives and retail market competition; and

918.3 whether early signalling of an intention to backdate by the Commission would be likely to result in more efficient retail prices getting into the market earlier.

## Our final decision

919. The Commission's final decision is that the regulatory period should start on 16 December 2015. While mindful of the Court's previously expressed views on backdating, in the particular circumstances of the UCLL FPP Commissioners Gale and Welson (the majority) consider that immediate implementation of the determination best promotes incentives that promote competition for the long-term benefit of end-users.

920. The majority were concerned that backdating would harm those incentives, particularly because of the negative impact (regardless of how it was implemented) backdating would be likely to have on retail markets. In the majority's view there were not countervailing benefits from backdating, in terms of promoting investment incentives or price signalling, that would adequately balance out this negative impact.

921. Commissioner Duignan considers an alternative start date of 1 December 2014 would best promote competition for the long-term benefit of fixed line end-users since:

921.1 vigorous competition in the fixed line retail market appears assured following the separation of the access provider from retail involvement and thus exposure of RSPs to backdating will not have long run detrimental effects on competition;

921.2 Parliament's 2011 addition of s18(2A) requires consideration of incentives and risks faced by investors in new capital intensive services offering new capabilities. Such investors and Chorus submit that investment relies on confidence a price review will apply TSLRIC prices *ab initio* rather than after a period of less accurate benchmarked prices and that decisions will be consistent with precedents;

921.3 thus the start date decision's major effect, regarding promotion of competition, will be its long run effect on the confidence of market participants and funders that they can rely on a previous Commission approach that the Court of Appeal has endorsed.

922. Commissioner Duignan's view regarding payment of the difference between the IPP and FPP prices in respect of services purchased prior to the date of this decision is covered in his section later in this chapter.

923. The first section of this chapter sets out a number of points on which all three Commissioners are agreed, and notes the submissions received on each point.

924. The majority and minority decisions, set out at the end of this chapter, reflect differences in emphasis and weighting, or differences regarding the implications arising from these points.

**We have a discretion to backdate**

925. Our view remains that we have the discretion to set an earlier start date for the FPPs than the date of this final determination, ie, to backdate. Our previous legal advice supports this view.[670]

926. In particular, we consider that:

926.1 we do not need an express statutory power to be able to start an FPP regulatory period prior to the final decision date – the reasoning in both the earlier High Court and Court of Appeal judgments that considered backdating under the Act support this view;[671,672]

926.2 while the Court of Appeal's judgment provides guidance to the Commission, it is not determinative of the start date of a FPP regulatory period; and

926.3 any decision about the relevant start date for the regulatory period needs to be considered in its specific factual and statutory context against the section 18 purpose.[673]

*Submissions and cross submissions since our July further draft determinations*

927. Chorus made a number of detailed submissions to support its position that backdating is required by the Act and is supported by the Court of Appeal judgment. Similarly, Wigley and Company reaffirmed its position that the Commission is prevented from backdating under the Act. Spark and Vodafone confirmed their agreement with the Commission's view that we have a discretion.

670 Commerce Commission "Further consultation on issues relating to determining a price for Chorus' UCLL and UBA services under the final pricing principle – supplementary paper" 25 March 2014.

671 *Telecom New Zealand Ltd v Commerce Commission* HC Auckland CIV-2004-404-5417, 8 April 2005

672 *Telecom New Zealand Limited Ltd & Anor* CA75/05, 25 May 2006.

673 Just as the earlier High Court and Court of Appeal judgments took colour from the relevant context for Telecom's applications.

928. Chorus argued that the Commission is required to backdate under the Act as follows.

928.1 The Court of Appeal held that, as a matter of statutory interpretation, a price review determination relates back to the date of the initial determination.[674]

928.2 Further, the legislative framework makes it clear that the initial price is contingent on a price review determination being carried out using a more sophisticated methodology. This is the substitutionary nature of the final review process which the Act has established in order to serve the section 18 purpose.[675]

928.3 In Chorus' view, the Commission is therefore not required or permitted to carry out a balancing act under the legislation. To do so would be inconsistent with section 18.[676]

928.4 There is no basis for distinguishing the Court of Appeal's judgment from a pricing review application under section 30M. Parliament consciously provided that the same price review provisions would apply.[677]

928.5 Section 52 only provides that a final determination must include an expiry date and not a commencement date. Parliament could have required a commencement date and without such a direction it is wrong to regard a second phase determination as having only prospective effect.[678]

929. Chorus went on to say that the Court of Appeal judgment reflects the statutory requirements set out above. In particular, it argued that the Court of Appeal's judgment was not dependent on the "time expiry" issue and that the reasoning in that case applies equally in the present context.[679] By contrast Russell McVeagh for

674 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services (2 July 2015) - Public version" 13 August 2015, paragraph [287.1].

675 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services (2 July 2015) - Public version" 13 August 2015, paragraphs [287.3]–[287.4].

676 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services (2 July 2015) - Public version" 13 August 2015, paragraph [287.6].

677 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services (2 July 2015) - Public version" 13 August 2015, paragraphs [287.2] and [298].

678 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services (2 July 2015) - Public version" 13 August 2015, paragraph [287.5].

679 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services (2 July 2015) - Public version" 13 August 2015, paragraphs [289] ]–[294].

Spark considered that the expiry date of the section 27 determination in the previous case remains a distinguishing factor.[680]

930. Chorus also noted that the Court of Appeal's judgment represents an almost complete adoption of the factual and economic propositions advanced by the Commission in that case.[681]

931. Vodafone and Spark disagreed with Chorus, continuing to submit that the Commission has the discretion to backdate the FPP price and that the Court of Appeal did not hold that backdating must occur in every IPP / FPP situation. These parties say that the Court of Appeal decided that not backdating would result in inefficiencies but that this view was confined to the specific facts of that case.[682] Vodafone noted that any backdating assessment must depend on the effects that arise directly and indirectly from the transfer involved. It cannot be postulated, *ex ante*, as a fixed rule.[683]

932. Vodafone responded to Chorus' "contingency" argument stating that when an application for a review of an IPP price is made, the Act provides that the IPP price continues to have effect and is enforceable pending an FPP determination. Any replacement of an IPP price simply reflects the statutory scheme and the different costing methodologies prescribed for an IPP and a FPP.[684]

933. Spark further submitted that the previous Telecom backdating case was decided in a different context (involving a different type of determination under a different industry structure), is not legally binding, and does not establish a requirement to

680 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services Cross Submission" CONFIDENTIAL, 24 September 2015, Attachment E: Russell McVeagh opinion, paragraphs [11]–[19].

681 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services (2 July 2015) - Public version" 13 August 2015, paragraphs [296]–[297]. In response, Wigley and Company made the point that a litigant's submissions (even where the litigant is a regulator) must be considered in that context –Wigley and Company "Cross-submission in relation to UCLL and UBA draft pricing review determinations" 24 September 2015, paragraphs [22.1]–[22.3].

682 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" CONFIDENTIAL, 13 August 2015, paragraphs [377] and [380]. CallPlus also agree that the Commission has the discretion to backdate – CallPlus "Submission on the Commerce Commission's Further Draft Pricing Review determinations for UBA and UCLL services" CONFIDENTIAL, 13 August 2015, paragraph [38].

683 Vodafone "Submission to the New Zealand Commerce Commission on further draft pricing review determination for Chorus' unbundled copper local loop service and further draft pricing review determination for Chorus' unbundled bitstream access service" CONFIDENTIAL, 13 August 2015, paragraphs [B1.4]–[B1.5], [B4.3].

684 Vodafone "Submission to the New Zealand Commerce Commission on further draft pricing review determination for Chorus' unbundled copper local loop service and further draft pricing review determination for Chorus' unbundled bitstream access service" CONFIDENTIAL, 13 August 2015, paragraphs [B1.1]–[B1.3] and [B4.14]–[B4.15]. Spark made similar arguments in its February submission – Spark, "UBA and UCLL FPP pricing review draft decision" 20 February 2015, paragraph [407].

backdate.[685] Spark noted that Chorus seeks to distinguish the *Vodafone TSO* case in this same FPP process for similar reasons.

934. In response to one of the points made by Chorus (summarised above), Wigley and Company submitted that Chorus has never previously opposed submissions that, absent a specific commencement date, the default position is that there is no backdating (citing the English case *Vodafone v BT and Ofcom* in support of this proposition).[686]

*Our response*

935. We note that submitters expressed a number of contrary positions on what is essentially a question of legal interpretation.

936. On balance we still consider that the statutory scheme, including the absence of any specific statutory provisions regarding backdating, is most consistent with a discretion to backdate. Despite the submissions of parties, we do not consider that the Act credibly supports either of the proposed mandatory interpretations ie, that the Commission must backdate or cannot backdate.

937. We have closely considered the previous High Court and Court of Appeal judgments, and accept their core finding of statutory interpretation that the FPP *relates back* to the IPP. That is consistent with the Commission having a discretion to backdate the FPP to the start date of the IPP, but does not in itself create a mandatory requirement to backdate.

938. The majority (Commissioners Gale and Welson) and minority (Commissioner Duignan) have different views regarding what further implications should be taken from the previous High Court and Court of Appeal judgments, which are set out at the end of this chapter.

**Basis for exercising discretion**

939. The basis of the discretion for setting an earlier start date than the date of the final determination is section 18.

940. Our starting point in considering section 18 is that a TSLRIC price will promote competition for the long-term benefit of end-users, for the reasons laid out in Chapter 2 of this final determination.

941. In considering whether backdating promotes competition, we note that the retrospective implementation of prices cannot influence decisions already made. However, the expectation of retrospective implementation at some future date may do so, as it has to some extent on this occasion.

685 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" CONFIDENTIAL, 13 August 2015, paragraphs [380]–[381].

686 Wigley and Company "Cross-submission in relation to UCLL and UBA draft pricing review determinations" 24 September 2015, paragraphs [18.1]–[18.2].

942. In making our section 18 assessment, we consider whether backdating: (i) is efficient; and (ii) promotes competition in a way that is likely to directly benefit end-users.

943. We assess the reasoning and/or evidence relating to (i) and (ii) in order to carry out the overall section 18 assessment below.

*Submissions*

944. Wigley and Company, in the alternative to its primary position, submitted that the Commission must carry out a full quantified cost benefit analysis to assess the section 18 effects of backdating. In particular, Wigley and Company submitted that the same analysis which is used for the Commission's assessment of uplift should be used to assess backdating.[687] CallPlus supported the quantification of any consumer benefits from backdating.[688]

*Our response*

945. In making our section 18 assessment of backdating, we weighed up the costs and benefits across each of the relevant considerations. We used quantitative analysis where it is valuable to do so, but not for issues or judgements that cannot be sensibly quantified. While the direct financial quantum of backdating is clear, we do not consider that an attempt to quantify the various incentives associated with backdating that are set out in this chapter would have assisted with our decision.[689]

**Context in which we exercise our discretion**

946. Significant reforms were made to the Act in 2011, in the context of Telecom's structural separation on 1 December 2011.

946.1 The retail minus UBA price was frozen for three years.[690]

946.2 A new cost-based pricing principle for UBA was introduced, applying from 1 December 2014. The Commission was required to make reasonable efforts to complete the cost-based IPP review of the UBA price by 1 December 2012, and any FPP pricing review determination by 1 December 2014.[691]

946.3 The UCLL price was required to be geographically averaged prior to 1 December 2011, but would not be implemented until 1 December 2014.[692]

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687 Wigley and Company "Submissions as to the revised draft UCLL and UBA FPP determinations – backdating" 13 August 2015, paragraphs [3.6]–[3.11].

688 CallPlus "Submission on the Commerce Commission's Further Draft Pricing Review determinations for UBA and UCLL services" CONFIDENTIAL, 13 August 2015, paragraphs [43]–[46].

689 We respond to this submission in more detail in Chapter 1.

690 Telecommunications (TSO, Broadband, and Other Matters) Amendment Act 2011, sections 75, 76.

691 Telecommunications Act 2001, Schedule 1, Part 2, Subpart 1; Telecommunications (TSO, Broadband, and Other Matters) Amendment Act 2011, sections 77, 78.

692 Telecommunications Act 2001, Schedule 1, Part 1, Subpart 1, clause 4A; Telecommunications (TSO, Broadband, and Other Matters) Amendment Act 2011, section 73(1) and (3).

947. Against this background, the Commission:

947.1 completed the averaging of the UCLL price on 24 November 2011;

947.2 completed a (Commission-initiated) re-benchmarking review of UCLL prices on 3 December 2012. Initial cost-based (IPP) UCLL prices were set in November 2007; and

947.3 completed the UBA cost-based IPP review on 5 November 2013.

948. Both the UCLL and UBA services are regulated under standard terms determinations that apply to all access seekers, and do not expire.[693]

949. As referred to earlier in this chapter, both the High Court and Court of Appeal have considered backdating in relation to the IPP/FPP structure in the Act. The Courts were asked by Telecom to make declarations that a FPP price review determination relating to a bilateral IPP determination, with an expiry date, could not be backdated or apply beyond the expiry date of the initial determination. The Courts refused to make those declarations.

950. While in our view the Commission has a discretion to backdate (ie, is not legally required to do so or prevented from doing so):

950.1 backdating UBA to a 1 December 2014 start date is consistent with the statutory context for the introduction of the amended cost-based pricing principle for UBA, and the date by which the Commission was required to make reasonable efforts to complete any UBA pricing review determination; and

950.2 an earlier start date is consistent with the Court of Appeal's observations in *Telecom v Commerce Commission*:[694]

> In our view Harrison J was right to uphold the contention by the Commission and TelstraClear that a price review determination relates back to the date of the initial determination. That is consistent with the substitutionary nature of reviewing or appellate decisions which vary an original decision. The alternative view implies a potential for negativing the efficacy of the review process which the Act has established in order to serve the s 18 purpose. Moreover, the obvious function of the price determination regime is to fix the price for a period of time relevant to the

693 Telecommunications Act 2001, sections 30A and 30Q.

694 *Telecom New Zealand Limited Ltd & Anor* CA75/05, 25 May 2006, paragraph [44]. We note that the Commission's submissions to the Court in that case were also consistent with the Court of Appeal's view (Commerce Commission "Submissions of the First Respondent dated 1 February 2006", at paragraph [64]): "Telecom submits (paragraph 3.7(e)) that backdating s 51 determinations does not provide for the s 18 purpose because efficiency is not served by altering the cost of the service after it has been consumed and paid for. The Commission submits that the commercial reality is that the providers of telecommunications services are aware that they provide these services in a regulated environment where the prospect exists that the regulator may impose price terms that are retrospective. Similarly, it enhances the Part 2 regulatory regime by providing a price that is, in Telecom's own words; "a more accurate fulfilment of the long-term section 18 purpose". It is difficult to understand why a process that allows the regulator to give best effect to the purpose of the Act should be given a restrictive meaning."

> application, not to fix the price for part of that time and another price for another part. We consider that the s 18 purpose is better served by substituting the revised price for the initial price ab initio rather than only after a period of relatively less efficient pricing. None of the arguments advanced on behalf of Telecom has persuaded us to the contrary.

*Submissions and cross submissions*

951. Spark submitted that the transitional statutory provisions are only relevant in the UBA context.[695] Chorus applied similar logic in submitting that UCLL should be backdated to December 2012.[696]

952. In cross submission Chorus noted that, in a standard process, both UCLL and UBA final prices should have been completed by December 2014. While the statutory target has not been met, the Commission can still give effect to Parliament's intent by adopting an earlier start date for the final price.[697]

*Our response*

953. Spark's submission is only relevant if the Commission decided to backdate, which the majority has not done. The minority view (set out at the end of the chapter) does however comment on the point to which UCLL should be backdated to, including the relevance of the transitional statutory provisions.

954. In relation to Chorus' cross submissions, we remain of the view that the Act gives us a discretion to backdate, without requiring it. We interpret Parliament's intent from the specific provisions of the Act. The transitional provisions for UBA require the Commission to use reasonable efforts to complete reviews by specified dates but are silent on what the Commission should do if it cannot meet those dates.[698]

**Considerations informing our section 18 assessment**

955. In our July 2015 further draft determination we set out a number of considerations, both for and against backdating, that were relevant to our assessment of whether backdating best promotes competition for the long-term benefit of end-users. These included:

  955.1 impact on long-term infrastructure investment incentives and impact on investor confidence;

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695 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" CONFIDENTIAL, 13 August 2015, paragraphs [386]-[389].

696 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services (2 July 2015) - Public version" 13 August 2015, paragraph [319] [320].

697 Chorus "Cross-submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services (2 July 2015) - Public version" 24 September 2015, paragraph [129].

698 Had the transitional provisions been meant to make backdating mandatory, we would have expected that they would have been explicit (rather than using reasonable efforts language) in their application to both services.

955.2 impact on access seeker competition;

955.3 feed-through of modelled prices prior to the final decision; and

955.4 incentives to delay the FPP process.

956. We address these considerations below, and submissions received in August and September.

**Impact on long-term infrastructure investment incentives and impact on investor confidence**

957. Investment by Chorus can facilitate competition between access seekers through offering a greater ability to provide new retail services and may itself compete with other infrastructure. In particular:

957.1 prior to an IPP/FPP process occurring, investors' decisions to sink costs in infrastructure could be expected to be linked to any expected regulatory price caps on the services which are provided from that infrastructure. However their expectations on the level of that price cap would not change with or without backdating of prices between an IPP and FPP decision. Generally speaking, there should be symmetric probabilities of an IPP being above or below an FPP and hence the expected financial outcome of the investment should be unaffected; and

957.2 it may be the case that the spread of financial outcomes an investor might expect would be larger where no backdating is expected to occur.[699]

958. Capital intensive innovation requires the support of investors who are placing their capital at risk. Such investors in the telecommunication sector will typically be familiar with TSLRIC but may perceive benchmarking as error prone and inaccurate. The commitment to backdating would reassure such investors that financial outcomes need not be dependent on the IPP.

959. The final prices for UCLL show the potential for change when moving from an IPP to a FPP methodology. The "levelised" full TSLRIC modelled price for UCLL is $30.63, which is 30% higher than the IPP UCLL price of $23.52, or a $7.11 increase.[700]

*Submissions*

960. Spark submitted that the additional uncertainty that is introduced into a "backdating period" will have a detrimental effect on investment. It noted that where investments are to a large extent sunk, there may be considerable option value in

[699] Without backdating, the outcome of an IPP will affect revenues and consequently the forecast range of potential revenues could be larger.

[700] By "levelised" we mean estimating a single price to apply over the full five-year regulatory period as we implemented in our December 2014 draft decision, rather than providing year by year prices which we proposed in our July 2015 further draft determination and which we are implementing in this final determination. We have levelised the price to make it more comparable to the IPP price.

delaying investment until some of the uncertainty has been resolved.[701] Spark also argued that the additional uncertainty will impact access seekers more than it will impact Chorus. Chorus' business plan would likely remain unchanged as investment timeframes are longer, whereas access seekers operate in a competitive market and so have shorter timeframes as they respond to the market.[702]

961. Vodafone made a similar point that, due to the uncertainty with respect to backdating, a decision to require backdating would affect access seekers' investment more than it would affect Chorus' investment.[703] Vodafone also made the point that this uncertainty is likely to discourage investment whereas certainty is likely to increase it.[704]

*Time consistency*

962. Chorus submitted that a time consistent approach is needed given the signal it sends to investors otherwise it will lead to a result contrary to the long-term benefit of end-users. Affected parties need confidence that the final price will be adopted if the initial price is determined to be inadequate.[705]

963. Chorus noted that its economic consultants, Sapere, rejected the view that backdating would have no effect on investment, because of the effects it would have on investor confidence and because of the way the investment cycle operates.[706] Sapere raised a particular concern about the majority reasoning in the July 2015 further draft determination being time inconsistent. Sapere's concern related to the majority referring to the point in the investment cycle at which the price review determination is made, implying that a different decision may have been taken if we were at a different point in the cycle ie, when a major new investment was at stake.

964. In relation to Sapere's investment cycle point, Wigley and Company argued that the benefits to end-users from promoting stronger incentives to invest will vary depending on the level of investment that is needed. This will vary at different

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701 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" CONFIDENTIAL, 13 August 2015, paragraph [409].

702 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" CONFIDENTIAL, 13 August 2015, paragraphs [411]-[413].

703 Vodafone "Submission to the New Zealand Commerce Commission on further draft pricing review determination for Chorus' unbundled copper local loop service and further draft pricing review determination for Chorus' unbundled bitstream access service" CONFIDENTIAL, 13 August 2015, paragraph [B4.11].

704 Vodafone "Submission to the New Zealand Commerce Commission on further draft pricing review determination for Chorus' unbundled copper local loop service and further draft pricing review determination for Chorus' unbundled bitstream access service" CONFIDENTIAL, 13 August 2015, paragraph [B2.6].

705 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services (2 July 2015) - Public version" 13 August 2015, paragraphs [287.11]–[287.12]. Chorus also made time consistency arguments in relation to whether there should be an uplift to the weighted average cost of capital.

706 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services (2 July 2015) - Public version" 13 August 2015, paragraph [310].

points in the investment cycle. Time consistency is not making the same decision in different circumstances. It is making the same decision in the same or similar circumstances.[707]

965. Wigley and Company also argued that time inconsistency problems can arise where changes the regulator makes (eg, revising valuations it had previously determined) undermine expectations about recovery of prudent and efficient past investment or may lead to *ex post* expropriation of investment capital.[708] In Wigley and Company's view, none of this is applicable to the revised draft decisions: there is no evidence the Commission's revised drafts would preclude Chorus from recovering the cost of its prudent and efficient past investment.

966. Vodafone also argued that the sources quoted by Sapere in support of its time inconsistency argument are not relevant to this IPP/FPP process, and provided a view from one of the authors of these papers, Dr Francesc Trillas, in support of this proposition.[709]

*Assurance function*

967. Chorus referred to the conclusions of it economic consultants, Sapere, as follows.[710]

967.1 The purpose of the dual pricing regime is, in economic terms, best viewed as providing assurance that prices will reflect TSLRIC pricing if need be rather than less accurate benchmarking;

967.2 For this assurance function to be credible and effective, it needs to apply from the same point in time as the relevant initial price applies. Otherwise, the intended assurance function is eroded, as the affected parties will not be able to be confident that the relevant prices will always be priced using TSLRIC.

[707] Wigley and Company "Cross-submission in relation to UCLL and UBA draft pricing review determinations" 24 September 2015, paragraphs [23.1]–[23.17].

[708] Wigley and Company "Cross-submission in relation to UCLL and UBA draft pricing review determinations" 24 September 2015, paragraph [23.3]. Spark made a similar point: Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" CONFIDENTIAL, 24 September 2015, paragraph [288].

[709] Vodafone "Cross Submission to The New Zealand Commerce Commission on further draft pricing review determination for Chorus' unbundled copper local loop service and further draft pricing review determination for Chorus' unbundled bitstream access service " CONFIDENTIAL, 24 September 2015, paragraphs [B4.1] – [4.14]. Vodafone earlier in the context of its critique of Chorus's and Sapere's assurance function noted that the Commission's reasoning also does not imply that it would come to a different conclusion if Chorus's circumstances were different. The fact that the Commission considers whether or not backdating might have a disproportionate detrimental impact on Chorus is evidence of the Commission's concern about maintaining an investment incentive and absolutely does not demonstrate an intention to behave opportunistically, see Vodafone "Cross Submission to The New Zealand Commerce Commission on further draft pricing review determination for Chorus' unbundled copper local loop service and further draft pricing review determination for Chorus' unbundled bitstream access service " CONFIDENTIAL, 24 September 2015, paragraphs [B3.1]–[3.13].

[710] Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services (2 July 2015) - Public version" 13 August 2015, paragraphs [307.1]–[307.2].

968. Chorus argued that the assurance function promotes investment at all time by assuring investors that, over time, prices will not be lower than an efficient level (ie, the long-term return for investment in assets providing the service will be TSLRIC-based).

969. Chorus referred to the Fletcher Inquiry which states that the initial price is “to get sufficiently close to the “efficient” price so that both parties accept the determination and decide not to progress to the (longer and more costly) pricing review determination”. The initial price is therefore a part of the pricing process because it may mean that the expense of cost modelling can be avoided; not because it remains operative even if it is later determined to not be efficient.[711]

970. Spark made a number of points in relation to Chorus’ and Sapere’s analysis. Spark argued that nothing in the statutory history supports a so-called assurance function. Sapere’s proposition, in fact, directly contradicts the stated purpose of the IPP/FPP framework designed by the Fletcher Inquiry, which in Spark’s view was to speed up the application of STDs and therefore the introduction of competition. Under the Chorus and Sapere approach, access seekers would not be able to make commitments on the basis of the IPP as they would face an extended period of pricing uncertainty in the event that a pricing review determination process was initiated.[712]

971. Vodafone similarly argued that Sapere’s “assurance function” construction denies the reality that an IPP price may remain standing without the benefit of any ”assurance” as to its efficiency. There is nothing in the Act to suggest that an IPP is contingent on an FPP. [713]

*Investor expectations*

972. L1 Capital noted that it invested in Chorus based on its best estimate of the ultimate price which was significantly above the IPP. It set out that it did not ever believe that there was a symmetric probability of “IPP being above or below FPP” and backdating formed a considerable part of its investment case. Had L1 Capital known that the significant issues with the IPP price would be ignored, it would not have placed its capital at risk. It noted that if investors’ rights are abrogated for the rights of others then it introduces an undiversifiable risk to regulated entities in New Zealand, not just Chorus. [714]

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711 Chorus "Cross-submission for Chorus in response to Draft Pricing Review Determinations for Chorus’ Unbundled Copper Local Loop and Unbundled Bitstream Access Services" CONFIDENTIAL, 24 September 2015, paragraph [113].

712 Spark “Further draft pricing review determination for Chorus’ UBA and UCLL services Cross Submission" CONFIDENTIAL, 24 September 2015, paragraphs [256]–[257].

713 Vodafone "Cross Submission to The New Zealand Commerce Commission on further draft pricing review determination for Chorus’ unbundled copper local loop service and further draft pricing review determination for Chorus’ unbundled bitstream access service " CONFIDENTIAL, 24 September 2015, paragraphs [B3.1]–[3.13].

714 L1 Capital "Submission on the further draft pricing determination for Chorus’ unbundled copper local loop and unbundled bitstream access services" 13 August 2015, p. 7.

973. Schroders submitted that Chorus investors will be detrimentally impacted by a decision not to backdate. It submitted that even where lower prices have been passed on to consumers, a fair process should require consumers to compensate Chorus investors for losses. This means access seekers should be required to raise prices for a period to reimburse Chorus.[715] It also noted that in order to maintain the integrity of the regulatory process and the faith of investors in this process, we would suggest that there must be a preparedness to apportion costs to consumers or access seekers where necessary rather than just Chorus alone.[716]

974. Black Crane Capital submitted that investors must be confident that they will earn a fair return on their investment. This is a key principle of private investment in infrastructure. The fact that backdating may cause problems for consumers and/or retailers does not detract from this. According to Black Crane Capital, telecommunications retailing is a highly competitive business with significant uncertainty and is funded by investors with much higher return requirements than investors in regulated monopoly infrastructure assets.[717]

975. Allan Gray submitted that the Commission's draft decision is "*glaringly inconsistent*" with its previous submissions made to the Court of Appeal in 2006. At the time, the Commission argued convincingly for the ability to backdate and noted that all providers knew they operated in a regulated environment where backdating was a distinct possibility. Allan Gray submitted the same continues to apply.[718]

*Our response*

976. We accept that uncertainty affects the confidence of all investors, including investors in access seekers, which in turn has an impact on promoting competition for the long-term benefit of end-users. Investor confidence is an important consideration in our backdating decision, though not a binary determinant of the outcome.

977. The "time consistency" concerns of investors are also an important consideration, which is addressed by applying a consistent framework over time in similar situations. In the current scenario it is appropriate for the Commission to make a balanced decision after it:

977.1 considers the context and incentive impacts of this specific decision;

977.2 considers the signalling impacts of this decision on future investments; and

977.3 takes account of the reasoning expressed in the previous High Court and Court of Appeal decisions.

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715 Schroders "Submission on draft determinations of the UCLL and UBA access service final pricing principles" 27 July 2015, p. 2.

716 Schroders "Submission on draft determinations of the UCLL and UBA access service final pricing principles" 27 July 2015, p. 3.

717 Black Crane Capital "Submission on UCLL and UBA pricing reviews" 12 August 2015, p. 1.

718 Allan Gray "Submission to UCLL and UBA FPP further draft determination" 12 August 2015, pp. 1-2.

978. We note that Professor Vogelsang has considered Sapere's submission in relation to backdating. According to Professor Vogelsang, backdating generates considerable uncertainty for market participants, as the FPP price and the period over which it applies will only be known for sure once the final pricing review determination has been made.[719] In Professor Vogelsang's view:

978.1 there does not appear to be a time consistency issue involved in relation to the backdating scenario the Commission is contemplating; and

978.2 any assurance function of the FPP needs to be balanced against the uncertainties for access seekers and end-users.

979. The majority and minority have different views regarding the significance of Sapere's assurance function analysis.

**Impact on access seeker competition**

980. The expected economic impact of an earlier start date than the date of the final FPP determinations varies based on whether it is implemented via a lump sum payment or is "clawed back" through increasing the monthly prices of the UCLL and UBA services.

981. If an earlier start date was implemented through a lump-sum payment then we would generally expect the following.

981.1 Retail competition would keep pressure on retail prices, and the larger proportion of this lump-sum cost would generally therefore fall on the shareholders of access seekers.[720]

981.2 The final prices would include a material increase in the UCLL price and consequentially a potentially large lump-sum payment by access seekers. Such windfall losses which are due to the regulatory process would be likely to have some impact on continued investment in access seekers, as access seekers would continue to be dependent on material input costs subject to regulation.

981.3 Investment by access seekers is important for the continued evolution of competition in retail broadband provision and an earlier start date may potentially impact on access seeker investment incentives.[721]

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719 "Backdating therefore is messy and interferes with business as usual for the access seekers/end-users. This is the primary reason why most countries shy away from regulatory backdating except in unusual circumstances. With this in mind a regulatory (ex post) decision in favor of backdating would ordinarily be seen as time inconsistent." Vogelsang, I. "Review of some Submissions on the Commerce Commission's July 2, 2015, draft determination on UCLL/UBA pricing" 26 November 2015, paragraphs [16]–[21].

720 We would not expect a one-off lump-sum cost or gain to be passed-through to retail prices where retail markets are competitive. In the alternative, where such payments or costs were related to the sale of products (a marginal cost), we would expect some level of pass-through. We noted that in December 2014 Spark announced that it would increase retail prices in response to the Commission's draft pricing review determinations – Spark media release "Spark changes pricing to reflect Chorus wholesale copper line costs" 10 December 2014.

982. If an earlier start date was implemented through claw-back, then we would generally expect the following.

982.1 This would represent an increase in the marginal cost paid by access seekers who all purchase the UCLL service as a regulated input when providing a broadband or voice service to end-users.

982.2 Such an across-the-board cost increase would be unlikely to have first order competition effects. We had received submissions on potential second order competition effects.

982.2.1 In its expert report for Chorus, CEG noted that higher prices may lead to a loss of economies of scale which may impact on competition.[722]

982.2.2 In its submission to the Commission, CallPlus noted its ability to compete through its network of unbundled exchanges is linked to its ability to achieve scale.[723]

982.2.3 We have little evidence to assess the materiality of this point.[724] However, to the extent that it is material, we would not favour an earlier start date implemented through claw-back.

982.3 As a general principle, this could lead to substantive increases in the TSLRIC based price for future years. This would lead to a scenario where, in response to prices being below our central TSLRIC estimate level for a period, we would then be setting them above that estimate for a further period to "cure" the distortion.

*Submissions*

983. Spark made the general point that backdating would mean that access seekers would innovate less, invest less and increase the retail price because of the uncertainty relating to costs and prices.[725]

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721 We would typically expect such investments to be short lived and consequently more frequent than for the underlying infrastructure provided by Chorus. We also recognise that there may be circumstances where a large one-off lump-sum payment can affect the financial viability of a company. This would be more likely to affect the smaller access seekers (although we have considered ways that this could be mitigated).

722 We previously considered this point in our December draft determination – Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service", 2 December 2014, paragraphs [440-441].

723 We discuss this point further in the relativity section of Chapter 5 of this Determination.

724 We can calculate the potential impact on price, but how that impacts on economies of scale of access seekers and in turn how that affects competition between access seekers is more difficult.

725 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" CONFIDENTIAL, 13 August 2015, paragraph [412]. CallPlus made a similar submission: CallPlus "Submission on the Commerce Commission's Further Draft Pricing Review determinations for UBA and UCLL services" CONFIDENTIAL, 13 August 2015, paragraphs [61]–[62].

984. L1 Capital argued that the markets within which access seekers operate is not workably competitive. Instead, it is characterised by a high degree of market concentration and market power. The effects of not backdating will simply create a windfall for access seekers' shareholders.[726]

985. Black Crane Capital submitted that if the New Zealand Government or the Commerce Commission wishes to compensate retailers or consumers then they should fund that themselves. It noted that many access seekers have partially passed on the potential price increase to consumers such that any decision not to backdate amounts to an unexpected windfall for access seekers and possibly consumers.[727]

*Our response*

986. Submissions in August and September 2015 have not assisted us in better understanding the *materiality* of the consequences of backdating in terms of access seeker behaviour and incentives.

987. We continue to believe that access seekers operate in markets that are subject to significant competitive pressures, which may limit their ability to fully pass through any lump-sum backdating payment. On the other hand, Spark did increase most of its broadband and landline retail prices (although reducing the price of higher value broadband products) after our December 2014 preliminary view regarding backdating was released, and in July 2015 stated that these increases were in anticipation of backdating and would be passed back to end-users if backdating did not apply.[728] We would expect any differential approach between access seekers to the pass through of these input costs to retail prices to play out in the market in the medium term, ie, all other things being equal, those access seekers that put up their prices are less likely to retain or attract customers than those parties that did not (or that put their prices up less). Any repayment of this price increase, as Spark committed to, should also play out in the market.

988. Similarly, in the event that the retail price increases that were observed after December 2014 were to be refunded by some access seekers (ie, consistent with Spark's public statements) as a result of our decision not to backdate, that would put competitive pressure on other access seekers who also raised prices to follow suit.

**Feed-through of modelled prices prior to the final decision**

989. A conceptual basis for TSLRIC is to provide efficient price signals over time. As a general proposition, the earlier efficient signals take economic effect the better. For that reason, under certain conditions signalling a general intention to adopt an earlier start date than the date of a final FPP decision could provide incentives to access seekers to amend retail prices before that final decision to better align with expected TSLRIC outcomes.

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726 L1 Capital "Submission on the further draft pricing determination for Chorus' unbundled copper local loop and unbundled bitstream access services" 13 August 2015, pp. 5-6.

727 Black Crane Capital "Submission on UCLL and UBA pricing reviews" 12 August 2015, p. 1.

728 Spark media release "Commerce Commission releases updated draft FPP charges" 2 July 2015, available at https://www.nzx.com/companies/SPK/announcements/266517.

990. A commitment to implement a "true-up" of the difference between the IPP and FPP determinations also ensures the total amount paid by access seekers is independent of the time taken to carry out a FPP.

991. There is an analogy between this analysis and that which would apply to other markets where investment decisions and pricing commitments are entered into based on best estimates that may prove incorrect.

*Submissions*

992. Spark and Vodafone submitted that for backdating to have any positive effect, the efficiencies have to be related to the expectation of backdating or not in future instances.[729] Spark also referred to DotEcon's report (prepared for Spark and Vodafone) which submitted that a number of conditions must hold in order to achieve demonstrable efficiency gains or a pro-competitive effect:

992.1 in any particular instance, parties must correctly predict that backdating will take place. Spark also noted Network Strategies' view that because of the forward looking regime, it is reasonable for the market to assume no backdating;[730]

992.2 parties must correctly predict to what point in time the future price will be backdated;[731]

992.3 parties must be able to predict the correct price that will eventually be determined with a reasonable degree of certainty. This FPP process has shown that the outcome of the cost modelling exercise is highly uncertain where neither Chorus nor Spark have correctly predicted the price;[732] and

992.4 parties must be in a position to behave, during the period prior to backdating being confirmed, as if the future prices already apply. This is impossible where there is too much uncertainty.[733]

993. Spark went on to submit that, in fact, backdating does "*not provide better incentives to update retail prices with expected TSLRIC outcomes*" but that it simply imports

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[729] Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" CONFIDENTIAL, 13 August 2015, paragraph [403].; Vodafone response [B2.2].

[730] Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" CONFIDENTIAL, 13 August 2015, paragraph [405a].

[731] Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" CONFIDENTIAL, 13 August 2015, paragraph [405b].

[732] Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" CONFIDENTIAL, 13 August 2015, paragraph [405c]. and Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" CONFIDENTIAL, 24 September 2015, paragraphs [273]–[281]. Wigley and Company make a similar point regarding the difficulties of professional advisers and the parties themselves in forecasting prices – Wigley and Company "Submissions as to the revised draft UCLL and UBA FPP determinations – backdating" 13 August 2015, paragraphs [5.5]–[5.10].

[733] Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" CONFIDENTIAL, 13 August 2015, paragraph [405d].

uncertainty into the backdating period.[734] According to Spark, while Commissioner Duignan is right that backdating will have the benefit of reassuring investors that they need not be reliant on less accurate benchmarking, the argument misses the downside from the additional uncertainty faced during periods where the market has to rely on its respective best guesses of the future FPP price. Decisions based on the IPP are certain and therefore likely to be preferable.[735]

994. CallPlus similarly submitted that access seekers cannot predict if backdating is going to occur and cannot guess the price that may be backdated in anticipation of the final determination. Not even Chorus with all its resources has been able to predict the price.[736] CallPlus submitted that the market cannot adjust because of the uncertainty and different access seekers will make different, not uniform, price adjustments.

995. Wigley and Company agreed with the concerns expressed by the majority about giving draft decisions price signalling status, due to the impact that status would have on the "all-important Commission process of consulting iteratively".[737]

996. Vodafone also noted that if the market was to act on the expected FPP price, it makes the IPP price redundant, which could not have been intended by Parliament.[738]

997. In response, Chorus submitted that backdating will create incentives on Chorus and access seekers to behave efficiently in the interim period in a wider range of circumstances. DotEcon's scenarios are over-precise. Knowing whether the efficient price is likely to be higher or lower than the initial price is enough.[739]

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[734] Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" CONFIDENTIAL, 13 August 2015, paragraphs [407]–[408].

[735] Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" CONFIDENTIAL, 13 August 2015, paragraph [410].

[736] CallPlus "Submission on the Commerce Commission's Further Draft Pricing Review determinations for UBA and UCLL services" CONFIDENTIAL, 13 August 2015, paragraph [50]. InternetNZ made a similar submission: InternetNZ "Submission on the further draft pricing determination for Chorus' unbundled copper local loop and unbundled bitstream access services" 13 August 2015, paragraphs [19]–[21].

[737] Wigley and Company "Submissions as to the revised draft UCLL and UBA FPP determinations – backdating" 13 August 2015, paragraphs [6.7]–[6.9].

[738] Vodafone "Submission to the New Zealand Commerce Commission on further draft pricing review determination for Chorus' unbundled copper local loop service and further draft pricing review determination for Chorus' unbundled bitstream access service" CONFIDENTIAL, 13 August 2015, paragraphs [B4.14]–[B4.17].

[739] Chorus "Cross-submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services (2 July 2015) - Public version" 24 September 2015, paragraphs [122] – [126]. Note though that in cross submissions Spark pointed to Chorus statements from 2012 suggesting that a TSLRIC price for UCLL should not increase or decrease markedly from existing levels: "An averaged UCLL price close to the existing price … is consistent with changes in the forward-looking cost of providing the UCLL in NZ" – Spark "Further draft pricing review determination for Chorus' UBA and UCLL services Cross Submission" 24 September 2015, paragraphs [276]–[278].

998. According to Chorus, in the present context, access seekers knew or should have known backdating was likely to occur and the likely direction because:

998.1 they were aware of the precedent supporting backdating;

998.2 it was clear from the outset prices were likely to increase; and

998.3 retail prices did not fall following the 2012 UCLL re-benchmarking and the 2014 transition to the cost based IPP for UBA.

999. Chorus submitted that the ability of access seekers to raise retail prices also indicates that competition did not prevent access seekers from taking into account the likely effect of backdating in their retail pricing.

1000. Chorus also noted that access seekers have already anticipated the potential changes from the final pricing review process in their UCLL and UBA pricing. In particular, there are strong indications that retail broadband prices increased as a result of the draft prices announced in December 2014.[740]

1001. In response Spark noted that Chorus failed to take into account the dynamic nature of retail markets. Spark argued that, in practice, the access seeker market is competitive and input cost changes are reflected in business decisions and retail offers. That includes a significant reduction in retail broadband prices over the relevant period.[741]

1002. Wigley and Company also made a number of points in response to Chorus' analysis of access seeker price increases. It noted that Snap did not change its prices and that Spark and CallPlus did not fully pass on the price increases to end-users. The differential between 100% pass-through and actual pass-through is large in the case of CallPlus. Wigley and Company also pointed out that Chorus limits its focus to three access seekers, these being Spark, Vodafone and M2 when there are a substantial number of other access seekers, of which two (Snap and Trustpower) did not put up their prices.[742]

*Our response*

1003. There was significant disagreement between submitters about the extent to which backdating decisions must be accurately foreseeable (including the amount) before they generate appropriate incentives. This disagreement is part of a broader debate between Chorus, Chorus investors and access seekers about whether a consistent preference for backdating adds to or alleviates uncertainty.

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740 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services (2 July 2015) - Public version" 13 August 2015, paragraphs [312]–[317].

741 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" CONFIDENTIAL, 24 September 2015, paragraphs [282]–[286].

742 Wigley and Company "Cross-submission in relation to UCLL and UBA draft pricing review determinations" 24 September 2015, paragraphs [17.1]–[17.7].

1004. In our July 2015 further draft determination we stated that "Chorus and a number of access seekers are sophisticated participants in telecommunications markets and are likely to be in a position to estimate the outcome of TSLRIC modelling".[743] A number of submitters have strongly disagreed that affected parties are able to estimate the outcome of TSLRIC modelling. As we set out in chapter 2, the range of estimates of the appropriate TSLRIC prices for the services being modelled includes:

1004.1 Spark/WIK referring to cost-based UCLL and UBA prices of $16.64 and $7.83 respectively, ie, a total UBA price of $24.47;

1004.2 Chorus submitting its cost model, developed by Analysys Mason, which indicated cost-based UCLL and UBA prices of $74.10 and $16.57 respectively, ie, a total UBA price of $90.67.

1005. We note that Chorus' approach in its final submission on this point emphasises parties being able to predict the direction of change, as opposed to the magnitude.

1006. The price increases announced by Spark and followed by some other access seekers after the December 2014 draft decision demonstrated the following:

1006.1 draft TSLRIC modelled prices did to some extent feed through to end-user pricing before final decisions were made;

1006.2 the retail price movements were different across access seekers (with some not increasing prices as all), and did not in aggregate reflect a straight pass through of the full proposed access pricing change; and

1006.3 access seekers increased retail prices only after the Commission put a draft access price into the market, ie, not based on their own estimates of the TSLRIC price prior to a Commission draft.

1007. The majority and minority have different views regarding the positive incentive properties of, and uncertainty associated with, consistently applying backdating to promote the feed through of draft modelled prices to end-users prior to final regulatory decisions. These views are set out at the end of this chapter.

**Incentives to delay the FPP process**

1008. In a price review process, information generated by all parties, including through the consultation process, allows the expectations of the likely final price to be updated over time. In particular, part way through a process it can become apparent whether the FPP price will be higher or lower than the IPP price. At this point, financial incentives to delay the process may arise with Chorus or with access seekers.

[743] Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 2 July 2015, paragraph [879.1].

1008.1 The Commission previously commented on this point in its submissions to the Court of Appeal in *Telecom v Commerce Commission*:[744]

> … if reviews do not have operative effect from the initial determination date, then the party that is likely to benefit from a higher (or lower) price will be disadvantaged in circumstances where the Commission is unable to expedite the pricing review process for any of a range of legitimate reasons.
>
> … where the reviewed price is lower than the initial price and is not backdated, the access seeker would be unfairly disadvantaged by having to pay substantial additional amounts (above cost) for the delivery of services which were provided in the past. Further, in that situation the access provider might be unfairly advantaged by recouping access prices which are substantially above cost for the period subject to the initial determination. Backdating the pricing review ensures that a party does not make any windfall gain from contractual provisions determined for the parties under the Act, and pursuant to which they are compelled to deal, but subject to either party being entitled to have the regulator revisit the accuracy of the price initially determined. A windfall from the non-application of a reviewed price is a situation that would clearly offend against the purposes of this part of the Act, set out in s 18. The converse also applies if benchmarking has set the initial price too low, and the service provider establishes on a TSLRIC assessment, that the efficient price should be higher.

1008.2 The Commission has to balance the benefits of earlier resolution of uncertainty through a quicker move to a final determination against a fuller consideration of issues raised with it which may impact on the accuracy of the final price.

1008.3 The expectation of backdating (where it incorporates some element of lump sum payment) will align the interests of all parties throughout the process in achieving an efficient and balanced timetable to minimise the disruption of a price review process.[745]

1008.4 The alignment of interest promotes confidence in the regulatory framework and thereby competition in the long-term benefit of end-users and specifically in regard to incentives for capital intensive innovation.

*Submissions*

1009. Wigley and Company submitted that the Commission controls the process and so any incentives to delay have limited effect. It also argued that the Commission has not addressed the English Court of Appeal case on backdating.[746]

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744 Commerce Commission "Submissions of the First Respondent dated 1 February 2006" at paragraphs [62-63].

745 Where backdating occurs through lump-sum payments, the ability of access seekers to pass these costs to end-users through retail prices will be limited by retail competition at the point where backdating is implemented.

746 Wigley and Company "Submissions as to the revised draft UCLL and UBA FPP determinations – backdating" 13 August 2015, paragraph [5.11].

1010. As set out above, both Vodafone and Spark have identified circumstances where there is an incentive to delay a process as one where backdating may be appropriate. They each note in that regard that those circumstances do not exist in relation to this matter.

1011. Schroders submitted that the draft decision on backdating removes any incentive for access seekers to expedite the conclusion of the regulatory process and exposes Chorus shareholders to the potential for further loss in the event the final determination is delayed beyond December 2015.[747]

1012. Allan Gray submitted that the Commission's draft decision not to backdate means it will always be to one party's advantage to delay the process as long as possible. Future regulatory processes could therefore become unworkable and inefficient.[748]

*Our response*

1013. We accept that mitigating incentives to delay pricing review determinations is relevant to our consideration of backdating, and that any backdating decision in this current process may affect the incentives for parties in future Commission regulatory processes. We note though that:

1013.1 the Commission's control of the FPP process is a significant mitigating factor against unnecessary delays;

1013.2 in our view, although our timetable had to be adjusted due to a cross submission from a Chorus expert raising new matters, no parties have deliberately and unnecessarily delayed the UCLL and UBA FPP process. Party-induced delays were therefore not a factor we considered in coming to our backdating decision.

1014. We have considered the English Court of Appeal case referred to by Wigley and Company. In that case the Court reached a conclusion that backdating was not permissible based upon a certain statutory scheme. New Zealand Courts have reached a different conclusion under the Act. Given the importance of the interpretation of, and inferences taken from, the specific legislation in both cases, we are wary about placing any reliance on the judgment in the English case.

**Backdating in practice**

*Submissions*

1015. We received a number of submissions seeking to draw analogies with how backdating has been implemented in other contexts and in other jurisdictions.

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747 Schroders "Submission on draft determinations of the UCLL and UBA access service final pricing principles" 27 July 2015, p. 3.

748 Allan Gray "Submission to UCLL and UBA FPP further draft determination" 12 August 2015, p. 2.

1016. In summary:

1016.1 Vodafone submitted that the most common application of backdating is in the compensation context. Vodafone argue that it is generally not appropriate to backdate in the context of *ex ante* regulation.[749]

1016.2 Vodafone assessed a number of instances where backdating has been required in the context of an *ex ante* regulatory determinations.[750] Vodafone drew the following conclusions:[751]

1016.2.1 backdating is used as a means to discourage delay tactics and award compensation in a dispute context as opposed to normal *ex ante* rate setting;

1016.2.2 backdating will be detrimental unless conditions under which it will be applied are known with certainty;

1016.2.3 the case for backdating is strongest where prices are manifestly wrong and all parties are able to know that this is the case and to be able to forecast the correct prices accurately; and

1016.2.4 the case for backdating is strongest where the benefits from the improved decision are large compared with the cost of uncertainty.

1016.3 Vodafone came to the overall conclusion that none of these circumstances are present in the current context.[752] Spark made a number of similar submissions to Vodafone.[753]

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749 Vodafone "Submission to the New Zealand Commerce Commission on further draft pricing review determination for Chorus' unbundled copper local loop service and further draft pricing review determination for Chorus' unbundled bitstream access service" CONFIDENTIAL, 13 August 2015, paragraphs [B3.1]–[B3.5].

750 Vodafone "Submission to the New Zealand Commerce Commission on further draft pricing review determination for Chorus' unbundled copper local loop service and further draft pricing review determination for Chorus' unbundled bitstream access service" CONFIDENTIAL, 13 August 2015, paragraphs [B3.6]–[B3.17]. We note that Vodafone's consultants, DotEcon, have produced a survey showing the circumstances where backdating has been required.

751 Vodafone "Submission to the New Zealand Commerce Commission on further draft pricing review determination for Chorus' unbundled copper local loop service and further draft pricing review determination for Chorus' unbundled bitstream access service" CONFIDENTIAL, 13 August 2015, paragraphs [B3.18]–[B3.19].

752 Vodafone "Submission to the New Zealand Commerce Commission on further draft pricing review determination for Chorus' unbundled copper local loop service and further draft pricing review determination for Chorus' unbundled bitstream access service" CONFIDENTIAL, 13 August 2015, paragraphs [B4.1]–[B4.2].

753 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" CONFIDENTIAL, 13 August 2015, paragraphs [392] – [398].

1017. Chorus, in response, argued that none of the international jurisdictions surveyed have the essential characteristics of the New Zealand price determination process which are:

1017.1 an initial price using a relatively straightforward, modest exercise;

1017.2 a limited time period in which the parties can apply for a review of the initial price using the final pricing principle; and

1017.3 a final pricing principle that adopts a more sophisticated methodology to determine the efficient price for providing the service that will give effect to section 18.[754]

1018. Further, Chorus submitted that in the New Zealand context, substitution of the final price for the initial price is not to be regarded as retrospective (in any prejudicial sense) as confirmed by the Court of Appeal.[755]

1019. Chorus also referred to the 24 April 2014 Unbundled Copper Low Frequency Service decision ([2014] NZCC 9) where the Commission backdated because of an earlier error. Chorus argued that there is little to distinguish this scenario from the one where the Commission intended to finish its review at an earlier time. Chorus noted that in the UCLFS decision it and access seekers were arguing different sides but the Commission still decided to backdate. In Chorus' view, for the Commission to take a different approach now will compound the perception, expressed in investors' submissions, that the regulatory process is biased against the regulated entity.[756]

1020. Wigley and Company submitted that UCLFS backdating is different to the FPP position, particularly because the Commission was fixing an administrative error that was obvious to all parties.

*Our response*

1021. We have considered the analogies parties have drawn to overseas decisions where backdating was considered. Like Chorus, we see these decisions as having limited value to this particular decision, which is specific to the current context and the Act.

1022. Analogies drawn from previous decisions under the Act are in principle more persuasive, but in our view Chorus' analogy to the Commission's April 2014 UCLFS decision is weak. In that scenario, backdating simply reflected that the Commission's substantive decision, which was known and understood by all parties, had

754 Chorus "Cross-submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services" CONFIDENTIAL, 24 September 2015, paragraph [107].

755 *Telecom New Zealand Limited Ltd & Anor* CA75/05, 25 May 2006, paragraph [33].

756 Chorus "Cross-submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services" CONFIDENTIAL, 24 September 2015, paragraphs [130] – [135]. See for example L1 Capital "Submission on the further draft pricing determination for Chorus' unbundled copper local loop and unbundled bitstream access services" 13 August 2015, p. 7, and Schroders "Submission on draft determinations of the UCLL and UBA access service final pricing principles" 27 July 2015, p. 2.

mistakenly not been implemented following the 2012 re-benchmarking of UCLL. Not correcting that error would have damaged all parties' confidence in the efficacy and fairness of the regulatory process. That is not analogous to the more balanced backdating question we are now considering.

1023. The Commission does not accept the implication that its timing decisions (backdating, glide paths) are biased towards access seekers or end-users. That was not for example the case with the glide path implemented in the Commission's 5 May 2011 Mobile Termination Access Service decision (Decision 724), which favoured access providers. While the MTAS decision did not involve substituting a FPP price for an IPP price, it did involve substituting a more efficient price (IPP) for a less efficient price (unregulated mobile termination rates).

**Final decisions**

**Commissioners Gale and Welson**

1024. Our final decision is that the regulatory period should start on 16 December 2015, directly after the final FPP determinations.

1025. In arriving at this decision, we note that a range of timing and implementation options are available to the Commission: backdating to the date of the IPP, partial backdating, immediate implementation, delayed implementation by glide path, lump-sum payments, or clawback. In the particular circumstances of the UCLL FPP process we consider that immediate implementation best promotes incentives that promote competition for the long-term benefit of end-users. By contrast we are concerned that backdating may in fact harm those incentives.

*Context*

1026. The following contextual points are relevant to our decision:

1026.1 Chorus is prohibited from operating in retail markets. As the regulated price (and backdating) involves payment by access seekers to Chorus as network owner, and access seekers are all being treated the same, it is hard to see backdating as having a direct impact on retail market competition.[757] This is in contrast to the direct network competition between Telecom and TelstraClear that provided the context for the previous High Court and Court of Appeal backdating judgments.

1026.2 Chorus' copper network is being overbuilt by fibre via the Government subsidised UFB project, which creates a very context specific environment in terms of both investment needs and incentives, and network migration.

1026.3 In our view the legislative history does not provide good reasons for limiting UCLL backdating to one year, as argued by Commissioner Duignan. We

[757] This is particularly the case for UCLL, for which there is no competition between Chorus and access seekers (except for in the limited geographic areas served by Vodafone's HFC network). Any unbundling competition between Chorus and access seekers is impacted by the UBA price only.

consider that the transitional provisions in the Act froze the UBA price only,[758] and are not convinced at this stage that there is a principled basis for limiting any backdating to December 2014, rather than 2012.

1026.4 We are satisfied that, at the time of the initial request for the UCLL pricing review determination, it is unlikely that access seekers or end-users would have had a clear indication of the direction in, or amount by, which the regulated prices would move as a result of the FPP. We do not consider that it would have been reasonable to expect all access seekers to perform this type of modelling, especially given the information asymmetry between Chorus and access seekers.[759]

*Impact on retail markets*

1027. As set out earlier in this chapter, we consider that the retail market in which access seekers supply services to end-users can generally be regarded as “workably competitive”. We would therefore expect prices to reflect the marginal cost which is incurred by access seekers in supplying retail services to end-users, so any past “error” in prices should have been largely passed through to end-users.

1028. Given this expectation, and in light of the present context, we consider that backdating by either clawback or lump sum would be damaging to the section 18 purpose we are meant to be promoting. To explain:

1028.1 *Claw-back:* claw-back, whereby the regulated wholesale price paid by access seekers is increased by a margin to recover the backdated amount, is less damaging to access seekers than lump sum backdating, but results in distorted pricing being put into the market. In this particular case, where IPP prices are found to have been too low as a result of the FPP process:

1028.1.1 We are not concerned by the distortion in access seekers’ and end-users’ levels of investment and consumption over the period prior to the FPP price being decided. The extent of any inefficiency arising from ‘over-consumption’ of copper-based broadband services during this period is in our view likely to be modest or immaterial, as the incremental cost of supplying additional UCLL and UBA services in the short-term will have been minor.

1028.1.2 We are concerned about the result of reversing that “error” by introducing a further and different distortion as a result of

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758 Hence the Commission undertaking the UCLL IPP re-benchmarking of its own volition, and implementing that price change in 2012. The argument that the additional UBA revenue (compared to a cost based price) provided by the statutory price freeze offsets, and therefore compensates for, the difference between the UCLL IPP and FPP prices undermines, in our view, the purpose and effect of the statutory price freeze.

759 In this regard, we note the comments made by Chorus in 2012 during our UCLL re-benchmarking exercise, in which Chorus indicated that a UCLL price close to the price prevailing at the time ($24.46) would be consistent with changes in the forward-looking cost of providing UCLL in New Zealand. See Chorus “Submission in response to the Revised Draft Determination on the benchmarking review for the Unbundled Copper Local Loop service”, 1 June 2012, page 5.

increasing future prices above our central TSLRIC estimate. This would result in demand for broadband services on the copper network being inefficiently depressed, a particular concern in areas where UFB will not be available.[760]

1028.1.3 We note that, with clawback, the wholesale price of UCLL and UBA could be approximately $6 more than the wholesale fibre price.[761] As previously pointed out by Professor Cambini, this would give Chorus an incentive to slow connections to fibre beyond the level it is contractually committed to.[762]

1028.2 *Lump sum:* We would not expect the prospect of a one-off lump sum payment or cost in the future to affect current prices.[763] Therefore in the current circumstances where the FPP prices are higher than the IPP prices, and price increases by some access seekers have at most recovered a part of the backdating amount (especially if backdating was required to 2012), imposing a lump sum recovery mechanism would result in an expropriation of shareholder value from the access seekers. That would have a chilling effect on investment and innovation in the retail markets where we expect most end-user benefits to be realised.

*Feed-through of modelled prices*

1029. We have considered the potential benefits of signalling a 'policy' of backdating to encourage the early feed-through of predicted modelled prices. Conceptually this would mitigate the negative retail market impact of lump sum backdating. However, as noted above, we do not consider that access seekers could have predicted the outcome of our TSLRIC modelling, so in practice this early feed-through would not have been possible. In addition:

760 If IPP prices had been higher than FPP prices, backdating (in this case by claw-back) would still not be warranted on section 18 efficiency grounds. The period of higher IPP prices would have created a more significant distortion by suppressing demand but that past distortion still cannot be 'repaired' by claw-back. A claw-back period of lower prices would harm migration.

761 The UCLL price being $7 too low for three years implies clawback (with interest) of an extra $5 each year for the regulatory period. Our comparison is based on mid-period prices, using the UFB price commencing from 1 July 2017 ($39.50).

762 Cambini, C. "Potential welfare gains and losses from an uplift to copper prices: A Reply to Companies' comments" 19 May 2015, pages 9-10.

763 To explain, we generally expect that access seekers are already charging as much as possible, mediated by the competition between them. The prospect of a future one-off lump sum cost would not normally change that profit maximising price. The same applies to the prospect of an input price increase (claw-back) for a defined period if that price has no long-term consequences. By contrast, and as we discuss below, a future sustained price increase will have immediate consequences if customers typically stay with an access seeker for some years; the higher future price increases the present cost of acquiring more customers.

1029.1 We do not see the distant prospect of lump sum adjustments as in itself clearly enabling competitive access seekers to raise prices pre-emptively to reflect that anticipated change.[764]

1029.2 We also have a concern about giving Commission draft decisions significant price signalling status: in our view this is not consistent with the legislative scheme. A draft is intended to allow parties to give views that inform the final decision: it is not a quasi-final decision itself, and may be significantly amended. The extensive consultation process that we have undertaken has been an essential part of the FPP process, and has resulted in significant amendments to components of our TSLRIC modelling. We see a significant downside in chilling that consultation process by actively promoting this price signalling through drafts.

*Price increase by access seekers*

1030. We have considered whether our reasoning above regarding lump sum backdating and incentivising feed-through of modelled prices is 'trumped' by the price increases announced by Spark and followed by some others after the December 2014 draft decision.[765] In our view, it should not be.

1030.1 As noted above, the price increases were different across access seekers, with some not increasing prices at all, and did not in aggregate reflect a straight pass-through of the full proposed access pricing change. Further the increases took no account of the prospect of backdating beyond the draft decision to 2012.

1030.2 Spark has promised to pay back its price increase if there is no backdating, but, for the other access seekers there was a sensible economic basis for increasing prices this year in anticipation of a price increase at the end of the year and irrespective of the prospect of backdating. The approaching price increase immediately raised the long run marginal cost of retaining or gaining customers: customers typically stay with an access seeker for some years. If access seekers have misjudged any price increases, or elect to pay back those increases, the consequences of doing so are likely to play out as they would in any competitive market. Access seekers that have increased prices against the possibility of backdating that has not eventuated may see a competitive benefit from sharing this outcome with their customers in some way.

*Impact on investment/Chorus*

1031. We have also considered whether there is a countervailing benefit from backdating, in terms of promoting investment incentives, particularly in light of section 18(2A).

[764] We would also expect the financial risks to access seekers arising from a period which may be subject to backdating to be a significant disincentive to initiating a pricing review in the first place. Accordingly, a policy favouring lump sum backdating for the purpose of bringing FPP prices into the market as early as possible may be self-defeating. That is, such a policy may make it more likely for IPP prices to continue unchallenged.

[765] In our view lump sum backdating is only an option because the access seeker pricing response occurred.

Similar to our consideration of whether there should an uplift to the FPP WACC, backdating would only have a positive effect where:

1031.1 There is new investment in contemplation;

1031.2 That investment would be subject to regulation; and

1031.3 The current backdating decision would be a 'tipping point' for that future investment.

1032. In our view, the causality between our current backdating decision and any future investment decision is remote, especially where there is a real question as to whether a major new bottleneck investment would be regulated by way of an IPP/FPP. Accordingly, in the current case, it is not clear to us that backdating would have any material effect on future investment. In any event, we note that the prospect of an IPP/FPP error is:

1032.1 Symmetric, so there is as much prospect of upside as there is downside risk for investors;[766] and

1032.2 Non-systematic, so a properly diversified investor ought to be able to manage this risk within their total investment portfolio without the need for any extra compensation or assurance.[767]

1033. Notwithstanding Sapere's submission, we are comfortable that this approach does not create a time inconsistency issue, in line with Professor Vogelsang's views.[768] Our decision reflects the current circumstances, and balances any assurance function of the FPP with the impacts of backdating on all stakeholders and retail markets. Specifically, we have been presented with no evidence that assumptions in relation to backdating this FPP had any bearing on Chorus' decision on whether to participate and invest in the UFB initiative. Indeed the re-benchmarking of UCLL IPP prices had not been signalled by the Commission at the time Chorus committed to the UFB initiative. We consider that this balanced approach best reflects the section 18 purpose, and that further elevating any assurance function is not supported by the scheme of the Act.

1034. We note that the FPP prices being determined here are not canonical. That is, while the Commission has made its best estimate of the TSLRIC prices, and although we are confident that the FPP prices are more accurate than the IPP prices they replace, we recognise that TSLRIC gives rise to a wide range of plausible prices and that the

766 We do not accept the argument that the likelihood of backdating depends on whether the FPP price is higher or lower than the IPP price (that is, the argument that the Commission would feel compelled to backdate a price reduction). It is common to apply regulatory pricing decisions on a forward-looking basis even though users may be able to credibly say they have been paying too much in the past.

767 The range of factors that are relevant to investment decisions are further considered in the section entitled "Should an uplift be applied to the mid-point WACC estimate?" of the final decision on the cost of capital for the UCLL and UBA pricing reviews, published at the same time as this final determination.

768 Vogelsang, I. "Review of some Submissions on the Commerce Commission's July 2, 2015, draft determination on UCLL/UBA pricing" 26 November 2015, paragraphs [16]–[21].

appropriateness of using the TSLRIC methodology is itself contested. So, we are not convinced that it is accurate to say that we are replacing a “wrong” or “anomalous” price with the “correct” or “incontestable” price. Rather, we consider it is more accurate to say that we are replacing a TSRLIC estimated by benchmarking with one estimated by modelling.

1035. In this regard, we consider that the impact on investment argument would be much stronger if there was evidence that a failure to backdate would result in an investor not being able to cover its actual costs (including a return on and of capital). Here we have not been presented with any evidence that this would be the case. Looking forward we note that:

1035.1 Chorus will inevitably be limiting its further investment in much of its copper network as it overbuilds the Government-subsidised fibre network;

1035.2 Chorus can, and does, seek capital contributions from end-users where it is building out the boundaries of its copper network.

*High Court and Court of Appeal judgments*

1036. In reaching this final decision, we have carefully considered the previous High Court and Court of Appeal backdating judgments.

1037. We acknowledge that the Courts supported backdating such that the FPP price replaced the IPP price *ab initio*, and have taken account of this reasoning. As the High Court specifically acknowledged though, the Commission retains a discretion regarding when to commence an FPP price.

1038. In our view the previous Court decisions need to be understood against the following background:

1038.1 The parties and the Court were focussed on Telecom’s argument that backdating was not possible, rather than situations where it might be more or less appropriate to backdate (and the options for doing so).

1038.2 The Courts were dealing with section 27 determinations which had discrete start and expiry dates. In contrast, a STD made under section 30M cannot include an expiry date (section 30Q). As a determination of indefinite length, the prices under a STD will typically be revised through, for example, updating mechanisms within the STD, reviews under section 30R (to review terms and/or update prices), or reviews promoted by legislative changes (such as national averaging). This means that the prices under a STD are not unchanging and the simple idea of substituting one price for another over the term of the underlying determination does not apply as easily as it did for a section 27 determination.

1038.1 The statutory context and industry structure was different. Amongst other things, in the earlier scenario Telecom and TelstraClear were direct competitors, while there is no retail competition between Chorus and the access seekers now.

1038.2 The section 18 arguments for and against backdating have been canvassed in far more detail in this proceeding than before the Courts, and the arguments that we find persuasive (including the issue of putting too much weight on draft prices) do not appear to have been considered in any significant way before.

1039. While we have therefore given weight to the Court's views, we still consider it most appropriate to look at each timing question on a case-by-case basis, as the Commission noted in its UCLFS backdating decision. In this particular case, even if we accept that there is a general policy argument for backdating the more accurate FPP price, we are satisfied that there are good section 18 reasons to commence the FPP price from the date of our final decision. We would remain of this view even if the previous backdating judgments creating a presumption that backdating would be applied in the normal course.

**Commissioner Duignan**

1040. I consider that a start date of 1 December 2014 for the FPP regulatory period best promotes the section 18 purpose and appropriately reflects, in the specific circumstances of this review, the Court of Appeal's ruling that a price review determination relates back to the date of the initial determination.

1041. If 1 December 2014 was the start date I would propose that in regard to services purchased prior to the date of this decision, access seekers should pay one third of the difference between the IPP prices and the FPP price within 30 days and the rest by equal monthly instalments over four years with interest payable at the 90 day Bank Bill rate from the date of this decision. Obviously access seekers could choose to pay the amount off earlier if they so wished.

1042. I find the Court of Appeal's logic in *Telecom* v *Commerce Commission* compelling and consider that it is generally applicable to pricing review determinations. As the Court held, consistent with the Commission's submissions at the time, the FPP produces a more efficient price that is effectively a substitute for the less cost reflective IPP price.

1043. I explain below why a start date of 1 December 2014 best promotes the section 18 purpose in the specific circumstances of the current price review. First, however, I briefly discuss *ex ante* compensation for risk and the implications of the results of the TSLRIC modelling. I then address the implications of the Court of Appeal rulings.

*Ex ante compensation for risk*

1044. There is no adjustment process in TSLRIC modelling to compensate Chorus for the risk that benchmarked prices are much lower than TSLRIC prices. In contrast, access seekers can adjust their prices and scale of operation or exit the market if the margins they earn do not compensate for the risks they face. Accordingly, provided the regulator's policies are stable, it is appropriate to expect retail margins will adjust to provide access seekers with *ex ante* compensation for risk, including risks relating to backdating.

*The implications of the TSLRIC modelling results*

1045. If the price review determination start date was 1 December 2014, the first year UCLL and UBA prices would be $30.94 and $11.94 respectively resulting in an aggregate (BUBA) price of $42.88 (assuming use of a consistent WACC methodology).

1046. For comparison, the prices that applied from 3 December 2012 until 30 November 2014 were a retail minus derived UBA price of $21.46 and a benchmarked UCLL price of $23.52 (on a geographically averaged basis). This combination resulted in a BUBA price of $44.98, less than 5% higher than the TSLRIC modelled price of $42.88 as noted above.

1047. Thus the TSLRIC modelling has revealed that the geographically averaged versions of the previous combination of pricing methodologies resulted in a BUBA price a little higher than the TSLRIC value. The benchmarked UCLL price was much lower than the TSLRIC value but the retail minus derived UBA price more than offset this, resulting in a close to the TSLRIC BUBA price.

1048. Since 1 December 2014, the UCLL price has continued to be the low benchmarked price of $23.52 but the UBA price has been reduced to a benchmarked value of $10.92. Thus the BUBA price has been $34.44, well below the TSLRIC value of $42.88. Thus pricing of BUBA during the year from 1 December 2014 is an anomaly. During the last year, the BUBA price has been 20% below the TSLRIC price and the UCLL price has been 24% below its TSLRIC price.

1049. Backdating to 1 December 2014 would correct these anomalous prices of the last year. During this year the BUBA price has been $8.44 below the TSLRIC price and the UCLL and UCLFS prices have been $7.42 below the TSLRIC prices. If the BUBA price applied to 1.1 million lines and the UCLL or UCFLS price differential applied to 0.6 million lines, the revenue earned under the regulated prices would have been around $14 million per month (or 21%) less than under the TSLRIC prices. I consider this anomaly should be corrected by setting the start date for the price review determinations as 1 December 2014.

1050. As regards the period prior to 1 December 2014, precise TSLRIC prices are not available and Chorus was being paid for some services on a non-geographically averaged basis. It is reasonable to assume, however, that the BUBA price was approximately $2.10 higher than the likely TSLRIC price and the geographically averaged UCLL and UCLFS prices were approximately $7.42 less than the likely TSLRIC price. Thus prior to 1 December 2014, if the BUBA price differential applied to 1.1 million lines and UCLL or UCFLS differential applied to 0.6 million lines, the revenue earned under the regulated prices would be around $2 million per month (or 3%) less than under the approximate TSLRIC prices.

1051. As explained below the Commission is barred by statute from changing the UBA price applying in the 3 years prior to 1 December 2014. The UBA price being well above cost, as the TSLRIC modelling has confirmed, allowed unbundlers the opportunity to recover the cost of their investment in providing a service competing with Chorus's UBA. Backdating the UCLL price earlier than 1 December 2014 would impose a cost on unbundlers that would conflict with the intention of the statutory provision.

Accordingly, I conclude that backdating earlier than 1 December 2014 is barred by statute for UBA and would be in conflict with a statutory objective and detrimental to the section 18 purpose in the case of UCLL.

1052. I next consider the Court of Appeal judgment.

*The Court of Appeal ruling establishes a norm for a price review start date*

1053. A number of submissions have argued that the Court of Appeal backdating judgment reflects the fact that the section 27 initial determination involved had an expiry date. They contrast this with the present price review of an STD IPP which does not have an expiry date. They argue that the Court of Appeal's analysis and ruling is therefore of limited or no relevance to the present STD price review.

1054. On closer inspection, however, the fact that section 27 determinations have expiry dates is essentially irrelevant to consideration of backdating issues because, independently of the backdating ruling, the High Court (supported by the Court of Appeal) ruled that the Commission is expressly empowered to set the expiry date of a price review determination and that power is "unconditional". This expiry date ruling eliminated the possibility that a section 27 price review would be a "formalised futility".

1055. Thus the Court of Appeal's ruling regarding the start date of a price review determination is logically independent of the fact that the section 27 initial determination had an expiry date. This in turn implies that the fact that the section 27 initial determination has an expiry date is not a basis for applying a different policy regarding the start date of the current STD price review determination compared to the previous section 27 price review determination.

1056. Accordingly, I consider that the Commission should accept the Court of Appeal's judgment as establishing a norm that all price review determinations start from the date of the initial determination that is being reviewed unless there are compelling reasons in a specific case to depart from that norm. Thus while I agree that the Commission does have the discretion to depart from the norm I would do so only if there is a compelling reason.

1057. The Court of Appeal judgment was a result of an application for a Declaratory Judgment. In my view, confidence in the New Zealand regulatory framework, including the role of the courts, will be damaged by a failure of the Commission to accept the Court of Appeal decision on the Declaratory Judgment as establishing a norm in regard to the start date of a price review determination. This is evidenced by the submissions from investors following the change in the Commissions position on backdating between the emerging view paper of 22 December 2014 and the July 2015 further draft decision.

*There is a compelling case for a 1 December 2014 start date for the reviewed UCLL price*

1058. In the current case I assess there is, indeed, a compelling reason – the statutory freeze of the UBA price – why the end of that freeze on 1 December 2014 should be the start date of the UCLL FPP regulatory period rather than 3 December 2012, the date of the UCLL determination under review.

1059. As noted earlier, the UBA price was frozen (at the retail minus based level) by specific statutory provision for the three years to 1 December 2014 to allow unbundlers to recover the cost of their unbundling investments and to allow Chorus and UBA access seekers time to prepare for the cost based UBA price. Applying the increase in the UCLL price resulting from the review would frustrate the above purposes, particularly regarding unbundlers, of the specific statutory provision. The unbundlers would be required to pay to Chorus the difference between the FPP price and the lower prices set by the UCLL determination of 3 December 2012. That price difference of around $7.42 per month would detract materially from achievement of the price freeze purpose of allowing unbundlers to recover the cost of their unbundling investments. Thus there is a compelling case to depart from the norm but only to the extent required to avoid frustrating the purpose of a statutory provision – the UBA price freeze[769].

1060. I note that it has been suggested that the section 30R review of the UCLL price that was issued on 3 December 2012 itself risked frustrating the purpose of the UBA price freeze – if, for example, it had increased the UCLL price. In particular the Chorus February 2015 submission argues (at para 341) that any concern that an increase in the UCLL price would undercut expected recovery of investment in unbundling should have been considered before the section 30R review was commenced rather than only now.[770] However any increase in the UCLL price would have increased the payments to Chorus for all lines thus leaving unbundlers' competitive position and thus their ability to recover the cost of their investments unchanged. Thus the purpose of the UBA price freeze would not have been frustrated.

*The Commission can and should have a policy regarding a price review start date*

1061. I turn next to the role of the Commission's policy regarding the start date of a price review determination.

1062. Some submissions have suggested that a pre-condition for backdating to serve the section 18 purpose is that market participants must believe it highly likely backdating will apply. This would seem to require that the Commission announces its policy norm is to backdate. The legal need for the Commission to retain an open mind during consideration of submissions might then be misinterpreted as preventing announcement of a policy norm of backdating to meet this pre-condition. It has however been held judicially that a regulatory body is entitled to adopt a policy regarding how it will normally exercise its discretionary powers provided it is always amenable to considering whether a particular case has exceptional circumstances that warrant a departure from the policy (the burden of establishing which can

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769 For completeness, I consider the circumstances set out in this section would meet the "extraordinary" threshold, justifying a start date for a price review determination different from the date of the determination under review, as suggested in paragraph 33 of Chapman Tripp's April 2014 advice to Chorus. Chapman Tripp "Unbundled Copper Local Loop (UCLL) and Unbundled Bitstream (UBA) Service – Pricing Review Determination (PRDs) – Legal Framework" 11 April 2014.

770 It should be noted that Chorus would be worse off if the Commission had not undertaken a 30R review of the UCLL price since, in that case, Chorus would not have had the opportunity to apply for the current price review which has resulted in a UCLL price increase.

properly be placed on the person asserting those features)[771]. Thus there is no legal obstacle to the Commission confirming that it regards the Court of Appeal rulings as establishing a norm that the start date of a price review determination will be the date of the determination under review, subject to consideration of whether compelling reasons justify a different start date.

1063. As regards the present price review, in last year's UBA case - in which the major market participants were represented – the Court of Appeal itself stated that "This Court has ruled that as a matter of statutory interpretation a price review determination relates back to the date of the initial determination".[772]

1064. The fact that Spark announced price adjustments in expectation of backdating indicates it is entirely possible for parties to expect backdating and act on that expectation. The pre-condition was met in this case and generated beneficial results in terms of prices being more reflective of the final pricing levels than if there had been no expectation of backdating.

*The only sustainable policy that avoids a bias against the access provider is to backdate*

1065. In general, a policy of backdating is sustainable whereas a policy to not backdate is unlikely to be sustainable. The issue is that where a price review indicates IPP benchmarked prices were higher than TSLRIC cost, it will be difficult to sustain public confidence in the Commission if Chorus is allowed to retain what would be accurately described as "excess revenue earned only because benchmarking did not accurately reflect the final pricing principle". The lobbying of the Commission by members of the public during the present price review indicates how much public attention would be focussed on the Commission in such circumstances. In order to discharge its responsibility to maintain public confidence, the Commission would likely require Chorus to return the excess revenue by, for example, clawback. Clawback involves discounting the regulated price for a period below the level that would otherwise apply, in the expectation that competition among access seekers would result in end users receiving the benefit of the discount.

1066. Investors will be understandably sceptical of any assertion that the Commission will refrain from applying backdating by clawback in these circumstances where the IPP price turned out to have been higher than the FPP price. Thus it is likely that many investors will factor into their assessment of the risk of investing in New Zealand an expectation that backdating will be asymmetric. In other words they will assess that backdating will not be applied where it would benefit the access provider but would likely apply, as it has in the past, when the access provider would have to return amounts received.

1067. The likely assumption by many investors that backdating would be asymmetric in future[773] comes on top of many international investors' concern that the implications

[771] *HTV Ltd. v Price Commission* [1976] ICR 170 (CA)

[772] *Chorus Ltd v Commerce Commission* [2014] NZCA 440, footnote 46.

[773] The Regulatory Review paper invites submissions on whether backdating policy should be specified in the Act but investors would recognise that the conclusion may be that the disadvantages of specification outweigh the advantages.

of the change to cost based pricing of UBA were not adequately foreshadowed by those directly involved in the separation of Chorus from Telecom including government agencies.[774] Furthermore, since Spark's pricing during this year has by its own admission included a provision to fund backdating into most of its broadband and landline prices, such investors will find it very difficult to understand the Commission's decision to overturn its own previous approach regarding price review determination backdating which was endorsed by the Court of Appeal.

1068. Thus the restoration of investor confidence, that the thoroughness of the TSLRIC modelling and FPP process could have achieved, risks being jeopardised by the decision not to continue to follow its previous approach to price review backdating.

1069. In summary, continuation of the backdating approach for which the Commission advocated, and won, Court of Appeal approval and which it also applied in regard to the UCLFS determination in 2014 would:

1069.1 promote incentives to get the more accurate FPP prices into the market place as early as possible, both by encouraging parties to adopt their own estimates and/or Commission drafts of the FPP prices, and by removing financial incentives to delay the process; and

1069.2 reassure investors that they need not be reliant on less accurate benchmarking processes at any point.

1070. Backdating is therefore consistent with providing the best platform for competition in the long-term benefit of end-users, because the most efficient price is applied and responded to earlier.

1071. I turn next to considerations specific to the current circumstances.

*A 1 December 2014 start date is consistent with the UBA target date set by Parliament.*

1072. A 1 December 2014 start to the FPP regulatory periods is consistent with the "reasonable efforts" requirement for UBA in the Act, i.e. the statutory preference for a 1 December 2014 start date.[775] We were not able to complete the UBA FPP review by that date, but backdating allows us to effectively meet it. For the reasons set out above, this start date logically flows through to UCLL as well.

*Spark, with 50% of the market, was able to adjust its prices to fund backdating*

1073. Spark announced on 10 December 2014, eight days after seeing our first TSLRIC modelling results, that it would increase most of its broadband and landline prices to partially fund backdating. That announcement preceded our release on 22 December 2014 of an emerging view favouring backdating. This demonstrates

[774] http://www.bloomberg.com/news/articles/2012-12-13/telecom-ceo-says-shock-new-zealand-policy-rulings-vex-investors.

[775] This is the earliest at which a cost modelled price for UBA could come into effect, as the Act mandates that a retail minus based price was in effect prior to that date – refer Schedule 1, Part 2, Subpart 1 of the Act. Chorus agreed that backdating for UBA should be limited to 1 December 2014 – Chorus 20 February 2015 Submission, para [324].

that the pre-condition that some submitters assert is required for backdating to serve the section 18 purpose was met – Spark acted on the expectation of backdating.

1074. On 2 July 2015, following the reversal of the emerging view regarding backdating, Spark stated by way of a New Zealand Stock Exchange announcement:

> In its earlier draft decision, the Commission had foreshadowed backdating to December 2014 which has created major industry uncertainty. This uncertainty caused Spark New Zealand to reluctantly increase prices on most of its broadband and landline plans from February 2015 to partially offset the impact of backdated charges.
>
> If the Commission confirms backdating is ruled out in its final decision, and that decision is not subject to appeal, Spark New Zealand will honour its commitment to pass the value of these related retail price increases back to customers in a fair and transparent way.

1075. This statement by Spark in July 2015 – many months after introducing provisions for backdating into most of its broadband and landline prices - confirms the provisions were not competed away. Given Spark's 50% market share that, in turn, implies that other access seekers were in a position to provide for backdating. To the extent that they have not done so they will have benefitted by acquiring market share.

1076. This July statement refutes Spark's own submissions and those of others who contend that access seekers could not set prices in expectation that backdating would apply. The commitment to return the provisions for backdating ($4 for standard broadband services) to customers implies the impact of backdating would be reduced by the amount of the provisions.The increase was $4 in the case of standard broadband prices.

1077. Spark's commitment that it will pass the value of the related price increases back to customers in a fair and transparent way might be implemented by temporary price reductions. In that event it would result in the price charged by the access seeker with around 50% market share temporarily not reflecting the FPP price. It is difficult to see how that could be compatible with stability in market prices or with promotion of section 18.

*Effects of backdating on competition in the fixed line retail market*

1078. The separation of Spark from Chorus has reduced the risk that other participants in the fixed line retail market could be disadvantaged by Chorus relative to another retail market competitor as they were regarding the SLES service. The combination of Vodafone and TelstraClear and the takeover of CallPlus by M2 followed by the merger with Vocus has ensured Spark faces financially strong fixed line competitors. In addition the UFB has resulted in the three major access seekers facing new competitors such as New Republic in UFB areas. The presence of three strong competitors plus the new entrants generates powerful incentives for access seekers to invest in new and innovative services whenever opportunities arise.

1079. Spark, Vodafone and CallPlus' new owners' financial strength will limit the impact of exposure to future lump sum backdating on their ability and incentives to finance investment. Spark's NZX market capitalisation is over 4 times that of Chorus, and

Vocus/M2 will also have a substantially larger capitalisation while Vodafone is a large multinational.

1080. Accordingly, my assessment is that the major long-term effect of the Commission's backdating policy on the section 18 purpose relates to incentives for infrastructure investment which section 18(2A) of the Act draws to the Commission's attention. In terms of section 18(2A), the key issue is infrastructure investors' confidence in the regulatory regime. Chorus' advocacy of backdating, expressed from the outset of the price review process - prior to the Commission indicating whether the FPP prices would be higher or lower than the IPP prices - supports the conclusion that backdating reassures infrastructure investors as discussed earlier.

1081. A key reason for favouring lump sum backdating over claw-back is that lump sum backdating incentivises early adjustment of market prices to reflect estimates of the more accurate FPP price. The prospect of backdating has served that purpose well on this occasion. It also encourages all parties towards expeditious completion of price determination reviews.

1082. It is also relevant that claw-back results in market prices that deviate from the TSLRIC derived prices. Incurring this inefficiency can be justified by the importance of promoting the investment which is a pre-condition for competition for the long-term benefit of end-users but the expectation is that lump sum backdating will usually be preferable.

1083. As explained, I do not consider that there is a case for backdating UCLL all the way to the 2012 re-benchmarking decision.

*Payment for services purchased between 1 December 2014 and the date of this decision*

1084. If 1 December 2014 was the start date, I would propose that in regard to services purchased prior to the date of this decision, access seekers should pay one third of the difference between the IPP prices and the FPP price within 30 days and the rest by equal monthly instalments over four years with interest payable at the 90 day Bank Bill rate from the date of this decision. Obviously access seekers could choose to pay the amount off earlier if they so wished.

1085. The one third immediate payment is based on (but lower than) the $4 provision that Spark has been charging standard broadband users to fund backdating payments. As described Spark asserted in July it would return this amount to end users if backdating did not apply which indicates this element of Spark prices has not been competed away. Given Spark has a 50% market share other access seekers have been able to include similar provisions in their prices or to instead take the opportunity to gain market share.

1086. I would propose the remaining two-thirds of the amount be payable over the four remaining years of the regulatory period under a 1 December 2014 starting date with interest payable at the 90 day Bank Bill rate. This extended payment period would minimise any retail price and other impacts of the 1 December 2014 start date.

# Attachment A: UCLL network footprint and demand

## Purpose

A1 This Attachment sets out in more detail our final decisions relating to the network footprint and demand for UCLL.

A2 The network footprint determines the number of connections that comprise the access network, informs where the modelled network will be deployed, and is a key determinant of the network's cost.

A3 The network demand determines the number of paying customers over which total modelled costs will be spread to produce a cost per user.

A3.1 Setting constant network demand leaves the relationship between network footprint and demand fixed throughout the regulatory period, and the cost per user remains fixed. Alternatively, modelling demand migration allows the demand to move, which flows through to the cost per user calculations.

A3.2 The time the modelled network takes to attract demand and reach full load is reflected in the level of demand assumed to be served from Day 1. This could mean a higher cost per user in the early years as demand builds.

## Our final decisions

A4 Our final decisions are that:

A4.1 the hypothetical efficient operator's network connects every building and dwelling along New Zealand's road network;

A4.2 the hypothetical efficient operator has demand equal to the number of end-users paying for services on Chorus' copper and fibre networks, and LFC networks;

A4.3 there is constant demand on the hypothetical efficient operator's network;

A4.4 the end-users comprising the network demand all take services from the hypothetical efficient operator from Day 1; and

A4.5 the hypothetical network is not connected to addresses in the Christchurch Red Zone.

A5 Our key reasoning for these decisions is based on:

A5.1 the need for us to select an appropriate network scale to determine a representative price for the regulated service, which we consider is best achieved by selecting a nationwide network footprint similar to Chorus' copper network;[776]

A5.2 relevant real-world information, which informs our geospatial footprint modelling and demand considerations;[777] and

A5.3 our framework and a European Commission recommendation, which has informed our treatment of fibre and cable networks, and their respective demand.

**The hypothetical efficient operator's network connects every building and dwelling along the New Zealand road network**

A6 The network footprint determines the number of connections that comprise the access network, informs where the modelled network will be deployed, and is a key determinant of the network's cost.

A7 Our final decision is that the hypothetical efficient operator's network connects every building and dwelling along New Zealand's road network.

A8 We have utilised various sets of high quality geospatial information – provided by Corelogic.

*Initial view*

A9 In our December 2014 UCLL draft determination, we considered where a hypothetical efficient operator would deploy its network. We reached the view that the hypothetical efficient operator's network footprint should connect (at least) the TSO lines Chorus is obligated to serve, and any additional lines would be connected if a capital contribution could be secured from the end-user.

A10 On the assumption that these capital contributions would be forthcoming, we concluded that our hypothetical efficient operator's network footprint should include all copper connections (both inside and outside the TSO-derived boundary we constructed).[778,779]

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776 As set out in our Framework, the purpose of our TSLRIC exercise is to set robust and representative wholesale prices for the regulated services in accordance with the section 18 purpose statement. As supported by submitters, we have abstracted from reality, eg, the hypothetical efficient operator has sufficient access to resources and instantaneously commissions a national network that replaces existing fixed telecommunications networks.

777 As set out in our Framework, many of our decisions involve matters that are, to some extent, objectively measurable. In these cases we believe it is appropriate to use data and evidence, which may include data from Chorus and others, to determine our best estimate of what an objective value is, rather than relying on subjective assertions or speculation. This does not detract from the approach of the hypothetical efficient operator concept; rather, it uses real-world information to inform our assessment of this concept.

778 Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014, paragraph [489].

A11 These early views on the modelled network footprint focussed on the extent to which our hypothetical efficient operator had either an obligation or commercial incentive to connect and provide service to end-users. Accordingly, the responses we received from Vodafone and Spark encouraged us to determine "commercially viable" and "economical" lines to serve.[780, 781]

A12 Our consideration of Vodafone's and Spark's submissions led us to conclude that a commercially viable line is simply a line that someone is prepared to pay for. This may be our hypothetical efficient operator, the end-user, or some other funding source. We recognised that, in a hypothetical efficient operator context, identifying these lines and who pays requires judgement. This is why we have developed our treatment of capital contributions.[782]

A13 In our July 2015 further draft determination paper, we stated that the scope of the UCLL network footprint is less about funding considerations, and more about establishing an appropriate scale operator for the provision of the UCLL service.[783]

A14 Accordingly, we determined that our modelled hypothetical efficient operator network should be a national network, and it is therefore efficient that (within the point in time modelling requirement of TSLRIC) the network be "built" to accommodate all buildings.[784]

A15 We noted that this approach necessarily shifted our modelling approach from connecting buildings to connecting address points. We also acknowledged that there were two outstanding issues with our address point database that required further investigation, and potentially corrective action. These issues were:

A15.1 the inclusion of address points without buildings (eg, vacant lots and reserves); and

A15.2 the exclusion (or under-counting) of address points with multiple connections to single dwellings (eg, home offices and granny flats).[785]

A16 Not having analysed these issues at the time, we were concerned that the presence of either or both of these issues within our network footprint could result in

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779 Our reference to "copper connections" was inconsistent with the UCLL footprint modelled. The modelled UCLL footprint was in fact based on address points within the Corelogic database, as set out in section 3.1 of TERA's Model Specification.

780 Vodafone "Submission to the New Zealand Commerce Commission on process paper and draft pricing review determinations for Chorus' unbundled copper local loop and unbundled bitstream access services and comments on Analysys-Mason's TSLRIC models" 20 February 2015, paragraph [G4].

781 Spark "UBA and UCLL FPP pricing review draft decision - submission" 20 February 2015, paragraph [209]

782 For further discussion on this point, please refer to Attachment K.

783 Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 2 July 2015, paragraph [952].

784 Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 2 July 2015, paragraph [953].

785 Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 2 July 2015, paragraph [955-956].

inaccurate network dimensioning, leading to cost estimation problems. Our July 2015 further draft determination paper was published with this caveat.

A17 The network footprint in our July 2015 UCLL further draft determination was 8.6% higher than the level of demand. However, as we noted, the demand (active customers) on an access network is never equal to the address points it has been dimensioned to serve. Typically it is equal to 80-90% of address points.[786, 787]

*Submissions*

A18 Spark supported our objective to establish an appropriate scale for the provision of the UCLL service. However, Spark disagreed on what that scale should be, viewing our decision to connect all address points as being inconsistent with what an efficient forward-looking hypothetical efficient operator would do. Spark favoured a scale for UCLL equal to actual plus a reasonable forecast of demand over the regulatory period.[788]

A19 WIK (supported by Wigley and Company) also disagreed with the draft decision to model all address points in New Zealand, viewing it as a conceptual error. In WIK's view, if the hypothetical efficient operator's network covers a larger footprint than the one determined by actual demand, the incremental costs of covering the difference in demand should not be recovered from actual demand.[789, 790]

A20 Vodafone supported a wider network footprint, encouraging the Commission to consider all connections a hypothetical efficient operator would find economic to serve – today and throughout the regulatory period.[791]

A21 Spark, Vodafone, and Network Strategies all suggested that, in relation to the address point database issues we identified, multiple connections at a single address point would likely outweigh the presence of vacant sites.[792, 793, 794]

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786 Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 2 July 2015, paragraph [944, 957].

787 Paragraph 957 of our UCLL Further draft determination stated the difference between footprint and demand to be 9.1%, which was incorrect.

788 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services - submission" 13 August 2015, paragraphs [111-115].

789 WIK "Submission – In response to the Commerce Commission's "Further draft pricing review determination for Chorus' unbundled bitstream access service" and "Further draft pricing review determination for Chorus' unbundled copper local loop service" including the revised cost model and its reference documents" 12 August 2015, paragraphs [352-353].

790 Wigley and Company "Cross-submission in relation to UCLL and UBA draft pricing review determinations" 24 September 2015, appendix A [other (e)].

791 Vodafone "Further draft pricing review determination for Chorus' unbundled copper local loop service and Further draft pricing review determination for Chorus' unbundled bitstream access service" 13 August 2015, paragraphs [F2.1].

792 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services - submission" 13 August 2015, paragraphs [116-121].

*Analysis*

A22 Our final decision is that the hypothetical efficient operator network connects every building and dwelling along New Zealand's road network.

A23 We consider that a network footprint that is similar to Chorus' copper network will provide an appropriate scale to determine a representative price for the regulated service. We also consider that this decision fits with our approach to capital contributions set out in Attachment K where we considered end-users would pay for the capital cost of extending the network beyond the TSO boundary.

A24 We discuss below issues in relation to the implementation of this approach.

A25 Following the publication of our further draft decision in July 2015, we worked with our geospatial experts (Corelogic), who had provided the address point database, to investigate whether we had modelled address points without buildings.

A26 Our address point database is a combination of two separate datasets that utilise land use categorisation. Using these datasets, our first round of analysis indicated that there were 186,417 address points that potentially did not have a building.

A27 We asked Corelogic to undertake a further round of analysis to cross-check these address points against a property valuation dataset. This cross-check reduced the address points without a building to 99,457.[795]

A28 We recognise that some of these vacant address points will be built on, but others will remain vacant. TSLRIC modelling is a point in time analysis, and we are therefore making an assumption that the observed level of address points without a building represents an equilibrium level.

A29 We consider that, with Corelogic's help, we have identified to a high confidence level the address points without buildings. By removing the 99,457 address points identified, we have appropriately shifted our modelling focus back to connecting buildings (and dwellings within buildings), rather than address points.

A30 We also looked at situations where a single address point has multiple connections, as our datasets would not capture such instances, and therefore undercount the network assets (lead-ins) to connect these dwellings.

A31 Importantly, when referring to modelling lead-ins, we are referring to a cable or duct that contains (at a minimum) two fibres. As the number of fibre pairs can be readily increased, an additional lead-in is only required where reticulation cannot occur from the existing lead-in (building termination point).

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[793] Vodafone "Further draft pricing review determination for Chorus' unbundled copper local loop service and Further draft pricing review determination for Chorus' unbundled bitstream access service" 13 August 2015, paragraphs [F2.2].

[794] Network Strategies "Revised draft determination for the UCLL and UBA price review" 13 August 2015, section [4.1].

[795] This figure has been revised down from 102,890 since our October 2015 consultation.

A32 The inability to reticulate fibre from the building termination point is (to our knowledge) the only reason for deploying an additional lead-in.

A33 As reticulation relates to the "network" contained within a dwelling, it is beyond the scope of our modelling. We are undertaking an access network cost estimation, which does not require estimating in-home wiring or LAN arrangements.

A34 We therefore reached the view that no adjustment should be made for under-counting. Our current modelling approach allows for multiple fibre pairs within a property's lead-in cable or duct.[796]

A35 Having reached views on both address points without buildings, and multiple connections to single address points, we observed that removing 99,457 vacant address points reduced the difference between footprint and demand to 3.6% (from 8.6%).

A36 This result prompted us to undertake a short, discrete consultation in late October 2015 to understand submitters' views on a 3.6% difference between footprint and demand, and whether and how it should be increased.

A37 In the consultation, we proposed:

A37.1 making a consequential adjustment to restore a gap between footprint and demand; by

A37.2 applying an adjustment that makes demand equal to our network footprint connections, less the Statistics New Zealand 2013 Census unoccupied 7.5% measure;[797] and

A37.3 that this approach reflected the level of paying customers in New Zealand, which would better approximate the unit costs of the modelled network.

A38 However, submissions were universally against our proposed adjustment. Submitters did not believe the information on which we proposed to make the adjustment was appropriate, and/or any more reliable or robust than our existing data.[798, 799, 800, 801, 802, 803]

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796 We do note, however, that as we are using Chorus' actual copper demand (ie, the number of lines it is paid for, which will include second lines for home businesses, faxes etc), this overstates the number of lines our hypothetical efficient operator is paid for.

797 We considered Statistic New Zealand's unoccupied residential dwelling data provided a justifiable basis on which to make an adjustment. Our view was that it reflected long-term vacancies, such as holiday homes, which would have a lead-in, but not an active connection.

798 Chorus "Submission for Chorus in response to Consultation paper – Network footprint and demand UCLL and UBA pricing review determinations" 21 September 2015, paragraph [10].

799 Analysys Mason "Submission to UCLL and UBA pricing review determinations: Supplementary consultation on network footprint and demand"4 October 2015, paragraph [2.2].

800 Spark "Consultation paper – network footprint and demand UCLL and UBA pricing review determinations" 6 October 2015, paragraphs [26,31-32].

A39 Most submitters were against making any form of adjustment.[804, 805, 806, 807]

A40 If any adjustment was to be made, Analysys Mason and WIK recommended changes to footprint, rather than demand, as this is methodologically superior. Analysys Mason's suggestion was to allow for cable and terminal spares, which amounted to applying a utilisation factor. WIK advised that if the Commission is convinced about the validity of the Census data, then it should adjust the footprint using a statistical approach.[808, 809]

A41 We have reflected further on our proposed adjustment and the submissions received. We have concluded that an adjustment to either demand or footprint as a consequence of our address point correction is not justified.

**The hypothetical efficient operator has demand equal to the number of end-users paying for services on Chorus' copper and fibre networks, and LFC networks**

A42 The network demand determines the number of paying customers over which total modelled costs will be spread to produce a cost per user.

A43 There are six significant fixed access networks in New Zealand:

A43.1 Chorus' copper network;

A43.2 Chorus' (UFB) fibre network;

A43.3 Vodafone's HFC network;

A43.4 Enable's (LFC) fibre network;

A43.5 Northpower's (LFC) fibre network; and

A43.6 Ultrafast Fibre's (LFC) fibre network.

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801 Vodafone "Consultation paper – network footprint and demand, UCLL and UBA pricing review determinations" 6 October 2015, appendix [1].

802 Network Strategies "Network footprint and demand" 5 October 2015, section [2-3].

803 WIK "Submission – in response to the Commerce Commission's "Consultation paper – network footprint and demand, UCLL and UBA pricing review determinations"" 5 October 2015, paragraphs [19, 30].

804 Spark "Consultation paper – network footprint and demand UCLL and UBA pricing review determinations" 6 October 2015, paragraphs [28-30].

805 WIK "Submission – in response to the Commerce Commission's "Consultation paper – network footprint and demand, UCLL and UBA pricing review determinations"" 5 October 2015, paragraphs [24, 31].

806 Vodafone "Consultation paper – network footprint and demand, UCLL and UBA pricing review determinations" 6 October 2015, appendix [1].

807 Network Strategies "Network footprint and demand" 5 October 2015, section [5].

808 Analysys Mason "Submission to UCLL and UBA pricing review determinations: Supplementary consultation on network footprint and demand"4 October 2015, paragraph [2.3].

809 WIK "Submission – in response to the Commerce Commission's "Consultation paper – network footprint and demand, UCLL and UBA pricing review determinations"" 5 October 2015, paragraphs [25-28, 31]

A44 Chorus' fibre network and the LFC network operators are collectively deploying a fibre network that is intended to replace Chorus' copper network in most parts of New Zealand. Vodafone's established HFC network is a competing network platform for both Chorus' copper network and the new fibre network.

A45 Our final decision is that the hypothetical efficient operator has demand equal to the number of end-users paying for services on Chorus' copper and fibre networks, and the LFC networks.

A46 Our framework sets out our assumption that Chorus' copper network, LFCs' infrastructure and Chorus' UFB infrastructure do not exist. As a consequence, Chorus' and LFCs' demands are served by the hypothetical efficient operator.

A47 In particular, we considered that it did not seem plausible to assume that the hypothetical efficient operator's network and the LFC/Chorus UFB networks would co-exist, given the nature of the UFB infrastructure as a government-sponsored overbuild of the existing copper access network. We have, however, been open to submissions that we should depart from this approach.

A48 In reaching our decision, we have also taken account of the European Commission's recent recommendation relating to the treatment of demand in LRIC models during a period of technological change.

*Initial view*

A49 Our December 2014 UCLL draft determination stated that the HFC network was a competing network,[810] but the LFC networks were being replaced (based on our MEA choice).[811] This resulted in demand including Chorus copper, Chorus fibre, and LFC end-users.

A50 In response, Chorus stated that:[812]

> …by spreading the modelled cost for UCLL and UBA across services provided on other infrastructure, the Commission will, in the presence of economies of scale, understate the unit costs of providing the regulated service.

A51 Chorus' view was also supported by its experts, Analysys Mason.[813]

A52 The majority of other submissions received on this matter supported our treatment of LFC demand (ie, to include demand residing on LFC networks).[814,815,816,817]

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810 Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014, paragraph [490].

811 Ibid, paragraph [497].

812 Chorus "Submission for Chorus in response to Draft pricing review determination for Chorus' unbundled copper local loop service and Unbundled Bitstream Access Services (2 December 2014) and Process and issues update paper for the UCLL and UBA pricing review determinations (19 December 2014" 20 February 2015, paragraph [297].

813 Analysys Mason "Report for Chorus – UCLL and UBA FPP draft determination cross-submission" 20 March 2015, section [2.5].

A53 We changed our treatment of HFC demand after consideration of submissions on our December 2014 draft determination.

A54 Our July 2015 UCLL further draft determination set out why we believed it was best to treat HFC and LFC demand the same. Our draft decision was to include HFC and LFC demand to avoid upward price movements resulting from migration to competing network platforms. Declining demand driving price increases appeared to us to be incompatible with competitive market outcomes.[818]

*Submissions*

A55 The subsequent submissions we received largely reflected views expressed in relation to our earlier draft determination.

A56 Spark noted its support for the inclusion of HFC demand into modelled UCLL demand. Its subsequent cross submission set out in more general terms that the hypothetical network should be costed independent of historical settings (including demand), as this process simulates the pricing consequences of a competitive market.[819, 820]

A57 Chorus did not support the inclusion of HFC demand, or the ongoing inclusion of LFC demand. Chorus contended that the Commission's approach will undercompensate it for the forward-looking costs of providing the service, and therefore was inconsistent with the Act's definition of TSLRIC and section 18 purpose.[821]

A58 L1 Capital also disagreed with the inclusion of HFC, arguing that it set a level of demand well beyond what any hypothetical efficient operator network could

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814 Spark "UBA and UCLL FPP pricing review draft decision - cross submission" 20 March 2015, paragraph [239].

815 Vodafone "Submission to the New Zealand Commerce Commission on process paper and draft pricing review determinations for Chorus' unbundled copper local loop and unbundled bitstream access services and comments on Analysys-Mason's TSLRIC models" 20 February 2015, paragraph [G5].

816 Wigley and Company "Submission on draft pricing review determination for UBA and UCLL services" 20 February 2015, paragraph [3.1].

817 Network Strategies "Final report for Spark New Zealand and Vodafone New Zealand – Review of issues from UCLL and UBA submissions – cross submission for the UCLL and UBA draft determination" 20 March 2015, p. 85.

818 Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 2 July 2015, paragraphs [966, 969].

819 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services - submission" 13 August 2015, paragraph [112],

820 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services – cross-submission" 25 September 2015, paragraphs [136-137],

821 Chorus "Submission for Chorus in response to Draft pricing review determinations for Chorus' unbundled copper local loop and unbundled bitstream access services (2 July 2015)" 13 August 2015, paragraphs [272-273].

realistically hope to achieve. The result of this was that the monthly line cost would be under-valued.[822]

A59 WIK disagreed with Chorus that all lines not provided by Chorus should be excluded from the relevant demand.[823]

A60 Analysys Mason observed that HFC is only included in modelled demand in Denmark and Norway – where in both cases it is owned by the incumbent. It noted that this is not the case in New Zealand, as Chorus does not own the HFC network.[824]

*Analysis*

A61 In arriving at our further draft determination to include HFC demand, we referred to a recent European Commission recommendation and to our expert Professor Vogelsang's opinion on this matter.[825, 826]

A62 We have now reconsidered our earlier views of their respective statements.

A63 The European Commission in observing the price instability created in LRIC models by migration from legacy copper to Next generation access (NGA) networks stated:[827]

> …stability would be reached by calculating the access costs of an NGA network and thus counteracting the volume effect (due to decreasing demand) which has been leading to higher unit costs. Such volume effects would see copper prices rising as customers switch to NGA products, because the same cost base of copper would be distributed between a smaller number of lines. In the proposed methodology, the model includes both copper and NGA lines, and therefore only traffic volume moving to other infrastructures (eg, cable, mobile and alternative operators' fibre) would entail an inflation of unit costs.

A64 Professor Vogelsang stated:[828]

> Since the MEA is both an actual replacement of the copper lines and the hypothetical replacement, the relevant state of demand is that for retail copper access before its decline

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[822] L1 Capital "Submission on the further draft pricing determination for Chorus' unbundled copper local loop and unbundled bitstream access services" 13 August 2015, p. 2.

[823] WIK "Cross-Submission – In response to the Commerce Commission's "Further draft pricing review determination for Chorus' unbundled bitstream access service" and "Further draft pricing review determination for Chorus' unbundled copper local loop service" including the revised cost model and its reference documents" 22 September 2015, paragraph [133].

[824] Analysys Mason "UCLL and UBA FPP further draft determination submission - PUBLIC" 11 August 2015, section [3.6].

[825] Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 2 July 2015, paragraph [968].

[826] Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 2 July 2015, paragraph [970].

[827] Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014, paragraph [492].

[828] Ingo Vogelsang "Current academic thinking about how best to implement TSLRIC in pricing telecommunications network services and the implications for pricing UCLL in New Zealand" 25 November 2014, paragraph [23(a)].

in demand. This holds to the extent that former copper access subscribers have not vanished but have migrated or are migrating to either mobile or UFB services.

A65 Having recognised the “death spiral” issue (escalating copper prices) would arise as the hoped for and expected FTTH was rolled out by the incumbent on a large scale, the European Commission recommended that demand should be set at the level for copper services that prevailed prior to the advent of significant FTTH deployment.

A66 We acknowledge that in some areas our “NGA” network is being provided by network operators other than the incumbent copper provider, ie, the LFCs. However, the LFCs, being recipients of the same UFB government funding as Chorus, are our equivalent NGA providers in those areas. We therefore consider that the LFCs are not alternative fibre providers in the European Commission’s use of that term.

A67 We now consider that the European Commission and Professor Vogelsang’s statements, when translated to the New Zealand context, correspond to including demand served by the LFCs, but excluding demand served by HFC.

A68 The exclusion of LFC demand would (over time) likely lead to a death spiral, where subsequent reviews would remove greater levels of demand, and lead to price increases – these price increases would drive further migration away from UCLL. It would also result in end-users in areas without access to UFB networks paying an increasing price. In terms of the section 18 purpose statement, we do not consider that either of these outcomes would promote competition for the long-term benefit of end-users.

A69 HFC is a competing, privately-funded, alternate network that may or may not be overtaken and displaced by UFB. We note Vodafone’s recent media announcement regarding upgrades to its HFC network – enabling 1Gbps residential services, which suggests it will be a viable UFB substitute in the medium term.[829] We consider that it is appropriate for this to be a competing network in our hypothetical world and to be able to deprive the hypothetical efficient operator of demand.

A70 We acknowledge that there are various uncertain factors that play into what the appropriate level of demand (relative to footprint) should be. However, we consider the combined effect of our demand decisions strikes the right balance.

A71 After correcting our modelled footprint for vacant address points, the 3.6% gap between footprint and demand is more likely to understate costs. On the other hand, the exclusion of HFC demand is more likely to overstate costs. Overall, these two modelling choices result in a 7.8% difference between our footprint and demand. We consider that this result is more likely to produce an unbiased national price.

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[829] https://www.vodafone.co.nz/press-release/vodafones-22million-network-upgrade-paves-the-way-for-wellington-and-christchurch-to-become-new-zealands-first-gigacities/.

**There is constant demand on the hypothetical efficient operator's network**

A72 Our modelling assumptions in relation to demand growth and migration are relevant for calculating unit costs over time. We must determine to what extent changes in the market – population growth and/or migration to or away from the network – should be modelled.

A73 Setting constant network demand leaves the relationship between network footprint and demand fixed throughout the regulatory period, and the cost per user remains fixed. Alternatively, modelling demand migration allows the demand to move, which flows through to the cost per user calculations.

A74 Our final decision is that there is constant network demand.

A75 In reaching this decision, we have assessed relevant real-world information relating to population growth; and been guided by the European Commission's recent demand recommendation on migration.

*Initial view and submissions*

A76 Our December 2014 draft decision was to model constant demand (ie, no migration).[830]

A77 Submissions did not support our constant demand assumption.

A78 Two lines of competing argument emerged in support of non-constant demand. The first focussed on the presence of competing network platforms, and expected migration away from Chorus' copper network. The second was premised upon future growth in population and usage, driving expansion of the modelled network.

A79 Chorus and Analysys Mason subscribed to the first line of argument. Chorus considered that the starting demand should be Chorus' current demand and adjusted based on Chorus' forecasts. [831] Analysys Mason argued that demand for UCLL will decrease as UFB is taken up, and that Chorus' total demand for UFB and UCLL will decline as customers move onto LFC and other networks such as mobile.[832]

A80 Network Strategies (supported by Spark, Vodafone, and Wigley and Company) supported the second line of argument, suggesting that future population growth

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[830] Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014, paragraph [509].

[831] Chorus "Submission for Chorus in response to Draft pricing review determination for Chorus' unbundled copper local loop service and Unbundled Bitstream Access Services (2 December 2014) and Process and issues update paper for the UCLL and UBA pricing review determinations (19 December 2014)" 20 February 2015, paragraph [294].

[832] Analysys Mason "Report for Chorus – UCLL and UBA FPP draft determination cross-submission" 20 March 2015, section [2.5].

will drive significant household fixed line demand, which due to our constant demand assumption will result in mobile-only household growth.[833, 834, 835, 836]

A81 More recently, and in support of their earlier submissions, Network Strategies, Vodafone and Spark pointed to looming changes in end-users' usage and throughput demand (driven by cloud-computing and services such as Netflix) that will undermine our constant demand assumption.[837, 838, 839]

A82 Separately, Spark proposed that a threshold for variation between actual demand and constant demand be set to trigger a reset of demand. Vodafone said that we should factor demand growth into the model, but not revisit during the regulatory period.[840, 841]

*Analysis*

A83 There are a number of factors that determine the demand for the UCLL service. During this process we have heard from submitters on aspects such as population growth, migration to Chorus' UFB network, migration to LFC networks, and fixed to mobile substitution.[842,843,844,845,846]

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833 Network Strategies "Final report for Spark New Zealand and Vodafone New Zealand – Commerce Commission draft determination for UCLL and UBA – a review of key issues" 20 February 2015, p. 10-16.

834 Spark "UBA and UCLL FPP pricing review draft decision - submission" 20 February 2015, paragraphs [81-85].

835 Vodafone "Submission to the New Zealand Commerce Commission on process paper and draft pricing review determinations for Chorus' unbundled copper local loop and unbundled bitstream access services and comments on Analysys-Mason's TSLRIC models" 20 February 2015, paragraphs [G7-G12].

836 Wigley and Company "Submission on draft pricing review determination for UBA and UCLL services" 20 February 2015, paragraphs [15.9-15.14].

837 Network Strategies "Revised draft determination for the UCLL and UBA price review" 13 August 2015, section [4.2-4.3].

838 Vodafone "Further draft pricing review determination for Chorus' unbundled copper local loop service and Further draft pricing review determination for Chorus' unbundled bitstream access service" 13 August 2015, paragraphs [F3.3-3.4].

839 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services - submission" 13 August 2015, paragraphs [122-123].

840 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services - submission" 13 August 2015, paragraph [124-125]

841 Vodafone "Further draft pricing review determination for Chorus' unbundled copper local loop service and Further draft pricing review determination for Chorus' unbundled bitstream access service" 13 August 2015, paragraph [F3.5]

842 Vodafone "Submission to the New Zealand Commerce Commission on process paper and draft pricing review determinations for Chorus' unbundled copper local loop and unbundled bitstream access services and comments on Analysys-Mason's TSLRIC models" 20 February 2015, paragraph [G7-G12].

843 Spark "UBA and UCLL FPP pricing review draft decision - submission" 20 February 2015, paragraphs [81-85].

844 Wigley and Company "Submission on draft pricing review determination for UBA and UCLL services" 20 February 2015, paragraphs [15.9-15.14].

845 Chorus "Cross-submission for Chorus in response to Draft pricing review determination for Chorus' unbundled copper local loop service and Unbundled Bitstream Access Services (2 December 2014) and

A84 Our draft decision (and further draft decision) to assume constant demand was not because we thought these factors were irrelevant considerations, or that their cumulative effect necessarily resulted in a constant level of demand.

A85 We have not received any new evidence in submissions that has caused us to re-think our constant demand assumption.

A86 As we have said previously in relation to population growth, New Zealand's population growth is undoubtedly positive, however, this trend has not translated into household fixed line growth on the copper network. It is not clear to us why this trend persists, but it is also unclear from the data presented to us that this trend is likely to change during the regulatory period. Accordingly, we do not support translating population growth into additional modelled UCLL demand.[847]

A87 In relation to growth in end-users' usage and throughput demand, it is not clear to us that increases in throughput will drive fixed line demand. Analysys Mason also cast doubt on this claim. [848] Such changes are relevant to UBA. However, having adopted traffic forecasts for the duration of the regulatory period, we consider that we have modelled sufficient growth into the UBA service.

A88 As noted above, allowing for the migration of copper to LFCs in our modelling would (over time) likely lead to a death spiral, where subsequent reviews would remove greater levels of demand, and lead to price increases, with these price increases driving further migration away from UCLL.

A89 Currently, we cannot see how such an approach could be for the long-term benefit of end-users, although we note our expert, Professor Vogelsang, considers such arguments could be considered.[849]

A90 Finally, we do not consider that a trigger to review this UCLL demand, as proposed by Spark, is warranted. TSLRIC is a point in time analysis, and we have opted for a regulatory period (of 5 years) that, amongst other things, balances certainty with flexibility. We note that we can undertake a 30R review of the price if we judge that it is warranted by a change in circumstances.[850]

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Process and issues update paper for the UCLL and UBA pricing review determinations (19 December 2014" 20 March 2015, paragraphs [313-326].

846 Analysys Mason "Report for Chorus – UCLL and UBA FPP draft determination cross-submission" 20 March 2015, section [2.5].

847 Network Strategies "Final report for Spark New Zealand and Vodafone New Zealand – Commerce Commission draft determination for UCLL and UBA – a review of key issues" 20 February 2015, p. 10-16.

848 Analysys Mason "Report for Chorus – UCLL and UBA FPP draft determination cross-submission" 22 September 2015, section [2.3].

849 Vogelsang "Reply to Comments on my November 25, 2014, paper 'Current academic thinking about how best to implement TSLRIC in pricing telecommunications network services and the implications for pricing UCLL in New Zealand'" 16 April 2015, paragraphs [23 and 96].

850 Section 30R of the Telecommunications Act 2001 sets out the conditions under which a review of a standard terms determination can be conducted.

### The end-users comprising the network demand all take services from Day 1

*Submissions, analysis and final decision*

A91 The time the modelled network takes to attract demand and reach full load is reflected in the level of demand assumed to be served from Day 1. This could mean a higher cost per user in the early years as demand builds.

A92 In setting our December 2014 UCLL draft decision, we noted that (coupled with constant demand) our fully-loaded demand assumption and instantaneous take-up assumptions were efficient because they would result in a price sufficient to cover the cost of any refurbishment, replacement or expansion of the hypothetical efficient operator's network.[851]

A93 In response, WIK stated that it fully supports the principle of a fully-loaded network assumption. Vodafone also, separately, provided its support for instantaneous demand take-up, as does Wigley and Company. [852, 853, 854, 855]

A94 Assuming that demand builds over time would result in initial prices that were higher than the efficient long run price (because the same total cost would be spread over a smaller number of connections initially). We do not think that such an outcome would be justified in terms of the TSLRIC objectives or the section 18 purpose statement.

A95 Accordingly, our final decision is that the end-users comprising the network demand all take services from Day 1.

### The hypothetical efficient network is not connected to addresses in the Christchurch Red Zone

*Submissions, analysis and final decision*

A96 As we set out in our draft decision, (based on data from Corelogic) there are about 8,000 properties within the Residential Red Zone that are either vacant or will shortly

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851 Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014, paragraph [509].

852 WIK-Consult "Submission in response to the Commerce Commission's 'draft pricing review determination for Chorus' unbundled bitstream access service' and 'draft pricing review determination for Chorus' unbundled copper local loop service' including the cost model and its reference documents" 20 February 2015, paragraph [413].

853 Vodafone "Submission to the New Zealand Commerce Commission on process paper and draft pricing review determinations for Chorus' unbundled copper local loop and unbundled bitstream access services and comments on Analysys-Mason's TSLRIC models" 20 February 2015, paragraph [G7].

854 Wigley and Company "Submission on draft pricing review determination for UBA and UCLL services" 20 February 2015, paragraph [3.1].

855 Vodafone "Further draft pricing review determination for Chorus' unbundled copper local loop service and Further draft pricing review determination for Chorus' unbundled bitstream access service" 13 August 2015, paragraph [F3.1]

be vacated. Once these properties have been vacated, any remaining buildings will be demolished.[856]

A97 Based on CERA's assessment, there is unlikely to be any significant building on this land within the regulatory period. Consequently, the UCLL demand within the Christchurch Earthquake Residential Red Zone area is deemed to be zero for the purposes of our modelling.

A98 We received no submissions on this matter.

A99 Our final decision is that the hypothetical efficient operator does not deploy network to address points within the Christchurch Earthquake Residential Red Zone. Accordingly, such properties are excluded from both the network footprint and modelled demand.

[856] Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014, paragraphs [514-515].

# Attachment B: Selecting the modern equivalent asset for the UCLL service

## Purpose

B1 This Attachment sets out our final decisions on the modern equivalent asset (MEA) for the UCLL service.

B2 We have selected a MEA approach as an appropriate tool for determining the efficient forward-looking costs of providing the UCLL service.

B3 There are several methodologies within a forward-looking TSLRIC exercise that we could use to determine the cost of the network and so determine a price for the UCLL service (including indexation and absolute valuation, both of which re-value the legacy assets of the existing network).

B4 Of the available approaches, the International Telecommunication Union (ITU) has recommended using a MEA whenever possible.[857] In the ITU's view, a MEA approach is the most accurate valuation approach to reflect the cost of an efficient operator, since it captures the associated costs that an efficient operator would face, if entering the market at a specific time. We agree.

B5 We also consider that the MEA approach fits with our hypothetical efficient operator and the principles for the *Vodafone TSO* case in relation to the modelling of the most efficient modern technologies.

B6 The Body of European Regulators for Electronic Communications (BEREC) defines MEA as follows:[858]

> Gross MEA value is what it would cost to replace an old asset with a technically up-to-date new one with the same service capability, allowing for any differences both in the quality of output and in operating costs. For the replacement cost valuation to be appropriate it is not necessary to expect that the asset will actually be replaced.
>
> The new technologies are usually superior in many aspects to the older technologies in terms of functionality and efficiency. However, since MEA values are required to reflect assets of equivalent capacity and functionality, it may be necessary to make adjustments to the current purchase price and also the related operating costs - for example, the new asset may require less maintenance, less energy and less space. Other adjustments may also be required in the calculation of current costs, e.g. surplus capacity.

B7 BEREC defines "equivalent" as an asset with the same service capability. A "modern" asset is defined to be a technically up-to-date or current asset, consistent with the forward-looking concept discussed in Chapter 2. BEREC notes that the MEA generally incorporates the latest available and proven technology.

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857 International Telecommunication Union "Regulatory Accounting Guide" March 2009, p. 18.

858 ERG COMMON POSITION "Guidelines for implementing the Commission Recommendation C (2005) 3480 on Accounting Separation & Cost Accounting Systems under the regulatory framework for electronic communications" p. 13. The European Regulators Group (ERG) was the predecessor to BEREC.

B8 Therefore, in determining the MEA for the UCLL service, we set out below how we have interpreted the requirement for “equivalence” with Chorus’ UCLL network, and the “modern” technologies capable of providing that “equivalence”. We have limited our consideration of “modern” technologies to those which are widely in use, which we consider consistent with BEREC’s reference to “available and proven” technologies.

**Our final decisions**

B9 We have taken a core functionality approach to determine the service that the MEA network must be capable of providing. In our view, a core functionality approach allows us to identify the key features of and optimise the UCLL service.

B10 In terms of core functionality:

B10.1 In our view, the core functionality of the UCLL service is to allow access seekers to provide voice and broadband services.

B10.2 We have clarified our view of broadband – where the MEA does not have to be unbundleable, we consider that the candidate MEA technology must be capable of supporting a layer 2 bitstream service with equivalent performance to Chorus’ UCLL network.

B11 We consider that to satisfy the equivalence criterion, the MEA network should be able to provide, to a large extent, a point-to-point, unbundleable layer 1 connection. In particular, exchange service areas (ESAs) that have already been unbundled, or are of a similar size to those that have been unbundled, must provide this functionality.

B12 Our final decisions as to the MEA are as follows.

B12.1 In ESAs where we consider that the MEA network must be able to provide a point-to-point (P2P), unbundleable service, we have selected P2P-FTTH as the MEA network.

B12.2 For the remaining ESAs, a P2P, unbundleable service is not a requirement of the MEA network.

B12.3 We have modelled several scenarios and have determined that the lowest cost technology is a mixed P2P-FTTH/FWA network with FWA based on certain RBI FWA sites.

B12.4 Accordingly, the MEA network in ESAs where a point-to-point, unbundleable network is not a requirement is a mixed P2P-FTTH/FWA network.

B13 We gave consideration to whether an adjustment at the ESA level is appropriate in light of our hypothetical efficient operator/MEA approach to TSLRIC.

B14 We consider the ESA level approach is inconsistent with our TSLRIC objective of incentivising efficient investment, as it may disincentivise investment in new and improved technologies and services.

B15 As the P2P-FTTH/FWA MEA network costs less than the FTTN network at the national level, it was not necessary for us to consider if we should make a cost adjustment to the P2P-FTTH/FWA network at that level.

**Our framework for determining the MEA for the UCLL service**

B16 As explained above we have decided to use the concept of a MEA to model the TSLRIC costs of providing the UCLL service. In the following sections we set out our approach to identifying the UCLL service we are modelling and to selecting a MEA capable of providing an equivalent service to that service.

*We are modelling a MEA network that is capable of providing the core functionality of the UCLL service*

B17 In our December 2013 UCLL process and issues paper, we suggested that TSLRIC requires us to model a hypothetical network that “as a minimum, should provide the same functionality as the existing UCLL service”.[859] As we explain in this section, we no longer hold that view.

B18 Chorus submitted that our choice of MEA is limited by the words “the service” in the Act’s definition of “TSLRIC”, and that we are therefore constrained to a MEA that has the same functionality as Chorus’ actual copper network.[860]

B19 We consequently sought legal advice, and then consulted on this. Dr James Every-Palmer’s advice of 12 March 2014 summarised the various interpretations as follows:[861]

> In my view, there are four candidate interpretations for the phrase “the service” in terms of the application of the TSLRIC concept:
>
> (a) the actual service provided by Chorus;
>
> (b) the service described in the relevant STD;
>
> (c) the designated access service as described in Schedule 1; or
>
> (d) a more abstract description of the regulated service that is technology neutral and captures its core functionality.

B20 Dr Every-Palmer went on to prefer option (d) above, on the basis that it is supported by a mix of contextual and purposive indicators in the Act.[862]

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[859] Commerce Commission “Process and issues paper for determining a TSLRIC price for Chorus' unbundled copper local loop service in accordance with the Final Pricing Principle” 6 December 2013, paragraph [96].

[860] Chorus "Submission in response to the Commerce Commission’s Process and issues paper for determining a TSLRIC price for Chorus’ unbundled copper local loop service in accordance with the Final Pricing Principle" 14 February 2014, paragraph [11].

[861] James Every-Palmer “FPP determination: Issues re service description and the modern equivalent asset - a report prepared for the Commerce Commission” 12 March 2014, paragraph [13].

[862] Ibid, paragraph [16].

B21 In our July 2014 regulatory framework and modelling approach paper, we expressed a view that we intended to consider the efficient cost today for an equivalent service, unconstrained by Chorus' (or end-users') historic technology choices, but capturing the "core functionality" of the regulated service.[863] This approach is what Dr Every-Palmer states as interpretation (d) – that is, a more abstract description of the regulated service that is technology neutral and captures its "core functionality". The term "core functionality" refers to the essential features of the relevant service, rather than the full functionality of the core network (being the part of the network used by multiple services). In this respect, we note that the existing functionality of the network may or may not be efficient.

B21.1 In its submission, Chorus disagreed with Dr Every-Palmer's view. Chorus continued to submit that we must model a service that focuses heavily on the full functionality and technology of its existing network.[864] This is consistent with Chorus' broader preference on the nature of our cost modelling exercise, which is to base our modelling closely on its actual network.

B21.2 The interpretation preferred by Chorus focusses closely on the literal words of the Act's definition of TSLRIC, in particular "the facilities and functions that are directly attributable to, or reasonably identifiable as incremental to, the service". These words lead Chorus to focus heavily on the functionality of its existing network, and conclude that the MEA must be capable of delivering the full functionality of the existing STD service, not just its "core functions". Chorus submitted that concepts like "core functionality" do not appear in the Act and cannot be read in.[865]

B21.3 CallPlus took a similar view, suggesting that the modelling of the UCLL service (and UBA service) should be based on the existing footprint of commercially available DSL services, which in its view is consistent with the purpose and context of the Act.[866]

B22 In our December 2014 UCLL draft determination we noted that we found these submissions unsupported by the statutory language, context and broader scheme of the Act, and therefore unpersuasive.[867] As Dr Every-Palmer suggested, if such an

863 Commerce Commission "Consultation paper outlining our proposed view on regulatory framework and modelling approach for UBA and UCLL services" 9 July 2014, paragraph [105].

864 Chorus "Submission in response to the Commerce Commission's Further consultation on issues relating to determining a price for Chorus' UCLL and UBA services under the final pricing principle – Consultation Paper (14 March 2014) and Supplementary Paper (25 March 2014)" 11 April 2014, paragraphs [58-67].

865 Chorus "Submission in response to the Commerce Commission's Further consultation on issues relating to determining a price for Chorus' UCLL and UBA services under the final pricing principle – Consultation Paper (14 March 2014) and Supplementary Paper (25 March 2014)" 11 April 2014, paragraphs [9-11], [58] and [61].

866 Orcon and CallPlus "Submissions by CallPlus and Orcon following the further consultation paper and the workshops" 11 April 2014, paragraph [2.11].

867 Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014, paragraph [257].

interpretation of the Act was intended, we would have expected Parliament to be clear and unequivocal that this was Parliament's intent.

B22.1 Our view in our December 2014 UCLL draft determination, consistent with submitters other than Chorus and CallPlus, was that Parliament intended us to undertake a TSLRIC exercise by building a TSLRIC cost model to determine the costs incurred using the most efficient means at any point in time to provide the service.[868] As Spark put it:[869]

> The difficulty with Chorus' and Callplus' proposed approaches is that, by tying the MEA tightly to characteristics of the current Chorus network and the way in which Chorus provides services today, it artificially bounds the scope for Commission's assessment of efficient costs. This means the Commission can't set a price that best reflects FPP or section 18 outcomes.

B22.2 Accordingly, we concluded that TSLRIC did not require that Chorus' existing network should constrain our modelling choices in the way that Chorus and CallPlus contended.[870]

B23 Chorus' submissions on our December 2014 draft and July 2015 further draft determinations was that the MEA should be capable of delivering the full functionality of the UCLL STD service.[871] Chorus had previously submitted that an approach focusing on "core functionality" introduces a significant element of subjectivity, and therefore unpredictability, into the TSLRIC exercise.[872]

B24 Our final decision, consistent with our July 2015 further draft determination, is that, based on our TSLRIC exercise, we are required to make a judgement about what service we are modelling. Even if the "the service" in the Act's definition of "TSLRIC" was a reference to the existing actual service, we consider that it is inherent in the TSLRIC methodology to abstract away from the particular technology in use. We consider Chorus' approach to be at odds with the purpose of a TSLRIC exercise. In our view, to constrain the choice of MEA to a subset of modern equivalent assets

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868 See for example Telecom "UCLL and UBA FPP: further consultation and supplementary paper - Submission" 11 April 2014, p. 1; Orcon "Cross submission on the further consultation on issues relating to Chorus' UCLL and UBA services" 30 April 2014, paragraph [7.4]; Telecom "UCLL and UBA FPP: further consultation and supplementary paper - Cross submission" 30 April 2014, p. 2 and paragraph [31].

869 Telecom "UCLL and UBA FPP: further consultation and supplementary paper - Cross submission" 30 April 2014, paragraph [15].

870 Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014, paragraph [259].

871 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services (2 July 2015) - Public version" 13 August 2015, paragraph [40]; and Chorus, "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and Process and Issues Update Paper for the UCLL and UBA Pricing Review Determinations" CONFIDENTIAL , 20 February 2015, paragraph [358].

872 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and Process and Issues Update Paper for the UCLL and UBA Pricing Review Determinations" CONFIDENTIAL, 20 February 2015, paragraph [361].

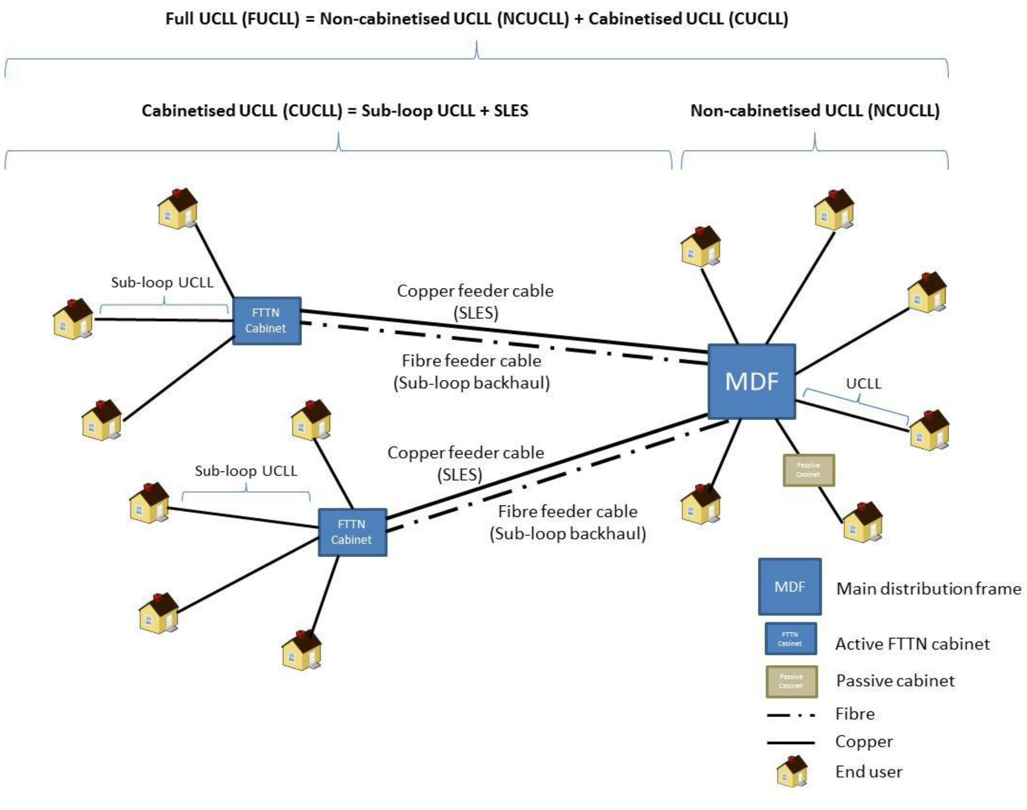
because of features (such as DC power) of Chorus' copper network is contrary to the TSLRIC exercise required by the Act.

B25 Accordingly, our view is that the "core functionality" approach allows us to model an equivalent service that best meets the requirements of the Act. This approach allows us to identify and optimise the UCLL service and therefore determine, for the purpose of the hypothetical efficient operator, the efficient forward-looking TSLRIC it would face in providing the service.

*The core functionality of the UCLL service is to allow access seekers to provide voice and broadband services to end-users*

B26 Given our view that the MEA must be capable of providing the "core functionality" we have considered which features are core to the UCLL service. To do so we looked at Chorus' UCLL network and how the UCLL service is used to provide voice and broadband services to end-users.

**Figure B1: Chorus' copper local loop network architecture**




B27 The UCLL service provides access seekers with access to the "last mile" of Chorus' UCLL network between the external termination point on an end-users premises and the local exchange.[873]

873 In this determination we are also setting prices for the SLU service, which provides access to and-users connected to active cabinets in Chorus' UCLL network.

B28 Chorus' UCLL network allows access seekers to provide voice and broadband services to end-users, and is used in the following ways.

B28.1 Access seekers can purchase the UCLL service and install their own equipment in the local exchange to "build" their own retail voice and broadband services – this is known as unbundling.

B28.2 Alternatively, the UCLL service is used as an input to Chorus' layer 2 UBA services which access seekers "buy" to provide retail broadband services.

B28.3 Access seekers can also purchase the UCLF service that provides access to the low frequency portion of Chorus' UCLL network. The price for the UCLL service flows through to the UCLF service, which allows access seekers to build their own voice services.

B29 Our view is that the core functionality of the UCLL service identifies the features that the MEA network as a whole has to be capable of providing. In that context, we consider that the ability to allow access seekers to provide voice and broadband services to end-users is the core functionality of the UCLL service.

B30 We also consider that the MEA network should be able to provide, in the main, a point-to-point, unbundleable layer 1 service. However, we do not consider these features as core across the whole network.

B31 Spark and Vodafone supported our view about the core functionality of the UCLL service.[874, 875] However, Chorus considered that if we were to adopt a core functionality approach, then the MEA network must provide a point-to-point, unbundleable network across all lines on which it is required to provide that functionality:[876]

> Whatever the core functionality of the service is, the HEO must be able to provide it to the end-user premises which Chorus is required to serve. Chorus' core regulatory obligation is to provide a point-to-point service that is unbundleable at Layer 1 to all intact copper connections.

B32 Chorus' view is consistent with its earlier submission that the core functionality must include the ability for layer 1 unbundleability:[877]

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874 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services - Public version" 13 August 2015, paragraph [129].

875 Vodafone "Submission to the New Zealand Commerce Commission on further draft pricing review determination for Chorus' unbundled copper local loop service and further draft pricing review determination for Chorus' unbundled bitstream access service - Public version" 13 August 2015, paragraph [A4.3].

876 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services (2 July 2015) - Public version" 13 August 2015, paragraph [47].

877 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and Process and Issues Update Paper for the UCLL and UBA Pricing Review Determinations", CONFIDENTIAL, 20 February 2015, paragraphs [369-370].

> The ability for the service to be unbundled represents the most basic functionality of Chorus' Unbundled Copper Local Loop Network service. The Act describes the UCLL service as "a service (and its associated functions, including the associated functions of operational support systems) that enables access to, and interconnection with, Chorus' copper local loop network (including any relevant line in Chorus' local telephone exchange or distribution cabinet)".
>
> The core functionality of the service is therefore best described as a physical connection providing a point-to-point transmission *medium* between the end-user and a hand-over point which enables RSPs to utilise their own equipment to provide a voice and data communications service to end-users.

B33 Spark disagreed with Chorus, submitting that the MEA is a tool to determine efficient costs, not an exercise to ensure that every line is capable of being unbundled.[878] Spark referred to the *Vodafone TSO* case, setting out its view that our task is to start with the modern technologies available to the hypothetical efficient operator and model the most efficient and commercially rational network that it would design using those technologies today.[879]

B34 In our view, there is no rigid requirement for the functionality of Chorus' UCLL network, such as point-to-point connectivity and unbundleability, to be replicated over the whole MEA network. For example, access seekers may not have the necessary scale to unbundle in lower density areas. As a result, the benefits of providing this functionality across the whole network may not be realised, and this would lead to inefficient costs being included.

B35 Accordingly, we do not view point-to-point connectivity and unbundleability as core across the whole MEA network. Conversely, we consider that a MEA that did not provide for any point-to-point connectivity and unbundleability would not be sufficiently equivalent to the Chorus' UCLL network to produce a robust and representative price. We discuss the appropriate balance below.

B36 In areas where such functionality is not core, we have also had to consider what performance criteria must be met to provide end-users with an equivalent service to that provided by Chorus' UCLL network.

B37 In this regard, where access seekers have not unbundled Chorus' UCLL network, they purchase Chorus' layer 2 UBA service as an input to provide retail broadband services. Where layer 1 unbundleability is not required, we consider that the candidate MEA technology must be capable of supporting a layer 2 bitstream service with equivalent performance to Chorus' UCLL network.

B38 The UBA service provided by Chorus currently provides an average busy time throughput of 250 kbps per end-user. In modelling the UBA service we have

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878 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services - Public version" 24 September 2015, paragraph [51].

879 Ibid, paragraph [53].

recognised that end-user throughput requirements will grow and have forecast an increase over the regulatory period to 1.9 Mbps.[880]

B39 In the UBA final determination we have stated that a hypothetical efficient operator would deploy a UBA core network capable of meeting current and future throughput needs.[881] Similarly, for the UCLL service, the MEA network should be capable of supporting our forecast throughput, to the extent that Chorus' UCLL network can.

B40 In the main, Chorus' UCLL network is capable of supporting this growth in throughput over the regulatory period. However, longer lines in Chorus' UCLL network would not be capable of supporting our forecast throughput growth over the regulatory period. Accordingly, we have identified several categories of line length in Chorus' UCLL network:

B40.1 Any copper line capable of supporting greater than 1.9 Mbps is allocated 1.9 Mbps.

B40.2 Any copper line not capable of supporting 1.9 Mbps is allocated throughput based on its existing line speed (with a floor of 150 kbps).

B41 In areas where the MEA network does not have to provide for layer 1 unbundling the line speed of the MEA network must be able to support the above throughputs at busy hour to be considered equivalent. We further discuss where we consider unbundleability to be a constraint on the MEA network in the following section.

B42 Vodafone submitted that current copper connections are irrelevant when considering which deployment the hypothetical efficient operator would choose.[882] Vodafone's view is that current telecommunication connections do not exist in the hypothetical efficient operator's world, and a network is being built for the first time.[883]

B43 We disagree with Vodafone's interpretation of the issue. We are using the MEA as a tool for setting an efficient forward-looking cost for the UCLL service. In this context, we consider it consistent with the TSLRIC exercise we are undertaking to take into account the performance attributes of the service for which we are setting a price. In our view, modelling a MEA network with lesser performance than Chorus' UCLL network would not be consistent with the MEA "equivalence" requirement. While it is inherent in our approach that not all aspects of the current service need to be replicated precisely, we consider that a failure to match broadband performance would mean that our model and resulting price would not be a true modern equivalent.

880 Commerce Commission "Final pricing review determination for Chorus' unbundled bitstream access service" 15 December 2015, Attachment B.

881 Ibid.

882 Vodafone "Submission to the New Zealand Commerce Commission on further draft pricing review determination for Chorus' unbundled copper local loop service and further draft pricing review determination for Chorus' unbundled bitstream access service - Public version" 13 August 2015, paragraph [D1.2].

883 Ibid.

*We have clarified where we consider P2P connectivity and unbundleability to be a requirement of the MEA network*

B44 As set out above, we do not consider a point-to-point, unbundleable service to be core across the whole network. In the following section we set out where the MEA network should provide this functionality. Our approach has been to strike a pragmatic balance having particular regard to where this functionality is likely to be demanded by access seekers.

B45 Our final decision is that the MEA network must provide a point-to-point, unbundleable service in the following areas:

B45.1 in exchange service areas (ESAs) where the existing network is already unbundled; and

B45.2 in ESAs with similar scale to the ESAs already unbundled.

B46 As previously stated, a P2P, unbundleable network allows for competition to occur and provides choice for end-users. We therefore consider that the MEA network should largely provide similar functionality.

B47 However, we recognise that unbundling is unlikely to occur in some areas. Costing a network that provides unbundleability across all ESAs may not result in long-term benefit to end-users as access seekers do not have the necessary scale to unbundle certain ESAs. We have therefore considered the footprint over which the MEA network must be unbundleable.

B48 In our view the MEA network, as a minimum, should be capable of providing an unbundleable service where unbundling has already occurred. Given that access seekers already use this level of functionality, not providing for unbundleability would be inconsistent with the equivalence requirement. We note that 214 exchanges, equating to about 82% of the modelled footprint, have already been unbundled.

B49 The level of unbundling in Chorus' copper network is dynamic. Evidence shows that unbundling continues to take place, with 20 exchanges unbundled in 2015. This suggests that access seekers' still see value in building their own retail broadband services over the existing copper network.

B50 On the other hand, we recognise that in less dense areas exchanges become smaller and end-users more dispersed. The likelihood of unbundling decreases and the cost of providing that functionality increases.

B51 Chorus submitted that unbundling is a function of access seekers demand (and therefore economics) for unbundling.[884] In Chorus' view, unbundling is only unlikely to occur where demand for an investment in layer 1 (to make it economic) is insufficient.[885]

B52 We agree with Chorus and have considered whether the MEA network should allow for unbundling over a larger footprint than where unbundling has taken place in the existing copper network. An access seeker would likely consider unbundling an exchange where it has gained the necessary end-user scale to purchase UCLL and is able to provide its own voice and broadband services more efficiently than Chorus.

B53 In this context, we have identified exchanges which have not been unbundled, but which have similar characteristics to those that have been unbundled. In our view, we should allow for unbundling in ESAs with similar scale to those already unbundled.

B54 Based on our observations of where unbundling has occurred to date, we have imposed the unbundleability requirement on all ESAs with 1500 or more lines.[886] This has increased the footprint over which we have modelled a point-to-point, unbundleable MEA network to 92% of the modelled footprint.[887]

B55 In the July 2015 further draft determination we considered that the hypothetical efficient operator would provide unbundleability over most lines due to our expectation that such an operator would, to some degree, be subject to regulatory obligations.[888]

B56 In response, Spark submitted that the take up of UCLL does not come close to matching the footprint in our MEA, and therefore Chorus will be compensated for inefficient legacy decisions.[889] Spark argued that our decision to presuppose an underlying copper network for the purpose of the MEA for the UBA service was intended to incentivise unbundling, so we were being inconsistent by including "inefficient unbundleability costs" that artificially inflated the UCLL cost in our UCLL cost model.

B57 We do not agree that we have been inconsistent. For the UCLL service we have tried to identify ESAs where unbundling may occur during the regulatory period. In these areas we consider it consistent with TSLRIC to reflect the efficient cost of providing

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884 Chorus "Cross-submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services - Public version" 24 September 2015, paragraph [22].

885 Ibid.

886 We note that there are ESAs that have been unbundled that have as few as 1500 lines in its footprint.

887 We note that ComReg in Ireland took a similar approach, deciding that exchanges with fewer than 2,500 lines would likely be uneconomic to unbundle. See http://www.comreg.ie/_fileupload/publications/ComReg1010.pdf

888 Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 2 July 2015, paragraph [1013].

889 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services - Public version" 13 August 2015, paragraph [159].

for unbundling in the MEA of the UCLL service. This does not incentivise unbundling. Likewise, our decision in relation to the UBA MEA is not intended to incentivise unbundling, but to better allow for competition through unbundling where it is efficient.

B58 In the following sections we discuss our selection of the MEA in areas where we consider unbundleability a requirement, and where unbundleability is not required.

**Selecting the MEA for the UCLL service**

B59 Having set out the functionality that the MEA must be capable of supporting, we then identified the technologies that we considered eligible as the MEA for the UCLL service.

B60 In the December 2014 draft determination, we identified several technologies can be used to provide voice and broadband services to end-users:[890]

B60.1 copper/FTTN;

B60.2 FTTH (both P2P and GPON);

B60.3 FWA;

B60.4 HFC; and

B60.5 mobile.

B61 We have previously considered GPON as an eligible technology. However, in our July 2015 further draft determination we set out that the MEA technology must largely be provided over a point-to-point architecture. Accordingly, we did not consider a fibre GPON network as an eligible MEA technology.[891]

B62 Wigley and Company submitted that we had not addressed its submission that the MEA is GPON rather than point-to-point, and that we had taken the approach of assuming point-to-point.[892] Wigley and Company referred to its 20 March 2015 submission where it submitted that GPON could not be excluded since a GPON network can be unbundled.[893]

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[890] Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014, paragraph [532].

[891] Commerce Commission “Further draft pricing review determination for Chorus’ unbundled copper local loop service” 2 July 2015, paragraph [1019].

[892] Wigley and Company "Submission on Further Draft Pricing Review UCLL and UBA Determinations" 13 August 2015, paragraph [14.1].

[893] Wigley and Company "Cross submissions as to draft UCLL and UBA FPP determinations" 20 March 2015, paragraph [14].

B63 As stated in our July 2015 further draft determination GPON was not excluded from our MEA consideration solely on the basis of unbundleability.[894]

B64 Rather, the MEA network must be unbundleable over a point-to-point architecture, rather than GPON's point-to-multipoint architecture. For the same reason HFC does not meet our criteria. In our view, a P2P architecture provides greater control to access seekers and dedicated bandwidth for each end-user.

B65 As explained above, we do not consider P2P connectivity and unbundleability as core across the whole network footprint. Therefore, we have considered separately the MEA for the UCLL service in ESAs where we consider those features to be a requirement and in ESAs where they are not.

*P2P-FTTH is the MEA in areas where we consider P2P connectivity and unbundleability to be a requirement of the MEA network*

B66 In ESAs where P2P and unbundleability are required features of the MEA network, we consider the following technologies eligible: a FTTN/copper network and P2P-FTTH network.

B67 We consider that our core functionality is the main consideration to select the MEA technology. This is consistent with our July 2015 further draft determination.[895]

B68 In our view, the hypothetical efficient operator would ensure it deploys the most future proof technology currently available which meets the core functionality and the additional features we have considered. In our view this is a P2P-FTTH network. A P2P-FTTH network is likely to have a longer useful life and provides greater capability than a FTTN network. This makes obsolescence less likely.

B69 We note that the additional considerations we had regard to in the December 2014 draft determination (technological performance, cost, operator strategy, and subscriber and retail price) provide limited additional guidance in our selection.

B70 However, in our view these additional criteria generally support us selecting a P2P-FTTH network. As we state above, a forward-looking hypothetical efficient operator is likely to deploy the most future proof technology currently available. This is likely to be the technology that provides the greatest performance.

*P2P-FTTH/FWA is the MEA in areas where we consider P2P connectivity and unbundleability are not requirements of the MEA network*

B71 In ESAs where we have determined that unbundling is unlikely to occur and therefore not a requirement of the MEA network, we have also considered FWA as a candidate MEA technology.

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[894] Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 2 July 2015, paragraph [1018].

[895] Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 2 July 2015, paragraph [1022].

B72 We have selected the lowest cost deployment of P2P-FTTH and FWA in determining the MEA that the hypothetical efficient operator would deploy in these ESAs.

B73 Although we do not consider unbundleability a requirement in these ESAs, we consider that the MEA network must be capable of supporting an equivalent level of broadband performance to Chorus' UCLL network.

B74 Similar to the MEA in unbundleable ESAs, we consider a P2P-FTTH network to be the appropriate fixed line technology. To determine the MEA technology in non-unbundleable areas, we have modelled the following scenarios:

B74.1 P2P-FTTH/FWA mix using all RBI FWA sites across all non-unbundleable ESAs;

B74.2 P2P-FTTH/FWA mix extrapolating results from RBI FWA sites with >50% ESA coverage to the remaining non-unbundleable ESAs;

B74.3 FWA-only extrapolating results from RBI FWA sites with >50% ESA coverage to the remaining non-unbundleable ESAs; and

B74.4 P2P-FTTH-only across all non-unbundleable ESAs.

B75 Attachment D further sets out our approaches for modelling each FWA scenario.

B76 Having modelled each scenario, we have then selected the lowest cost scenario as the MEA for the non-unbundleable footprint. Accordingly, we consider the MEA for the UCLL services in non-unbundleable areas to be a mixed P2P-FTTH/FWA network with FWA using the current and projected RBI FWA sites.

**MEA adjustment**

B77 Having decided to model a P2P-FTTH/FWA MEA network that has different capabilities to Chorus' UCLL network, we have considered whether a cost adjustment is appropriate to account for the differing capabilities of the MEA network.

B78 To do so we have modelled a FTTN network alongside our MEA network, which acts as a cost cap on the MEA network. Given our focus on equivalence we have been careful to ensure that we have not inefficiently provisioned the MEA network.

B79 In the December 2014 draft determination our view was that we would adjust the cost of the P2P-FTTH/FWA MEA if the FTTN network was less costly than the P2P-FTTH/FWA network, to reflect the different capabilities of the network.[896]

B80 In the December 2014 draft determination,[897] and July 2015 further draft determination,[898] we rejected making a MEA adjustment on the basis of consumer

[896] Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014, paragraph [558].

[897] Ibid, paragraph [567].

[898] Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 2 July 2015, paragraph [1029].

preference or technological performance. We rejected both approaches as they would be difficult to estimate in practice and would likely introduce a degree of unpredictability.[899]We continue to reject an adjustment on the basis of consumer preference or technological performance. In our view an adjustment based on either approach would not allow for efficient cost recovery.

B81 In response to our December 2014 draft determination, Spark and WIK submitted that the cost of the alternative networks should be considered on an ESA by ESA level.[900] In response, Chorus submitted that the lowest cost network should be selected as the MEA and that if we decided to select the MEA on an ESA level, then operating expenditure should be increased to reflect the additional support systems of operating multiple platforms.[901]

B82 In the July 2015 further draft determination, our view remained that a cost comparison between alternative MEAs should be considered at the national level. However, we recognised that the capital cost of FTTN could be lower than our chosen MEA in some parts of the network. Accordingly we sought submissions on how we should model a network that used multiple technologies, if we were to model more than one fixed line technology.[902]

B83 WIK recommended that we select the MEA technology ESA by ESA. WIK argued that this would be consistent with our MEA approach and TSLRIC principles, and noted that such an approach was contemplated by European Commission guidelines, which allow for a dual MEA approach, and had been used overseas.[903]

B84 WIK referred to an earlier submission where they submitted that we did not provide any argument why a technology choice at the national level best fits with our definition of TSLRIC or the long-term interests of end-users.[904]

B85 We have given further consideration to whether an adjustment at the ESA level is appropriate in light of our hypothetical efficient operator/MEA approach to TSLRIC.

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899 Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014, paragraph [567].

900 Spark "Submission on UBA and UCLL FPP pricing review determination" CONFIDENTIAL, 20 February 2015, paragraph [254].

901 Chorus "Cross-submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and Process and Issues Update Paper for the UCLL and UBA Pricing Review Determinations", 20 March 2015, paragraphs [78-80].

902 Commerce Commission “Further draft pricing review determination for Chorus’ unbundled copper local loop service” 2 July 2015, paragraphs [1033-1034].

903 WIK-Consult "Submission In response to the Commerce Commission’s “Further draft pricing review determination for Chorus’ unbundled bitstream access service” and “Further draft pricing review determination for Chorus’ unbundled copper local loop service” including the revised cost model and its reference documents" 12 August 2015, paragraphs [365-367].

904 WIK-Consult "Submission in response to the Commerce Commission's Draft pricing review determination for Chorus' unbundled bitstream access and unbundled copper local loop services including the cost model and its reference documents" CONFIDENTIAL, 20 February 2015, paragraph [183].

B86 In our view, a cost adjustment at the ESA level (which would be akin to selecting the MEA at the ESA level) is inconsistent with our hypothetical efficient operator/MEA approach, which is to assume that the hypothetical efficient operator would deploy the most future proof technology. There is also a risk that this approach would likely under-estimate the efficient forward-looking TSLRIC of providing the UCLL service, as it does not take into account the additional costs of operating multiple fixed line technologies.

B87 As we have stated above, our view is that the hypothetical efficient operator would likely choose to deploy the most future proof technology available. In this regard, we note that WIK has agreed with this point throughout the process, for example:[905]

> The technology of choice for the MEA should be the technology a new entrant into the market would deploy today. We are convinced that no investor would deploy a new network based on twisted pairs. In addition, new technologies will increase welfare for end-users. If the MEA is restricted to today's services, such an approach would constrain investments creating new services which increase welfare. Not only the prices of services of today are in the interests of end-users and RSPs, but they are also interested in being served by a future proof technology allowing bandwidth growth on demand, so that an approach solely focussed on cost efficiency does not fit the MEA concept.

B88 We consider the ESA level approach inconsistent with our TSLRIC objective of incentivising efficient investment, as it may disincentivise investment in new and improved technologies and services.

B89 We also note that by taking an ESA level approach to selecting the MEA would lead to the counterintuitive result of copper being selected as the MEA in many of the more built-up urban ESAs.

B90 Having modelled both a P2P-FTH/FWA and FTTN network, we note that the P2P-FTTH/FWA MEA network costs less than the FTTN network at the national level. As a result it was not necessary for us to consider if we should make a cost adjustment to the P2P-FTTH/FWA network.

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[905] WIK-consult "Cross submission In response to the Commerce Commission's "Consultation paper outlining our proposed view on regulatory framework and modelling approach for UBA and UCLL services "" 20 August 2014, paragraph [10]. See also WIK-Consult "Submission in response to the Commerce Commission's Draft pricing review determination for Chorus' unbundled bitstream access and unbundled copper local loop services including the cost model and its reference documents" CONFIDENTIAL, 20 February 2015, paragraph [111].

# Attachment C: Network optimisation

## Purpose

C1 This Attachment sets out our final decisions on the:

C1.1 optimisation of nodes;

C1.2 optimisation of exchange buildings; and

C1.3 optimisation of cable paths.

C2 At a high level, optimisation within TSLRIC modelling is concerned with two aspects:

C2.1 how much of the existing network should be reflected in the modelling (all, none, or somewhere in between); and

C2.2 what will be the basis for deriving the costs – built-up from granular cost components (bottom-up), or adopting something closer to the network provider's aggregated accounts (top-down).

## Our final decisions

*Overall approach*

C3 Consistent with our use of the hypothetical efficient operator concept to model the TSLRIC costs, we have taken a scorched earth approach as our starting point.[906] However, for the reasons set out below, we consider that a modified scorched node approach is appropriate and provides a reasonable approximation of the forward-looking efficient costs that would be incurred in supplying the UCLL service.

*Optimisation of nodes*

C4 We have adopted a modified scorched node approach to optimisation, which retains the existing number and location of nodes (ie, exchanges)[907] in Chorus' copper network. All other aspects of the access network have been scorched and optimised - notably the cable routes linking end-users and exchange locations. We consider that this provides an appropriate and reasonable estimate of a scorched earth approach.

C5 We have redefined the exchange coverage areas by computing them using a Voronoï algorithm instead of using the existing exchange coverage areas in Chorus' copper network.

C6 Our optimisation of cable routes has required us to implement minor modifications to take into account the location of notional nodes and network connectivity.

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906 That is, the hypothetical efficient operator builds its new network from scratch without being constrained by Chorus' legacy decisions.

907 Cabinets are retained for modelling UCLL based on copper technology. However, they are scorched for modelling based on fibre or FWA technologies.

*Optimisation of exchange buildings*

C7 We have optimised the size of Chorus' exchange buildings based on a bottom-up calculation of the space required to house equipment.

C8 Where available, we have used data provided by Chorus to inform the bottom-up calculation to model the most efficient deployment.

*Optimisation of cable routes*

C9 For practicality, and where applicable, we have constrained the modelled network to the road network. Cable routes follow the New Zealand road network, which we have determined includes motorways, private roads, and access ways.

**Optimisation of nodes**

C10 Our final decision is to use a modified scorched node approach to optimisation, which retains the existing number and location of nodes (ie, exchanges)[908] in Chorus' copper network.

C11 All other aspects of the access network have been scorched and optimised - notably the cable routes linking end-users and DSLAM locations. We consider that this provides an appropriate and reasonable estimate of a scorched earth approach.

*Submissions*

C12 In December 2013 we set out the following possible approaches to optimising the modelled network.[909]

C12.1 No optimisation (which occurs in a top-down or bottom-up approach). Under this option, the number, location, topology and function of exchanges and cabinets in the current network are retained in the analysis. Additionally, the existing network infrastructure (for instance ducts and poles) is also retained and the network is not optimised to reflect projected demand.

C12.2 Complete optimisation ("scorched earth"). Under this option, the network is fully optimised. This scorched earth approach allows complete redesign of the network, without considering any past investment and existing node locations/numbers. However, this approach may not reflect a number of real-world issues such as the sunk costs and the irreversible nature of some of the investments that the regulated operator has made (for example, the number and the location of local exchanges).

C12.3 Scorched node optimisation. This approach lies midway between the previous two options. Under this option, the number, locations and functions of major network nodes (eg, exchanges) are left as they are. The

908 Cabinets are retained for modelling UCLL based on copper technology. However, they are scorched for modelling based on fibre or FWA technologies.

909 Commerce Commission "Process and issues paper for determining a TSLRIC price for Chorus' unbundled copper local loop service in accordance with the Final Pricing Principle" 6 December 2013, paragraph [93].

access network is then optimised with respect to the number, location and function of the minor nodes (eg, cabinets) and the efficient routing and dimensioning of the local access network between these points and end-users' premises. There is therefore some degree of trade-off between efficiency and real-world/historic investment considerations.

C12.4 Modified scorched node optimisation. This option is a variant of the scorched node approach that provides a degree of flexibility on the level of network scorching that occurs.

C13 We noted that a modified scorched node approach is widely used internationally by regulators. The approach has significant practical advantages as it corresponds to a more realistic efficiency standard and acknowledges (to a degree) real-world investment decisions made by the network operator, while allowing for optimisation where efficiencies can be identified. It also allows for a greater degree of flexibility in approach.[910]

C14 In response to our December 2013 paper, Wigley and Company submitted that the Act requires us to model the MEA using a scorched earth approach, as any other approach would not reflect forward-looking costs.[911]

C15 In reaching our draft decision to adopt a modified scorched node approach, we stated in our December 2014 UCLL draft determination that we disagreed with Wigley and Company, and considered scorched node and modified scorched node to be consistent with the "forward-looking" requirement.[912]

C16 Our view was that while a scorched earth approach was consistent with a forward-looking approach, we preferred the modified scorched node approach as better suited to meet our TSLRIC objectives.[913]

C16.1 A scorched earth approach may set an unrealistic standard for incremental build-outs for which a modified scorched node approach was better suited. Given a national roll-out is less likely than an incremental build, we considered that a modified scorched node approach was likely to better promote efficient investment; and

C16.2 Regulators in other countries have also typically adopted a scorched node or modified scorched node approach.[914] In our view, a modified scorched node

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910 Commerce Commission "Process and issues paper for determining a TSLRIC price for Chorus' unbundled copper local loop service in accordance with the Final Pricing Principle" 6 December 2013, paragraph [95].

911 Wigley and Company "UBA AND UCLL FPP Price Review Determinations – Memorandum for Cross submissions on behalf of Orcon" 30 April 2014, paragraphs [2.1]-[2.26].

912 Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop hypothetical efficient operator service" 2 December 2014, paragraph [577].

913 Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop hypothetical efficient operator service" 2 December 2014, paragraph [578].

914 Commerce Commission "Process and issues paper for determining a TSLRIC price for Chorus' unbundled copper local loop service in accordance with the Final Pricing Principle" 6 December 2013, paragraph [94].

approach therefore better aligned with our then TSLRIC objective of predictability, including the fact that it is an orthodox approach.

C17 As we explain in Chapter 2, we have moderated the weight which we place on predictability. However, we still regard regulatory predictability as one of a number of factors that we should take into account in reaching a determination that best promotes the section 18 purpose.

C18 We explain below why our final decision is to apply a modified scorched node approach when modelling a hypothetical network.

C19 Chorus supported the use of the modified scorched node approach as being consistent with orthodox TSLRIC. Chorus considered the implementation of this approach is generally robust, subject to several technical aspects, which have been addressed by TERA and in our July 2015 further draft determination paper[915, 916, 917, 918, 919]

C20 Analysys Mason for Chorus considered that the scorched node assumption is appropriate, as it is very commonly used in regulatory cost models.[920, 921]

C21 Spark agreed that a modified scorched node approach is a common approach taken by other regulators – an approach which balances real-world costs with the forward-looking choices an hypothetical efficient operator would make.[922, 923]

C22 While Spark supported the use of the modified scorched node approach, it considered that within this modelling construct, more should be done to optimise exchange service area boundaries and the shortest path algorithm.[924, 925]

915 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and Process and Issues Update Paper for the UCLL and UBA Pricing Review Determinations" CONFIDENTIAL, 20 February 2015, paragraph [91].

916 Analysys Mason "Report for Chorus - UCLL and UBA FPP draft determination submission – CONFIDENTIAL" 20 February 2015, p. 26.

917 Chorus “Submission in response to the Commerce Commission’s Draft Pricing Review Determinations for Chorus’ UBA and UCLL services (2 July 2015)” 13 August 2015, paragraphs [50-53].

918 TERA Consultants "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services: Analysis of the responses to the second consultation following the further draft determination" December 2015, p. 67.

919 Commerce Commission “Further draft pricing review determination for Chorus’ unbundled copper local loop service” 2 July 2015, paragraphs [1087 -1088].

920 Analysys Mason "Report for Chorus - UCLL and UBA FPP draft determination cross submission - PUBLIC" 20 March 2015, section [2.4.1].

921 Analysys Mason “Report for Chorus – UCLL and UBA FPP draft determination cross-submission – PUBLIC” 22 September 2015, section [4.2].

922 Spark "Submission on UBA and UCLL FPP pricing review determination" CONFIDENTIAL, 20 February 2015, paragraph [59].

923 Spark “Further draft pricing review determination for Chorus’ UBA and UCLL services” 13 August 2015, paragraph [197].

924 Spark "Submission on UBA and UCLL FPP pricing review determination" CONFIDENTIAL, 20 February 2015, paragraph [59a-b].

C23 WIK, while acknowledging that state-of-the-art modelling methodologies allow for adopting the major nodes of an existing network, also argued that our draft decisions failed to optimise the exchange service area boundaries, and that our use of the shortest path algorithm should be replaced by an augmented shortest path algorithm, which minimises trench cost rather than simple cable length.[926, 927, 928]

C24 Vodafone submitted that a proper application of a scorched node (or modified scorched node) approach would permit some optimisation of exchanges, such as changing the MDF/ODF boundaries, modifying the number of MDFs/ODFs and modifying the number and location of street cabinets in the copper-based network.[929, 930]

C25 In earlier submissions, Wigley and Company submitted that, given the constraints of a scorched node approach, the TERA model route length algorithm appeared appropriate and provided appropriate optimisation. However, later in the process, our approach to optimisation was highlighted as an example of where historic costs had been incorrectly used in a forward-looking exercise.[931, 932]

C26 We have also received a large number of submissions addressing very specific and technical details relating to the implementation of our optimisation approach. TERA's responses to these points are set out in TERA's review of submissions.[933] We have reviewed and agree with TERA's responses to these submissions. We have therefore not included any separate responses in this Attachment.

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925 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" 13 August 2015, paragraphs [194-197].

926 WIK-Consult "Submission in response to the Commerce Commission's Draft pricing review determination for Chorus' unbundled bitstream access and unbundled copper local loop services including the cost model and its reference documents" CONFIDENTIAL, 20 February 2015, paragraphs [113-116].

927 WIK "In response to the Commerce Commission's 'Further draft pricing review determination for Chorus' unbundled bitstream access service' and 'Further draft pricing review determination for Chorus' unbundled copper local loop service' including the revised cost model and its reference documents" 12 August 2015, paragraphs [197-199].

928 WIK "Cross-submission - In response to the Commerce Commission's 'Further draft pricing review determination for Chorus' unbundled bitstream access service' and 'Further draft pricing review determination for Chorus' unbundled copper local loop service' including the revised cost model and its reference documents" 22 September 2015, paragraphs [104-105].

929 Vodafone "Submission on process paper and draft pricing review determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and comments on Analysys Mason's TSLRIC models" 20 February 2015, paragraph [D5.2].

930 Vodafone "Submission to the New Zealand Commerce Commission on Further draft pricing review determination for Chorus' unbundled copper local loop service and Further draft pricing review determination for Chorus' unbundled bitstream access service" 13 August 2015, paragraph [G1.1].

931 Wigley and Company "Submission on draft pricing review determination for UBA and UCLL services" 20 February 2015, paragraph [3.1].

932 Wigley and Company "Cross-submission in relation to UCLL and UBA draft pricing review determinations" 24 September 2015, paragraphs [6.10-6.11].

933 TERA Consultants "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services: - Analysis of the industry comments following the July 2015 draft determinations" December 2015.

*Analysis*

C27 As defined in Chapter 2, our hypothetical efficient operator operates in a world where Chorus' network does not exist. Our hypothetical efficient operator is therefore not constrained by the legacy decisions of Chorus.

C28 However, as also explained in Chapter 2, real-world information, and indeed that reflecting the legacy decisions of Chorus, may be used to inform our assessment of the constraints a hypothetical efficient operator would be likely to face and the decisions it would be likely to make.

C29 We accept that modelling a hypothetical network built from scratch based on a MEA theoretically leads to a scorched earth approach being our starting point for network optimisation. However, for the reasons which follow we consider that a modified scorched node approach is appropriate.

C30 First, we consider that a modified scorched node approach produces a reasonable approximation of the cost that would be generated by a scorched earth approach.

C31 Optimising on a scorched earth basis (by eliminating or moving exchanges) simply amounts to shifting cost between the access network and the core network. This may not materially reduce the total costs of the network as each end-user will still have to be connected back to the node and from the node further back in the network.[934]

C32 The conceptual reason for this is as follows.

C32.1 Optical fibre can operate over longer distances than copper. A scorched earth optimisation, utilising this greater reach, would likely have fewer exchanges than a modified scorched node approach.

C32.2 However, as the number of exchanges decreases, the amount of trenching between end-users and the exchange increases. There is a cost trade-off taking place that may not materially change the overall cost.

C33 We consider that optimising the number and location of exchanges (as a scorched earth approach may dictate) would be unlikely to have a significant effect on the total network cost.

C34 We do not consider such cost shifting to be an "efficiency" or an "optimisation" that is important to our modelling or to the pricing of copper services as the whole link must be present for the service to be provided.

C35 Changing the number of "handover points" would risk distorting relativities as it would shift how much of the link from the end-user to the access seeker is included in UCLL and how much is included in other services.

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934 James Allan from Analysys Mason made a similar argument at the conference: Commerce Commission, "UBA and UCLL pricing review determination conference transcript", 15-17 April 2015, p. 84.

C36 Overall, we do not consider there to be a sound section 18 basis for this and consider that it would rather be an unwarranted consequence of the hypothetical efficient operator thought experiment.

C37 We have made a judgement call as to how much of the link between the access seeker and the end-user is included in UCLL and we consider that this is best achieved by retaining the exchange locations.

C38 Secondly, we have also taken into account a number of other factors which support the case for keeping the exchange locations fixed.

C38.1 Deploying a network based on scorched earth involves a great deal of technical uncertainty which leads to larger risk of regulatory error.

C38.2 Optimisation based on (modified) scorched node is a commonly accepted modelling interpretation of TSLRIC, and we are not aware of any jurisdictions where a scorched earth approach to optimisation has been used for fixed access network costing.[935]

C39 For the reasons given above, we consider our modified scorched node approach to represent a limited (but necessary) compromise to the scorched earth concept.

C40 We considered all submissions made in response to our December 2014 UCLL draft decision to adopt a modified scorched node approach. Most of these submissions were a critique of our implementation, rather than our decision to adopt a modified scorched node approach.

C41 We agreed that a number of implementation improvements may have been possible, and undertook to discuss and test these with TERA.

C42 We looked at the exchange service area boundaries and the shortest path algorithm.

C43 As a result, we now calculate the exchange coverage areas by using a Voronoï algorithm instead of using Chorus coverage areas.[936] We also now calculate optimised paths by minimising the length of the trench network, instead of the length of each line.

C44 By using the Voronoï algorithm, the total network area is divided into smaller coverage areas (based on the shortest distance to the location of the exchanges). The result is that for each exchange there is a corresponding coverage area consisting of all address points closer to that exchange than to any other exchange.

935 We note WIK "In response to the Commerce Commission's "Further draft pricing review determination for Chorus' unbundled bitstream access service" and "Further draft pricing review determination for Chorus' unbundled copper local loop service" including the revised cost model and its reference documents" 12 August 2015, paragraph [303] identified where scorched earth approaches have been taken in relation to setting mobile termination costs.

936 A Voronoï algorithm divides an area into regions based on distance to points in a specific subset of the area. That set of points is specified beforehand, and for each point there is a corresponding region consisting of all locations closer to that point than to any other.

C45 Optimising the exchange coverage areas using the Voronoï algorithm in this way results in a lower total network cost

C46 We also tested the impact of changing the shortest path algorithm in line with the submissions,[937] which suggested using an augmented algorithm.

C47 The aim of the shortest path algorithm used in our December 2014 draft determination paper was to derive the shortest path between each address point and its parent exchange.

C48 The aim of the augmented algorithm is to minimise the length of the trench network. The distance between the building and its parent exchange is potentially longer than with the original shortest path algorithm, leading to more cables, joints and ducts to be installed.

C49 We found that the augmented algorithm does decrease the length of the trench network, and therefore the total trenching cost of the network. However, the algorithm required more cables, joints and ducts to be modelled.

C50 The combined effect of a shorter trench network, but more cables, joints and ducts lead to a higher total network cost than that calculated in our draft decision. On this basis we reject the use of the augmented algorithm, and retain a shortest path algorithm.

**Optimisation of exchange buildings**

C51 Our final decision is to optimise the size of Chorus' exchange buildings based on a bottom-up calculation of the space required to house equipment.

*Submissions*

C52 Our July 2015 further draft UCLL decision adopted a bottom-up approach to model the size of buildings, based on the modelled demand of the services provided, and the modern equipment required to provide those services.[938]

C53 In reaching this draft decision, we highlighted that with equipment becoming smaller in size and some exchange equipment no longer in use, a number of Chorus' buildings would not be fully utilised.[939]

C54 This raised the issue of whether to maintain the size of Chorus sites to reflect the historical deployment or to model optimised sites that reflect what a hypothetical efficient operator would deploy, given the modern equipment available.

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937 WIK-Consult "Submission In response to the Commerce Commission's "Further draft pricing review determination for Chorus' unbundled bitstream access service" and "Further draft pricing review determination for Chorus' unbundled copper local loop service" including the revised cost model and its reference documents" 12 August 2015, paragraph [197].

938 Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 2 July 2015, paragraph [1095].

939 Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 2 July 2015, paragraph [1089].

C55 We considered that adopting a top-down approach based on Chorus' actual costs was likely to over-estimate the cost for a hypothetical efficient operator, as it would include costs which are not relevant given the modern equipment available and the services provided.[940]

C56 We considered that a bottom-up approach was more consistent with how a hypothetical efficient operator would dimension its exchange buildings.

C57 We also used data provided by Chorus regarding relevant modern sites consisting of blueprints of a number of sites and linking their current sites with the relevant modern buildings. Where available, TERA drew on this information to determine what, in its expert opinion, would be the most efficient deployment.[941]

C58 The only significant submission we received was from Spark, who noted that the use of Chorus' data in this context is appropriate, provided it had been tested against engineering best practice.[942]

*Analysis and final decision*

C59 In our July 2015 decision, we incorrectly stated that TERA, in determining the most efficient exchange configuration, was informed by blueprints of Chorus' modern exchange buildings.

C60 TERA has confirmed that it has not used this information, as it is difficult to derive robust inputs from these blueprints.

C61 Our final view is that a bottom-up approach which has been tested against actual dimensioning rules for modern sites provides the best indication of how a hypothetical efficient operator would dimension its exchange buildings.

**Optimisation of cable routes**

C62 Our final decision is to constrain the modelled network to the road network.

C63 Cable routes follow the New Zealand road network, which we have determined includes motorways, private roads, and access ways.

*Submissions*

C64 We stated in our July 2015 UCLL further draft decision that the optimised network follows the road network.

C65 In reaching our draft decision, we determined that the optimised network utilises motorways, private roads and access ways.[943]

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940 Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 2 July 2015, paragraph [1091].

941 Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 2 July 2015, paragraph [1093].

942 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services", 13 August 2015, paragraph [198].

C66 We noted that models overseas often exclude use of motorways, as gaining access is prohibitive. However, in New Zealand network operators have access to motorways under the Telecommunications Act and National Code of Practice for Utility Operators' Access to Transport Corridors.[944]

C67 We stated that a hypothetical efficient operator would pay consent costs and obtain access to deploy cables along motorways and private roads where it was efficient to do so.[945]

C68 To reflect the additional costs associated with the use of motorways and private roads, TERA (when calculating the shortest path from an individual property to an exchange building) applied weightings to minimise their use.

C69 WIK submitted that our weightings for private roads and motorways were arbitrary and resulted in more expensive solutions.[946]

C70 In response, Analysys Mason pointed out that the weights were not used to generate unit costs. They considered the use of weights to be appropriate, given they were only used to bias the route selection away from private roads.[947]

C71 Chorus and Analysys Mason noted that our approach will not take into account all major geographical constraints, such as waterways, mountains and railways.[948, 949]

*Analysis*

C72 As described by Analysys Mason, the network route weighting applied by TERA is basic modelling logic that prioritises cable routes along public roads, rather than motorways and private roads. The weights implemented in the model simply give effect to this logic.

C73 The weights for private roads and motorways are applied, such that if two network points can be connected using public roads in less than a specified factor of the alternative (motorway or private) road distance, then it is used.

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943 Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service " 2 July 2015, paragraph [1041].

944 Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014, paragraphs [589-590].

945 Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014, paragraph [591].

946 WIK "In response to the Commerce Commission's 'Further draft pricing review determination for Chorus' unbundled bitstream access service' and 'Further draft pricing review determination for Chorus' unbundled copper local loop service' including the revised cost model and its reference documents" 12 August 2015, paragraph [200].

947 Analysys Mason "UCLL and UBA FPP draft determination cross-submission – PUBLIC" 22 September 2015, annex [A].

948 Chorus "Submission in response to the Commerce Commission's Draft Pricing Review Determinations for Chorus' UBA and UCLL services (2 July 2015)" 13 August 2015, paragraph [50].

949 Analysys Mason "Report for Chorus: UCLL and UBA FPP further draft determination submission" 11 August 2015 section [2.2].

C74 We found that the use of weights is far more significant than the weighting factors themselves, ie, a weight of 3 or 10 made little difference to the selection of motorway or private roads.

C75 As Table C1 shows, the weightings we applied have reduced the use of private roads, and reduced the overall road distance in the modelled network.

**Table C1: Optimisation of cable routes – weighted and unweighted**

| | Normal Roads (KM) | Private Roads (KM) | Motorways (KM) | Total (KM) |
|---|---|---|---|---|
| Weighted | 92,079 | 1,525 | 9 | 93,614 |
| Unweighted | 92,028 | 2,017 | 9 | 94,054 |

C76 Optimising cable routes is concerned with identifying the shortest network routes – not the lowest cost routes. The cost of routes is calculated by applying the trenching unit costs (refer Attachment J). The unit costs for trenching are optimised independently, and applied to each road segment once the optimised cable routes have been identified. It is the combination of two independent optimisations (route length and trench cost) that produces our lowest cost route estimates.

C77 We are confident that our decision to constrain the optimisation of cable routes to the road network takes into account the major geographical constraints that Chorus identifies.

C78 Refer to TERA's Model Specification Paper for more detail on how these weightings were implemented. [950]

**The Vodafone TSO case**

C79 As explained in Chapter 2, the context and circumstances of the *Vodafone TSO case* are different from those in this FPP process, but we consider that our approach to determining the TSLRIC of the UCLL service is aligned with the principles to be derived from the Supreme Court's judgment in that case.

C80 In relation to optimisation, we consider that we have appropriately optimised our model by taking an approach to the network optimisation that is efficient and appropriate to the current circumstances.

C81 Differently from the *Vodafone TSO case*, we did not chose a model based on the incumbent's existing network with limited optimisation. In particular, our model was only informed by the existing number of nodes and their existing locations. We have optimised the cable routes, building sizes and exchange coverage areas instead of using the existing coverage areas in Chorus' copper network.

[950] TERA Consultants "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services: Model Specification" December 2015, section [3.2.7].

# Attachment D: Network deployment

D1 Having selected the MEA (see Attachment B), we need to consider another layer of detail as to how our network will be rolled out:

D1.1 where (or to which end-users) Fixed Wireless Access (FWA) will be deployed;

D1.2 how we will decide how much of the access network will be on poles rather than buried; and

D1.3 how much of the network can share costs with other infrastructure (eg, electricity distribution networks).

D2 This Attachment sets out in more detail these decisions under the three broad headings FWA, aerial deployment, and infrastructure sharing.

## FWA network deployment

### Purpose

D3 This section sets out our final decisions relating to fixed wireless access (FWA) deployment in the UCLL modelled network. Having determined that FWA is a potential MEA technology (see Attachment B), we need to consider where it should be deployed in the modelled network in order to establish the cost.

D4 FWA operates in the same way as a mobile network. It enables the transmission of (voice and broadband) data between two antennas. The main difference is that the end-user's location is fixed.

D5 FWA connects end-users' homes to a local exchange via a wireless link to a cellular tower, which is in turn connected to the local exchange by fibre backhaul.

D6 Like a mobile network, the coverage and capacity of a FWA site is determined by the:

D6.1 technology (wireless generation, eg, 3G, 4G);

D6.2 spectrum (radio frequency band, eg, 900 MHz, 700 MHz);

D6.3 bandwidth (the size of the frequency band available for use eg, 20 MHz); and

D6.4 sectors (a FWA site is comprised of sectors – typically three).

D7 Local factors, such as number of users, and line-of-sight between the building and FWA antenna, also have a significant effect on the real-world performance of FWA. Accordingly, the maximum theoretical performance of wireless technologies is not achieved in practice.

D8 While FWA cannot compete head-on with fibre in terms of throughput performance, the advantage of FWA is that it requires significantly less cabling and ducts. This cost advantage can be important, particularly in more remote areas.

D9 FWA deployment requires us to determine:

D9.1 coverage and capacity (technology, spectrum, bandwidth, sectors);

D9.2 site location (taking into account any geographic or topographic constraints on the MEA); and

D9.3 end-user performance requirements (informing how many end-users can be served by a FWA site).

D10 Determining the appropriate extent of FWA deployment has been a complex and controversial issue. As summarised in this Attachment, some submitters have been in favour of deploying FWA more extensively in the model, while others have suggested that less FWA should be deployed. Often, the changes that have been advocated involve a high degree of complexity, without a clear analysis of the costs and benefits.

D11 In considering FWA deployment, our goal has been to identify where a hypothetical efficient operator would deploy FWA. We have taken into account unbundleability, line speed performance, different FWA technologies, and different deployment strategies. We have also taken into account real-world information relating to capability, limitations, and cost, and been informed by the recently deployed RBI FWA network in New Zealand.[951]

**Our final decisions**

D12 FWA will be modelled:

D12.1 using LTE technology at 700 MHz;

D12.2 with a site capacity of 66 Mbps (three sectors);

D12.3 to only connect end-users within the TSO-derived boundary (as explained in Attachment K – Capital contributions);

D12.4 in exchange service areas (ESAs) where we have determined that unbundleability is not required;

D12.5 using the Vodafone RBI FWA site coverage and location within non-unbundle-able ESAs;

D12.6 to meet the existing copper line speeds with a cap of 1.9 Mbps and floor of 150 kbps;

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951 As set out in our Framework, many of our decisions involve matters that are, to some extent, objectively measurable. In these cases we believe it is appropriate to use data and evidence, which may include data from Chorus and others, to determine our best estimate of what an objective value is, rather than relying on subjective assertions or speculation. This does not detract from the approach of the hypothetical efficient operator concept; rather, it uses real-world information to inform our assessment of this concept.

D12.7 to connect the longest lines first; and

D12.8 to utilise microwave backhaul where efficient.

D13 FTTH will be modelled to all lines that, due to site capacity constraints, cannot be served by FWA.

D14 We have compared the costs of a range of deployment scenarios for the relevant ESAs being:

D14.1 FWA-only;

D14.2 FWA/FTTH mix; and

D14.3 FTTH-only.

D15 We have adopted the lowest cost scenario, which is an FWA/FTTH mix using the RBI FWA sites across all non-unbundleable ESAs.

D16 While a range of views are possible, we are confident that our end result is a reasonable approximation of the FWA deployment which would be adopted by a hypothetical efficient operator deploying a modern equivalent of Chorus' UCLL network.

**Previous FWA modelling – December 2013**

D17 We first proposed FWA technology as a candidate MEA, at the "edges" of the hypothetical network, in our 2013 process and issues paper.[952]

D18 Both Vodafone and Spark were in favour of the use of FWA as an MEA in low-density areas.[953, 954]

D19 Chorus, however, did not believe that FWA was available as an MEA, since it could not be unbundled at layer 1.[955]

D20 Analysys Mason submitted that, although Sweden had used FWA in their MEA, it had only been used in the ultra-rural geo-type, where the existing service does not include broadband.[956]

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952 Commerce Commission "Process and issues paper for determining a TSLRIC price for Chorus' unbundled copper local loop service in accordance with the Final Pricing Principle" 6 December 2013, paragraph [104.4].

953 Vodafone "Comments on process and issues paper for the unbundled copper local loop (UCLL) final pricing principle" 14 February 2014, paragraph [B3].

954 Telecom "Submission on Process and issues paper for determining a TSLRIC UCLL price" 14 February 2014, paragraph [93].

955 Chorus "Comment on applications for a pricing review determination of the Commission's determination on the pricing for the unbundled copper local loop service (Decision NZCC 37/2012)" 25 February 2014, paragraphs [8–12].

956 Analysys Mason "Report for Chorus - Response to Commission" 12 February 2014, section [1.4.2], citing European Commission, Brussels, 12/05/2011 C(2011) 3431 SG-Greffe (2011) D/7587 Commission decision

**Previous FWA modelling – July 2014**

D21 In our July 2014 consultation paper, we disagreed with Chorus' restrictive interpretation of the MEA for UCLL, and proposed to deploy FWA at Vodafone's RBI sites.[957]

D22 Chorus continued to disagree with the use of FWA, arguing that FWA:

D22.1 could not be unbundled at layer 1;

D22.2 could not be used as the MEA for UCLL; and

D22.3 would result in connections with a high failure rate.[958]

D23 Spark and Vodafone, on the other hand, argued that our proposed deployment was too limited.[959] They suggested a binary approach whereby FWA should be deployed wherever it is more efficient (which, in their view, meant whenever it produced the lowest cost).

D24 Network Strategies submitted that an efficient operator would utilise FWA in areas of low line density, but that this would still produce a footprint considerably wider than the RBI footprint.[960]

**Previous FWA Modelling – December 2014**

D25 In our December 2014 draft determination we proposed that:

D25.1 we would continue to use the RBI footprint as our FWA coverage area;

D25.2 the FWA service would be LTE at 700 MHz;

D25.3 we would cap the number of end-users at 67 per FWA site, allowing us to maintain an average throughput of 250 kbps per end-user, consistent with our treatment of UBA; and

D25.4 we would choose the most expensive end-users within the RBI coverage area to serve with FWA, thus ensuring the most efficient allocation of FWA resources.

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concerning Case SE/2011/1205: Further details of price control remedies – review of the LRIC model Comments pursuant to Article 7(3) of Directive 2002/21/EC.

957 Commerce Commission "Consultation paper outlining our proposed view on regulatory framework and modelling approach for UBA and UCLL services" 9 July 2014, paragraph [164].

958 Chorus "Submission in response to the Commerce Commission's consultation paper outlining its proposed view on the regulatory framework and modelling approach for UBA and UCLL services (9 July 2014)" 6 August 2014, paragraphs [317–335].

959 Telecom "UCLL and UBA FPP: consultation on regulatory framework and modelling approach" 6 August 2014, paragraph [127], and Vodafone New Zealand "Comments on consultation paper outlining Commission's proposed view on regulatory framework and modelling approach for UBA and UCLL services" 6 August 2014, paragraphs [G2.1–G2.6 and following recommendations].

960 Network Strategies "Final report for Telecom New Zealand and Vodafone New Zealand - Key issues in modelling UBA and UCLL services - Commission consultation on regulatory framework and modelling approaches for FPP process" 6 August 2014, p. 4.

D26 In response, Spark and Vodafone submitted that our approach was too conservative, and was not efficient.[961] They maintained their view that FWA should be deployed wherever it is cheaper.

D27 WIK accepted that our approach to determining the number of customers served by FWA was appropriate. However, it raised several concerns with the way we were modelling sector capacity, submitting:[962]

D27.1 LTE-advanced is the most advanced technology, but LTE is modelled;

D27.2 LTE-advanced offers sector capacity of 150 Mbps;

D27.3 modelling FWA based on 150 Mbps per sector (rather than 16.67 Mbps) results in a cost reduction of 11% for UCLL;

D27.4 if LTE is modelled, the sector dimensioning should be at least 35 Mbps; and

D27.5 state-of-the-art mobile deployments use more than three sectors, which would increase capacity.

D28 Network Strategies made the following points regarding our FWA model.[963]

D28.1 Our coverage was too restricted. FWA would be efficient over a wider area than the RBI coverage provided.

D28.2 We had been too conservative with our assumptions regarding the throughput available from an FWA site (and therefore the number of customers that could be served). Network Strategies' analysis showed that LTE sites (with two or three sectors) are capable of connecting around 260 customers while the theoretical maximum is over 300.

D28.3 Our assumptions regarding the coverage that could be achieved with LTE at 700 MHz were conservative, since we used Vodafone's existing RBI coverage.

D28.4 Our approach of only serving the most expensive end-users in the RBI coverage area was unrealistic from a network planning perspective, and could lead to counterintuitive results.

D28.5 We had not considered the use of microwave backhaul in our model.

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961 Spark "Submission on UBA and UCLL FPP pricing review determination" CONFIDENTIAL, 20 February 2015, paragraphs [9] and [40] in particular; and Vodafone "Submission on process paper and draft pricing review determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and comments on Analysys Mason's TSLRIC models" 20 February 2015, paragraph [1.8].

962 WIK-Consult "Submission in response to the Commerce Commission's Draft pricing review determination for Chorus' unbundled bitstream access and unbundled copper local loop services including the cost model and its reference documents" CONFIDENTIAL, 20 February 2015, paragraphs [191–193].

963 Network Strategies "Final report for Spark New Zealand and Vodafone New Zealand - Modelling Fixed Wireless Access" CONFIDENTIAL, 20 February 2015, section 2.

D28.6 We had over-stated spectrum fees.

D29 As a further response to our FWA modelling, Network Strategies presented a report on its own FWA model in which is modelled the cost of FWA to serve the parts of zones 3 and 4 where the ESAs have not yet been unbundled.[964]

D30 There were a number of key components and assumptions underpinning the Network Strategies model including the following.

D30.1 The cost was calculated by identifying suitably mixed areas, engineering the FWA service in detail for each specific area, then calculating the cost per customer in each sample area.

D30.2 The modelling assumed site-sharing with Vodafone's existing sites plus some additional sites.

D30.3 The model assumed sharing at some sites, where land rental was shared;

D30.4 The model also assumed that the hypothetical efficient operator would also provide mobile services from new and co-located sites. The hypothetical efficient operator's mobile business thus also shared the site costs.

D30.5 It used our modelling assumptions in a number of areas, including maintaining a minimum throughput of 250 kbps.

D30.6 The costs derived from the engineered sample areas were then applied to end-users in zones 3 and 4 in ESAs that had not yet been unbundled.

**FWA Modelling Further Draft Decision – July 2015**

D31 We considered submissions received on our December 2014 draft determination. The main changes we made in light of these submissions were as follows.

D32 We agreed with Chorus that we should allow for growth in demand of UBA throughput per end-user, a change from our previous position of allowing for 250 kbps per user with no growth.[965,966]

D33 We increased the peak throughput assumptions from 16,666 kbps to 22,000 kbps per sector. This change was implemented based on Network Strategies' submission that showed a site (with three sectors) could provide 250 kbps to 260 end-users.[967]

964 Ibid, sections 3 and 4.

965 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and Process and Issues Update Paper for the UCLL and UBA Pricing Review Determinations" Public version, 20 February 2015, paragraph [509].

966 Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 2 July 2015, paragraph [1122].

967 260 end users per site equates to 87 end users per sector. 250 kbps x 87 users = 21,750 kbps, which we rounded up to 22,000 kbps.

D33.1 We acknowledged WIK's submissions regarding FWA sector capacity. However, as LTE-advanced is not currently deployed in New Zealand, we did not consider this technology for the MEA.[968]

D33.2 Network Strategies FWA modelling experience with Vodafone was more compelling than WIK's (unsupported) submission to set sector capacity at "around" 35,000 kbps.

D34 We used the current RBI coverage areas to derive the costs of deploying FWA, and then applied those costs to certain categories of end-users scattered across the UCLL footprint.

D35 We identified three categories of end-users:

D35.1 voice-only (fed by more than 6 km of copper);

D35.2 low speed (capable of less than 1 Mbps, over 5300 m but less than 6 km of copper); and

D35.3 full speed 1.9 Mbps (the remaining end-users).

D36 We used RBI coverage areas to derive FWA costs for "voice-only" and "low speed end-users". To calculate the costs per end-user we have allocated:

D36.1 150 kbps of throughput to each voice-only end-user (assuming no growth in throughput, this being voice-only); and

D36.2 1 Mbps to low-speed customers (starting at 150 kbps and growing at the normal rate of 50% per annum for 5 years).

D37 We applied these costs across the network to all customers in each category.

D38 We acknowledged that our proposed approach did not reflect physically modelling the position of the FWA sites.

*Submissions*

D39 All parties were critical of our FWA modelling choices, with the exception of Chorus, who (in the alternative to the argument that FWA could not be used at all because it was not unbundleable) supported the extent of our FWA deployment.[969]

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968 Attachment B sets out our view that a MEA technology must be proven and widely available.

969 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services (2 July 2015) - Public version" 13 August 2015, paragraph [131].

D40 Vodafone was the lead dissenting voice. Vodafone's submission set out what it saw as numerous and significant shortcomings with our FWA deployment. Its key concerns were:

D40.1 FWA has been modelled by ESA, and FWA should not be deployed in this way. Network Strategies also raised concerns with this issue; [970, 971]

D40.2 real-world current copper connections are irrelevant when considering the hypothetical efficient operator's deployment – the hypothetical efficient operator would consider expected demand profiles and in choosing technologies make an economic optimisation assessment across the supply costs of fibre or FWA;[972]

D40.3 FWA customers are arbitrarily identified based on the existing capacity restrictions of current copper connections, which is not a valid way of assessing the extent of coverage that an efficiency-maximising hypothetical efficient operator would achieve using FWA;[973]

D40.4 the application of a distance criterion is not relevant to the technologies being considered. Network Strategies also raised concerns with this issue;[974, 975]

D40.5 microwave backhaul has not been modelled, despite being used in rural areas of New Zealand, and would produce in lower modelled costs. Network Strategies also raised concerns with lack of microwave backhaul;[976, 977] and

970 Vodafone "Submission to the New Zealand Commerce Commission on further draft pricing review determination for Chorus' unbundled copper local loop service and further draft pricing review determination for Chorus' unbundled bitstream access service" CONFIDENTIAL, 13 August 2015, paragraph [D5.4].

971 Network Strategies "Final report for Spark New Zealand and Vodafone New Zealand - Revised draft determination for the UCLL and UBA price review" 13 August 2015, p. 9.

972 Vodafone "Cross submission to the New Zealand Commerce Commission on further draft pricing review determination for Chorus' unbundled copper local loop service and further draft pricing review determination for Chorus' unbundled bitstream access service" CONFIDENTIAL, 24 September 2015, paragraph [C3.3].

973 Vodafone "Submission to the New Zealand Commerce Commission on further draft pricing review determination for Chorus' unbundled copper local loop service and further draft pricing review determination for Chorus' unbundled bitstream access service" CONFIDENTIAL, 13 August 2015, paragraph [D2.6].

974 Vodafone "Submission to the New Zealand Commerce Commission on further draft pricing review determination for Chorus' unbundled copper local loop service and further draft pricing review determination for Chorus' unbundled bitstream access service" CONFIDENTIAL, 13 August 2015, paragraph [D4.6].

975 Network Strategies "Final report for Spark New Zealand and Vodafone New Zealand - Revised draft determination for the UCLL and UBA price review" 13 August 2015, pp. 3-4.

976 Vodafone "Submission to the New Zealand Commerce Commission on further draft pricing review determination for Chorus' unbundled copper local loop service and further draft pricing review determination for Chorus' unbundled bitstream access service" CONFIDENTIAL, 13 August 2015, paragraph [D6].

D40.6 despite having Network Strategies' FWA model, we stated that no workable alternative solutions for FWA had been presented to us.[978]

D41 Network Strategies acknowledged the increase in sector throughput (from 16,666 kbps to 22,000 kbps) was a realistic level to model for a LTE deployment.[979]

D42 Network Strategies reiterated earlier submissions, pointing out our model is based on LTE technology in 700 MHz, which can provide greater coverage than current RBI (based on 900 MHz), and hence will require fewer base stations than those planned for RBI.[980]

D43 Conversely, Analysys Mason noted that our assumption to model FWA address points based on perfect utilisation, regardless of their dispersion across New Zealand, significantly under-estimated the number of base stations required.[981]

D44 Analysys Mason also submitted that the unit costs of FWA would be 6.1 times higher in Network Strategies' FWA model, were the per user throughput increased from 250 kbps to reflect our proposed service throughput categories (voice-only, low speed, etc).[982]

D45 Spark submitted that we had not modelled the capability of FWA as a starting point, which is what a hypothetical efficient operator would do. Consequently, the approach we have taken is fundamentally inefficient, and therefore inconsistent with our obligation to identify an efficient cost-based price.[983]

D46 Russell McVeagh added that section 18 requires us to include FWA to the extent it would be used by an efficient operator acting rationally.[984]

D47 WIK strongly recommended returning to a deployment approach of replacing the most expensive lines, rather than imposing a 5.3 km distance limit, which it saw as conceptually wrong.[985]

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977 Network Strategies "Final report for Spark New Zealand and Vodafone New Zealand - Revised draft determination for the UCLL and UBA price review" 13 August 2015, pp. 10, 24.

978 Vodafone "Submission to the New Zealand Commerce Commission on further draft pricing review determination for Chorus' unbundled copper local loop service and further draft pricing review determination for Chorus' unbundled bitstream access service" CONFIDENTIAL, 13 August 2015, paragraph [D3].

979 Network Strategies "Final report for Spark New Zealand and Vodafone New Zealand - Revised draft determination for the UCLL and UBA price review" 13 August 2015, sections [2.2, 2.3.1].

980 Network Strategies "Final report for Spark New Zealand and Vodafone New Zealand - Revised draft determination for the UCLL and UBA price review" 13 August 2015, section [2.3.1].

981 Analysys Mason "UCLL and UBA FPP draft determination submission - PUBLIC" 13 August 2015, section [7.3].

982 Analysys Mason "UCLL and UBA FPP draft determination cross-submission - PUBLIC" 22 September 2015, section [6.2].

983 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services - Public version" 13 August 2015, paragraph [152].

984 Russell McVeagh "Chorus submission on further draft UCLL and UBA pricing reviews" 24 September 2015, paragraph [48].

D48 WIK, in highlighting our modelled peak throughput, submitted that it could not identify any reason why we had not made use of LTE-advanced systems and their higher throughput capacity.[986]

**FWA modelling constraints**

*Unbundleability*

D49 Unbundleability describes the attribute of a technology, enabling exclusive third party access to the physical network that links an end-user to an exchange. Technologies with this attribute provide a dedicated point-to-point connection. Unlike point-to-point technologies, such as copper and fibre, FWA operates across shared infrastructure. FWA is not able to be unbundled.

D50 As set out in Attachment B, the MEA network, in our view, should be capable of being unbundled where unbundling has already occurred, and at exchanges with similar scale (number of lines) to those that have been unbundled. As a result, we have included a modelling constraint which excludes FWA from being considered in respect of ESAs which have been unbundled and/or have 1,500 or more lines.

*TSO-derived boundary*

D51 We have assumed that the hypothetical efficient operator is required to serve lines within the TSO-derived boundary. As set out in Attachment K – Capital contributions, we assume that capital costs outside this boundary are met by the end-user.[987] That is, the capital costs of lines outside of the TSO-derived boundary are not relevant to our model.

D52 Reflecting this, the total capacity of our modelled FWA sites serve only end-users within the TSO-derived boundary. We acknowledge that the coverage of these sites “spills”’ into geographic areas outside the TSO-derived boundary, but confirm they are excluded from our FWA modelling

*Line speed equivalence*

D53 The technical characteristics of wireless technologies mean resources are shared amongst those connected to a FWA site. Unlike fibre, which as a transmission medium is only limited by the higher service-layer electronics attached at each end, we need to explicitly set the performance (level of throughput) to be received by the address points served by FWA.

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985 WIK-Consult "Cross-Submission in response to the Commerce Commission's Further draft pricing review determination for Chorus' unbundled bitstream access and Further draft pricing review determination for Chorus' unbundled copper local loop service including the revised cost model and its reference documents" CONFIDENTIAL, 22 September 2015, paragraph [8].

986 WIK-Consult "Submission In response to the Commerce Commission’s “Further draft pricing review determination for Chorus’ unbundled bitstream access service” and “Further draft pricing review determination for Chorus’ unbundled copper local loop service” including the revised cost model and its reference documents" 12 August 2015, paragraph [308].

987 Refer to Attachment K for detail on the treatment of sub-divisions.

D54 We consider that our MEA should deliver at least the same performance end-users receive on their existing copper connections (ie, is equivalent to the line speed during peak conditions).

D55 We are therefore taking copper line speeds as a proxy for the level of throughput required for each end-user.

D56 As explained in Attachment B – Selecting the modern equivalent asset for the UCLL service, we consider that a network which failed to meet these performance requirements would not be a true modern equivalent.

D57 Our reference to existing copper performance was a concept that we introduced in our December Draft, where we stated:[988]

> …the end-users connected to a fixed wireless tower are guaranteed bandwidth such that they will receive performance sufficiently comparable to existing copper services.

D58 We expanded on this concept in July, proposing three categories of users and allocating FWA resources to provide distinct levels of performance.[989]

D59 We acknowledge that our July approach, notably our voice and low-speed metrics, was heavily criticised by Vodafone and Network Strategies. We do, however, see this concept as important to our understanding of the requirements of the MEA, and have therefore developed this concept further to better reflect the range of performance across all address points. In other words, all lines are eligible for FWA irrespective of line speed.

D60 As set out in Attachment B, we have determined that UCLL MEA network should be capable of supporting our forecast throughput of 1.9 Mbps. However, we recognise that on some longer lines, this level of performance cannot be provided.

D61 To solve for this issue, we have determined the following for FWA throughput:

D61.1 Any copper line capable of supporting >1.9 Mbps is allocated 1.9 Mbps.

D61.2 Any copper line not capable of supporting 1.9 Mbps is allocated throughput based on its existing line speed (with a floor of 150 kbps).

D62 We are modelling line speeds by taking the optimised line lengths (shortest path algorithm) from either the local exchange or active cabinet. However, we are ignoring the performance improvements provided by RBI cabinets, as this line speed has been achieved as a result of government funding. Line lengths for address points served by a RBI cabinet are measured from the local exchange.

988 Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014, paragraph [601].

989 Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 2 July 2015, paragraph [1131].

D63 We have assigned line speeds to each address point based on ADSL2+ technical capabilities, as set out in the Interference Management Plan. ADSL2+ is the most common DSL technology in use in New Zealand, and is the technology on which our UBA modelled network is based.[990,991]

D64 We have derived line speed benchmarks from the Interference Management Plan, as they were developed and agreed by operators to reflect copper characteristics (spectral compatibility) in New Zealand.

D65 We asked TERA to use these line speed benchmarks to calculate the level of FWA throughput each end user requires in order to meet our equivalence modelling constraint. We have discussed and agreed with TERA's approach. Please refer to TERA's Model Documentation for more information on TERA's modelling of FWA throughput.[992]

*RBI sites*

D66 As noted above, we have used existing RBI sites as our starting point for modelling FWA. That is, our approach has been informed by real-world information from a recently deployed FWA network. We acknowledge that this was not the only option, as Network Strategies' geo-typing approach has demonstrated.[993]

D67 We acknowledge that our further draft over-stated the difficulty of alternative modelling approaches, such as the one presented by Network Strategies. However, at that time we had not reached a clear view on where unbundling was required, which contributed in part to those earlier statements.[994]

D68 Having now determined a clear geographic-based unbundling requirement, we consider that the RBI sites outside those geographic areas are a good proxy for where a hypothetical efficient operator would deploy FWA sites. As discussed below, we have also considered the costs of deploying FWA to ESAs without RBI FWA coverage using extrapolation methodologies.

D69 Our decision to adopt the existing RBI coverage (based on 3G propagation), and not the superior 700 MHz (4G) coverage, was criticised by parties. However, as discussed above, the use of RBI sites did not overly constrain geographic coverage (ie, their location was not problematic for our modelling). We found that the real-world capacity of LTE was the key driver of how many address points we could serve with FWA.

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990 Commerce Commission "New Zealand Copper Local Loop Preliminary Interference Management Plan – Part 2 – Spectral Compatability Determination Process" November 2007, table [4.2].

991 Refer Commerce Commission "Final draft pricing review determination for Chorus' unbundled bitstream access service" 15 December 2015, Section B – Selecting the MEA for the UBA service paragraph [44].

992 TERA Consultants "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services: - Model Documentation" December 2015, section [5.2.3.3].

993 Network Strategies "Final report for Spark New Zealand and Vodafone New Zealand - Modelling Fixed Wireless Access" CONFIDENTIAL, 20 February 2015, sections [3-4].

994 Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 2 July 2015, paragraphs [1127–1129].

D70 We note, as WIK identified, that LTE-advanced offers significantly more capacity than LTE. However, as set out in Attachment B, a MEA is a widely in use and proven asset. LTE-advanced is not currently in use in New Zealand, we have therefore discounted this technology as a MEA candidate.[995,996]

**FWA deployment**

D71 Having determined deployment aspects, such as technology, spectrum, bandwidth, and geographic restrictions, a number of further modelling decisions are required that affect all FWA scenarios, which we set out below.

*Longest lines first*

D72 In order to reflect equivalent FWA line speed performance, we took account of speeds based on the line length shortening that Chorus-funded cabinets have delivered.

D73 However, as our approach to UCLL network optimisation scorches these cabinets, dimensioning the FWA sites has been based on the address point's distance from the exchange.

D74 This approach creates a slight anomaly, as rather than necessarily connecting the lines with the slowest speeds, it has the effect of including some address points that (in the real world) are cabinetised, and have fast line speeds. However, the alternative was to ignore line speed performance from cabinets altogether, which would be inconsistent with our goal of modelling a sufficiently equivalent network.

D75 This line speed modelling anomaly does not in any way undermine our assumption that the address points that are furthest from the exchange (ie, the longest lines) are the most expensive to serve with fibre.

D76 We understand that connecting the longest lines first is not typical of real-world wireless deployments, where address points closest to the site are connected first. However, this approach enabled us to connect more address points with FWA. It is also consistent with our decision to model a hypothetical efficient operator deploying a new network from scratch.

D77 Finally, we implemented a practical modelling rule to guard against our model producing unusual network topographies from the line length data. Accordingly, FWA sites are provisioned by road segment, rather than individual address points. This means that the whole road segment is served by FWA, or not at all. [997]

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995 WIK-Consult "Submission In response to the Commerce Commission's "Further draft pricing review determination for Chorus' unbundled bitstream access service" and "Further draft pricing review determination for Chorus' unbundled copper local loop service" including the revised cost model and its reference documents" 12 August 2015, paragraph [308].

996 Refer Attachment B, paragraph [8].

997 For practical modelling purposes, the location of the building relative to RBI coverage is ignored – that is, the building can be outside of the RBI coverage but counted if the road segment has 50% or more of the

D78 The implication of provisioning the FWA sites by road segment means that, unless the throughput of address points along a road segment(s) collectively equals the site capacity (66 Mbps), the site will have spare capacity. We have looked at the results of this road segment approach, and observe that most sites retain some spare capacity. Accordingly, we are confident we are modelling at least an equivalent service.

*Backhaul*

D79 In response to submissions received from Vodafone and Network Strategies, we determined to utilise microwave backhaul where it was cost-effective to do so.

D80 We instructed TERA to include microwave as a backhaul option (alongside fibre) when modelling FWA.

D81 TERA finds that where a mix of FWA and FTTH is deployed, the proximity of fibre to the FWA sites means that it is always more economic to use the fibre over microwave backhaul. In the scenario where only FWA is deployed, TERA finds microwave is more cost effective than fibre for connecting FWA sites further than three kilometres from the exchange. The overall cost effectiveness of each scenario (FWA, FTTH, or a mix) is discussed and analysed subsequently in this Attachment. Please refer to TERA's Model Documentation for more information on TERA's modelling of microwave backhaul.[998]

D82 As identified by Analysys Mason:[999]

> Mobile operators who also own highly capillary fixed access networks are more likely to make substantial use of those fixed access networks and less use of microwave links. For example, past data from AGCOM in Italy shows that the mobile arm of Telecom Italia (who own a highly capillary fixed access network) uses a much larger fraction of fixed wireline backhaul links than the competing Italian mobile operators.

D83 This observation supports TERA's findings on the cost effectiveness of microwave backhaul.

*FTTH*

D84 Consistent with our draft decision, FTTH is modelled to all lines that cannot be served by FWA.[1000] This applies to scenarios 1 and 2.

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length within the RBI coverage. Conversely, the building is not counted even if it falls with the RBI coverage if the road segment has less than 50% of its length within the RBI coverage.

998 TERA Consultants "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services: - Model Documentation" December 2015, section [4.3.3.4.1.1].

999 Analysys Mason "UCLL and UBA FPP draft determination cross-submission - PUBLIC" 22 September 2015, section [6.5].

1000 Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014, paragraph [600.3].

**Least cost deployment of FWA and FTTH**

D85 Our next task was to compare the deployment costs for the relevant ESAs to determine whether the hypothetical efficient operator would serve the non-unbundleable ESAs using FWA-only, FWA/FTTH mix or FTTH-only.

D86 The four scenarios we modelled were:

D86.1 FWA/FTTH mix using all RBI FWA sites across all non-unbundle-able ESAs (scenario 1);

D86.2 FWA/FTTH mix extrapolating results from RBI FWA sites with >50% ESA coverage to the remaining non-unbundle-able ESAs (scenario 2);

D86.3 FWA-only extrapolating results from RBI FWA sites with >50% ESA coverage to the remaining non-unbundle-able ESAs (scenario 3); and

D86.4 FTTH-only across all non-unbundle-able ESAs (scenario 4).

D87 These scenarios make good use of the RBI FWA sites and provide a range of results for analysis. We acknowledge that there are many more iterations that could have been modelled, which we respond to in relation to extrapolation and our subsequent analysis section.

D88 Before summarising the results of this modelling, we comment on the need for extrapolation in scenarios 2 and 3 and set out the approach.

*Extrapolation methodology*

D89 As our key modelling objective is to identify a modern replacement network for the UCLL service, we are necessarily focussed on connecting address points to exchanges. This means our FWA modelling is aligned with the ESA topologies in these non-unbundle-able areas.

D90 RBI FWA sites provide a range of coverage across these non-unbundle-able ESAs (ie, 100%-0% coverage). In order for us to model FWA costs across all non-unbundleable ESAs, it is necessary for us to establish a representative set of ESAs and/or costs.

D91 TERA advised that there were many methods of extrapolation. They recommended the following approaches to us, which, after consideration, we have decided to adopt.

D92 For scenario 2 we categorised ESAs with at least 50% RBI FWA coverage as “RBI ESAs”, and those with less coverage as “non-RBI ESAs”. This approach allows us to model FWA costs in RBI ESAs, and then extrapolate the results to non-RBI ESAs.

D93 There are 437 ESAs that are non-unbundle-able. 68% of these ESAs are deemed to be “RBI ESAs”. This shows that RBI FWA sites provide a significant level of coverage across non-unbundle-able ESAs.

D94 The extrapolation to non-RBI ESAs is based on the proportion of lines served by FWA within RBI ESAs. The full FWA site costs determined from RBI ESAs are the relevant costs for extrapolation.

D95 For scenario 3, we modelled FWA to all lines within our TSO-derived boundary that are in non-unbundleable areas.

D96 TERA identified the cost of this deployment by:

D96.1 firstly, deriving a cost per Mbps, by dividing the total cost of deploying FWA to RBI ESAs by the total throughput capacity;

D96.2 secondly, calculating the total throughput of all lines (in Mbps) within our TSO-derived boundary and non-unbundle-able area; and

D96.3 lastly, multiplying the cost per Mbps by total throughput.

*Analysis*

D97 Taking into account the modelling constraints and deployment rules produced the following modelling results.

**Table D1: Modelling results of non-unbundle-able deployment scenarios**

| **Scenario** | **Number of lines served** | **Number of FWA sites** | **Average peak FWA throughput** | **UCLL price** |
|---|---|---|---|---|
| 1. FWA/FTTH mix using all RBI FWA sites across all non-unbundle-able ESAs | FWA: 22,294<br>FTTH: 138,925 | 268 | 679 kbps/user | $29.75 |
| 2. FWA/FTTH mix extrapolating results from RBI FWA sites with >50% ESA coverage to the remaining non-unbundle-able ESAs | FWA: 41,756<br>FTTH: 119,463 | 787 | 1,066 kbps/user | $30.57 |
| 3. FWA-only extrapolating results from RBI FWA sites with >50% ESA coverage to the remaining non-unbundle-able ESAs | FWA: 161,219<br>FTTH: N/A | 4,154 | 1,456 kbps/user | $33.68 |
| 4. FTTH-only across all non-unbundle-able ESAs | FWA: N/A<br>FTTH: 161,219 | N/A | N/A | $29.93 |

D98 We note that:

D98.1 Scenario 1 is cheaper than deploying FTTH (scenario 4).

D98.2 Scenario 2 is more expensive than deploying FTTH (scenario 4). This result is not intuitive, as the scenario we are extrapolating (scenario 1) is cheaper than FTTH-only. The change in cost relativities is due to differences between RBI and non-RBI ESAs. In particular, the non-RBI ESAs we are extrapolating to have (on average) higher line density and higher line speeds, which means that FWA sites serve less address points, and therefore cost more to serve with FWA per address point than the RBI ESAs.

D98.3 The results from our FWA-only scenario (scenario 3) illustrate the significant impact that throughput can have on the cost of wireless deployments.

D98.4 Our results, albeit based on different assumptions, are not dissimilar to the order of magnitude calculated by Analysys Mason, which showed an increase from 250 kbps to 1.9 Mbps per end-user throughput would increase FWA unit costs by a factor of 6.1. [1001]

D98.5 The average peak per user throughputs for scenarios 1 and 2 are 679 kbps and 1,066 kbps respectively. This shows that FWA site capacity in RBI ESAs is exhausted serving lines with line speeds well below 1.9 Mbps.

D98.6 This demonstrates that, when line speed equivalence assumptions are taken into account, FWA (at least current in use technologies and capacities) is only viable as a fixed line replacement on the edges of the network.

D98.7 The high cost of scenario 3 excludes it from our deployment considerations.

D99 We have two cost observations of FWA scenarios (scenarios 1 and 2) that are either cheaper or close to FTTH-only (scenario 4). This tells us that there are likely to be other configurations of FWA and FTTH in these areas that may yield a lower cost.

D100 The challenge with identifying a lower cost FWA/FTTH configuration is that the FWA cost curve is "lumpy". More specifically, an incremental address point served by FWA can require the deployment of a new FWA site. The optimal configuration along the cost curve is when all FWA sites modelled are fully utilised. We cannot observe this without running such an iterative and complex modelling process, such as a Monte Carlo simulation.

D101 We do not believe the materiality of the benefit set against the additional time and cost of undertaking an iterative modelling process is justified.

D102 Our decision therefore is to model FWA deployment based on the lowest cost scenario, which is scenario 1. In other words, the deployment is based on a FWA/FTTH mix using the RBI FWA sites across all non-unbundleable ESAs – supplemented by FTTH.

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[1001] Analysys Mason "UCLL and UBA FPP draft determination cross-submission - PUBLIC" 22 September 2015, section [6.2].

### Sharing of FWA towers with mobile operators

D103 In our December 2014 UCLL draft determination, we did not consider the possibility of the hypothetical efficient operator sharing FWA towers with mobile operators.

D104 Consequently, the costs of the FWA towers were not shared with mobile operators.

D105 In response, WIK stated that radio towers usually are capable of hosting several base stations and that the hypothetical efficient operator would therefore share as many sites as possible with mobile operators.[1002]

D106 We agreed with WIK that the hypothetical efficient operator would deploy its MEA network to in the most cost-effective manner, and that given the opportunity to share its infrastructure in order to reduce costs, an efficient operator would be likely to do this if possible.

D107 We noted, in our further draft determination, that FWA towers can be accessed after they have been deployed, and given that they are capable of carrying other companies' infrastructure, there is no reason why the hypothetical efficient operator would not share as much as possible in order to reduce costs.[1003]

D108 The FWA towers modelled are based on Vodafone's RBI sites, which are capable of hosting several base stations. Indeed, according to the Rural Broadband Agreement between Vodafone and MBIE, Vodafone's FWA towers must be constructed to enable co-location of at least two other access seekers (other than Vodafone).[1004]

D109 Our further draft decision was that the costs of the FWA towers in the model should be shared between the hypothetical efficient operator and two mobile operators.[1005]

*Submissions*

D110 WIK, in support of our further draft decision, submitted that sharing of FWA sites with other network services and network operators corresponded with reality and cost efficiency.[1006]

D111 However, Analysys Mason questioned the degree to which sharing of towers occurs in New Zealand. While acknowledging that sharing was potentially attractive for mobile operators in highly rural areas, Analysys Mason doubted the level of sharing

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[1002] WIK-Consult "Submission in response to the Commerce Commission's Draft pricing review determination for Chorus' unbundled bitstream access and unbundled copper local loop services including the cost model and its reference documents" CONFIDENTIAL, 20 February 2015, paragraph [119].

[1003] Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 2 July 2015, paragraphs [1195] and [1197].

[1004] Rural Broadband Agreement, 2011, Schedule 1, p. 69.

[1005] Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 2 July 2015, paragraph [350.2] and [1165].

[1006] WIK-Consult "Submission In response to the Commerce Commission's "Further draft pricing review determination for Chorus' unbundled bitstream access service" and "Further draft pricing review determination for Chorus' unbundled copper local loop service" including the revised cost model and its reference documents" 12 August 2015, paragraph [306].

proposed would occur where existing mobile operators were present, concluding that sharing with one other operator (on average) would be more realistic.[1007]

D112 Analysys Mason also highlighted that all FWA site costs were being divided by three - including the costs associated with antennas, feeders, combiners, electronics and resilient power supplies. This was, in their view, an error, as the costs associated with electronic equipment would not in practice be shared with mobile operators who will use their own electronics, antennas, etc.[1008]

*Analysis*

D113 We consider that our further draft decision, which was based on the engineering design standards in Vodafone's Rural Broadband Agreement, was reliable real-world information.

D114 Based on our FWA deployment choices in our July 2015 decision, which produced a widespread of FWA lines across rural and urban areas, Analysys Mason observed that sharing in less likely in urban areas.

D115 However, our final decision on FWA deployment has resulted in a more tightly defined rural-focussed deployment. So rather than FWA serving a proportion of premises all over New Zealand, it covers all end-users within a given set of more remote areas.

D116 Our assumption that the costs of FWA towers should be shared with two other mobile operators is appropriate. We note that Vodafone's Rural Broadband Agreement specifies that at least three other "small" access seekers should be able to co-locate (in addition to the two main access seekers).

D117 We agree with Analysys Mason's observation that site costs associated with electronic equipment are operator-specific, and should not be shared.

D118 We have discussed this with TERA. For the purposes of calculating costs, our model now splits site costs into "shared" and "non-shared".

D119 Our final decision is that FWA tower costs designated as shared will be allocated between the hypothetical efficient operator and two other mobile operators. Operator-specific electronics and supporting infrastructure will not be included in this cost allocation.

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1007 Analysys Mason "Report for Chorus - UCLL and UBA FPP further draft determination submission" CONFIDENTIAL, 11 August 2015, section [7.4].

1008 Analysys Mason "Report for Chorus - UCLL and UBA FPP further draft determination submission" CONFIDENTIAL, 11 August 2015, section [7.1].

**Spectrum costs**

*December 2014*

D120 In our December 2014 draft decision, we assumed the hypothetical efficient operator would obtain access to a suitable allocation (2x20 MHz) of spectrum to provide its FWA service.[1009]

D121 We modelled the cost of access to this spectrum using the results of the recent 700 MHz spectrum auction. That is, we assumed the hypothetical efficient operator would gain access to spectrum (whether it won it at auction, leased it from another operator, or was specifically-allocated spectrum by the government to ensure broadband access in more remote areas), and at the price that operators actually paid in the real world.[1010] On this basis, we concluded that the hypothetical efficient operator would pay $22 million for access to the spectrum.

D122 In response, Chorus submitted that the costs included did not reflect the price paid on the final outcome of the 700 MHz auction.[1011]

D123 Analysys Mason agreed with Chorus that the assumed spectrum costs were too low and should (at a minimum) reflect the final auction result. Analysys Mason contended that the spectrum cost would be higher, as the hypothetical efficient operator would represent a fourth bidder.[1012]

D124 If the Commission is to include spectrum fees, Vodafone believed the rates paid for spectrum usage rights by a predominantly fibre-focussed hypothetical efficient operator would be significantly lower than the market rates paid by mobile operators for spectrum management rights covering the entire country.[1013]

D125 Network Strategies could not identify any precedents in existing publicly available TSLRIC models for the inclusion of spectrum fees for the provision of fixed services using wireless or mobile technologies, but nonetheless agreed that the Commission should consider incorporating the spectrum costs for FWA.[1014]

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1009 Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014, paragraph [605].

1010 Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014, paragraph [606].

1011 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and Process and Issues Update Paper for the UCLL and UBA Pricing Review Determinations" CONFIDENTIAL, 20 February 2015, paragraphs [164.3-552].

1012 Analysys Mason "Report for Chorus - UCLL and UBA FPP draft determination submission" CONFIDENTIAL, 20 February 2015, section [6.4].

1013 Vodafone "Submission on process paper and draft pricing review determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and comments on Analysys Mason's TSLRIC models" 20 February 2015, paragraph [E1.5].

1014 Network Strategies “Final report for Spark New Zealand and Vodafone New Zealand - Modelling Fixed Wireless Access” CONFIDENTIAL, 20 February 2015, section [2.2.10].

D126 Network Strategies noted that the price that winning bidders paid during the 700 MHz auction was for a national coverage licence with no restrictions on service provision.[1015]

D126.1 If 700 MHz spectrum was purchased by the hypothetical efficient operator at the price achieved at the digital dividend auction then, in Network Strategies' view, the hypothetical efficient operator would have been under the expectation of a revenue stream commensurate with that of a national mobile operator.

D126.2 If the hypothetical efficient operator was not to offer mobile services then the valuation of the spectrum must be based only on the revenues that would be achieved by RBI FWA subscribers (that is, the FWA business case). In other words, the hypothetical efficient operator would pay less than $22 million for spectrum to be used only within the RBI areas and to deliver only FWA and no other services.

D127 Wigley and Company also identified the difference in spectrum valuation an hypothetical efficient operator providing limited FWA would pay relative to a national mobile operator.[1016]

*July 2015*

D128 In our further draft determination, we agreed with Vodafone, Network Strategies and Wigley and Company that adopting the prices from the 700 MHz spectrum auction as representative FWA costs was inappropriate.

D129 To account for the geographic limits on the extent of FWA, and therefore the addressable market, we determined to scale the 700 MHz auction costs according to the number of end-users are served by FWA.[1017]

*Submissions*

D130 In response, Chorus and Analysys Mason restated their view that spectrum costs should reflect the full opportunity cost, ie, the cost that a hypothetical efficient operator would have to pay to acquire it in the market. This cost is best estimated by the amounts paid in the 700 MHz auction.[1018, 1019]

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1015 Network Strategies "Final report for Spark New Zealand and Vodafone New Zealand - Modelling Fixed Wireless Access" CONFIDENTIAL, 20 February 2015, section [2.2.10].

1016 Wigley and Company "Submission on backdating in relation to draft UCLL and UBA pricing review determinations" 20 February 2015, paragraph [11.4].

1017 Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 2 July 2015, p. 207.

1018 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services (2 July 2015) - Public version" 13 August 2015, paragraphs [134.5–134.6].

1019 Analysys Mason "Report for Chorus - UCLL and UBA FPP further draft determination submission" CONFIDENTIAL, 11 August 2015,section [7.6].

D131 Analysys Mason pointed out that given the wide geographic coverage area of the FWA use now assumed by the Commission, use for FWA would essentially prevent this spectrum being used for other services in New Zealand.[1020]

D132 Conversely, Vodafone, WIK and Network Strategies supported scaling spectrum costs according to the number of end-users served by FWA.[1021, 1022, 1023]

*Analysis*

D133 Part of Analysys Mason's critique of spectrum costs in our further draft determination was linked to our FWA deployment decision – a decision that resulted in a wide geographic spread of FWA connections.

D134 We accept Analysys Mason's argument that a wide geographic FWA deployment would prevent that spectrum being used for other services in New Zealand.

D135 However, our final decision on FWA deployment has resulted in a more tightly defined rural-focussed deployment. So rather than FWA serving a proportion of premises all over New Zealand, it covers all end-users within a given set of more remote areas.

D136 Hence, the relevant cost of the spectrum is not the opportunity cost of a national spectrum, but the opportunity cost of the regional spectrum. That is, the spectrum could be used by another operator outside of the areas it is deployed by the hypothetical efficient operator.

D137 We have determined that this "regional spectrum" cost can be estimated, as a proportion of the opportunity cost of national spectrum. We set this proportion equal to the number of FWA connections divided by the number of FWA and FTTH connections.[1024]

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1020 Analysys Mason "Report for Chorus - UCLL and UBA FPP further draft determination submission" CONFIDENTIAL, 11 August 2015, section [7.5].

1021 Vodafone "Submission to the New Zealand Commerce Commission on further draft pricing review determination for Chorus' unbundled copper local loop service and further draft pricing review determination for Chorus' unbundled bitstream access service" CONFIDENTIAL, 13 August 2015, paragraph [D7.2].

1022 WIK-Consult "Submission In response to the Commerce Commission's "Further draft pricing review determination for Chorus' unbundled bitstream access service" and "Further draft pricing review determination for Chorus' unbundled copper local loop service" including the revised cost model and its reference documents" 12 August 2015, paragraph [306].

1023 Network Strategies "Final report for Spark New Zealand and Vodafone New Zealand - Revised draft determination for the UCLL and UBA price review" 13 August 2015, section [2.2].

1024 Refer to TERA Consultants "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services: - Model Specification" December 2015, section [8.2]

### FWA site cost correction

D138 In response to our July 2015 further draft determination, Analysys Mason pointed out that our model had excluded significant costs relating to FWA site costs.[1025]

D139 We acknowledge this was an error in our modelling. The cost of cabinets, DC power systems and batteries were omitted.

D140 TERA has now included these costs as part of the FWA base station aggregate.[1026]

## Aerial deployment

### Purpose

D141 This section sets out in more detail our final decisions on the extent of aerial deployment in the hypothetical network and the cost of this deployment.

### What it is and why it is relevant to TSLRIC

D142 Aerial deployment refers to the use of poles to deploy distribution cables and lead-in cables instead of burying them (known as underground deployment).

D143 Typically, when deploying a network aerially, two sets of poles are built, one on each side of the road. On the side with more buildings (referred to as the major side) are large poles capable of carrying large distribution cables (used to distribute the network across the country) and smaller lead-in cables (used to deploy the network into individual buildings). On the side of the road with fewer buildings (referred to as the minor side) are smaller poles, solely used to hold lead-in cables.

D144 Aerial deployment has lower capital costs than underground construction, but has higher operational costs. It is also easier to share aerial infrastructure with other networks (notably electricity distribution networks) than underground construction. Overall, the cost of aerial is cheaper than the cost of underground deployment.

D145 It is important that we set an accurate price for aerial deployment by:

D145.1 determining a realistic way to split costs between the hypothetical operator and electricity distribution businesses (EDBs); and

D145.2 setting a reasonable cost of getting consent for the hypothetical efficient operator.

### Our final decisions

D146 We have decided that the hypothetical efficient operator will use aerial infrastructure for:

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[1025] Analysys Mason "Report for Chorus - UCLL and UBA FPP further draft determination submission" CONFIDENTIAL, 11 August 2015, section [7.2].

[1026] Refer to TERA Consultants “TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services: - Analysis of the responses to the second consultation following the further draft determination” December 2015, p. [22].

D146.1 47% of distribution cables; and

D146.2 46% of lead-in cables.

D147 The key reasons for this percentage split are:

D147.1 we recognise that the hypothetical efficient operator would seek to use aerial infrastructure where possible because it is cheaper (particularly where infrastructure can be shared with other providers);

D147.2 however, we recognise that the hypothetical efficient operator may not always get consent to deploy its network aerially;

D147.3 we use real-world evidence about the EDBs' use of aerial deployment as a guide to where the hypothetical efficient operator would deploy its network aerially. This is because we are uncertain that the hypothetical efficient operator would receive consent to deploy its network aerially elsewhere. Further, the opportunity to share infrastructure would not exist in other areas. Using real-world evidence to inform our decisions is consistent with our framework set out in Chapter 2.

D148 In terms of the cost of deployment, we have decided that:

D148.1 the hypothetical efficient operator would rent access to the EDBs' poles for the purpose of distributing its network and running lead-ins into buildings on the major side of the road;

D148.2 the hypothetical efficient operator would build lead-in poles on the minor side of the road;

D148.3 EDBs would rent access to the hypothetical efficient operator's poles to provision buildings on the minor side of the road; and

D148.4 the hypothetical efficient operator would have to pay to replace 10% of EDB poles.

D149 We set the yearly pole rental price that the hypothetical efficient operator would pay to the EDB at:

D149.1 $[ ]**CNZCI** for EDB poles where the EDB receives reciprocal access to one of the hypothetical efficient operator's poles (for no additional cost); and

D149.2 $[ ]**CNZCI**,**UFFCI** for each EDB pole where the EDB does not access a pole provided by the hypothetical efficient operator.

D150 We set the cost the hypothetical efficient operator would pay to gain consent to install poles on the minor side of the road at a total of [ ]**CNZCI**.

D151 The key reasons for these deployment cost decisions are below.

D151.1 We have selected these model setting because we understand that they reflect what occurs in the real world. We have set the level of pole replacement and pole rental and consenting based on real-world data, including data from Chorus;

D151.2 As explained in Chapter 2, real-world information, and indeed that reflected in the legacy decisions of the incumbent, may inform our assessment of what constraints a hypothetical efficient operator would likely face and decisions it would likely make.

**Proportion of aerial deployment**

*Our initial views*

D152 In our December 2014 UCLL draft determination and our July 2015 UCLL further draft determination papers, we stated that the hypothetical efficient operator would deploy its network aerially in areas where EDBs had existing aerial infrastructure.[1027]

D153 We considered it reasonable to assume that the hypothetical efficient operator would be granted consent for an aerial network that already exists. This is because no additional aerial network would be built, and so there will be minimal changes to visual effect. In this case we have assumed that aerial deployment is limited to areas with an existing aerial network.

D154 While the hypothetical efficient operator might seek to deploy aerially in other areas (where the EDBs have no existing aerial network), we were uncertain of whether it would be economically and practically feasible for the hypothetical efficient operator to gain consent in these areas.

D155 We noted Chorus' submission that the hypothetical efficient operator would not deploy aerially in all places where poles are available and aerial deployment is legally permitted.[1028] To address this, we considered the LFCs' experience in deploying their UFB networks using existing aerial infrastructure.

D156 Information provided by Northpower and Ultrafast Fibre suggested that full use of existing aerial infrastructure by the hypothetical efficient operator was not possible. Based on Ultrafast Fibre's and Northpower's deployment experience, our view was that it was reasonable to reduce the area of deployment by 2% to take into account areas where the hypothetical efficient operator would be unable to use existing aerial infrastructure. Accordingly, we modelled 47% of distribution cables using aerial infrastructure.

[1027] Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014, paragraph [609].

[1028] Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and Process and Issues Update Paper for the UCLL and UBA Pricing Review Determinations" CONFIDENTIAL, 20 February 2015, paragraph [142].

D157 To calculate the percentage of lead-in cables that are aerially deployed, we approximated the number of premises served by aerial lead-in cables. We did this by assuming a uniform distribution of end-users across the network, and calculating a national weighted average percentage of end-users served by aerial lead-in cables. We estimated that EDBs use aerial lead-in cables for 47% of customers.

D158 For consistency with our approach to aerial distribution cable, we adjusted down by 2% the estimated percentage of customers served by aerial lead-ins. Accordingly, we modelled 45% of lead-in cables using aerial infrastructure.

*Submitters' views*

D159 Network Strategies submitted that we had made an error in calculating the level of network deployment. It argued that we made in error in calculating the percentage of aerial lead-ins. It also pointed out that it could not replicate our calculation of the percentage of EDB's network distribution cables deployed aerially.[1029]

D160 Chorus agreed with us that it was appropriate to make a deduction from the EDBs' level of aerial deployment when calculating the extent of the hypothetical efficient operator's use of aerial deployment. However, it argued that this deduction should be larger than 2% because:

D160.1 in some cases EDB poles will be poorly located or too congested for the hypothetical efficient operator to use; and

D160.2 in some cases other services may be underground, preventing consent from being obtained.[1030]

D161 Chorus noted that Network Strategies stated that Vector considered that it was only economically viable to re-use 65% of its existing poles for network distribution.[1031] However, Network Strategies and WIK clarified that Vector's statement only meant that Vector could re-use 65% of its poles without additional investment. They submitted that many more poles would likely be re-used in practice.[1032,1033]

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[1029] Network Strategies "Final report for Spark New Zealand and Vodafone New Zealand - Revised draft determination for the UCLL and UBA price review" 13 August 2015, pp. 55-56.

[1030] Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services - Public version" 2 July 2015, paragraphs [116-117].

[1031] Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services - Public version" 2 July 2015, paragraph [118].

[1032] Network Strategies "Final report for Spark New Zealand and Vodafone New Zealand - Response to submissions on revised draft determination - Pricing review - UCLL and UBA Final Pricing Principle - Public version" 24 September 2015, p. 49.

[1033] WIK-Consult "Cross-Submission in response to the Commerce Commission's Further draft pricing review determination for Chorus' unbundled bitstream access and Further draft pricing review determination for Chorus' unbundled copper local loop service including the revised cost model and its reference documents" CONFIDENTIAL, 22 September 2015, paragraph [94].

D162 WIK submitted that the level of coverage should be greater than we had allowed for because the hypothetical efficient operator:

D162.1 could easily use aerial deployment in areas where EDBs were not using it; and

D162.2 could deploy aerial infrastructure next to the EDB's network at times when it was not possible to share the network. [1034]

*Analysis and final decisions*

D163 We noted Network Strategies' submission that we made errors when calculating the percentage of the EDBs' networks using aerial distribution. We reviewed the data for aerial deployment and confirm that the 49% figure is correct.[1035] We calculated this figure by calculating the percentage of the total low voltage (<1kV) lines deployed overhead.[1036]

D164 We found an error in the data we presented in our July 2015 UCLL further draft determination paper for the percentage of lead-ins deployed aerially. A revised set of data is in the table below. This data shows that the estimated percentage of EDB customers served by aerial lead-ins is 48%, rather than 47% as we had previously stated. Maintaining our decision to reduce the area served with lead-ins by 2%, the total percentage of lead-ins served by aerial is 46%.

[1034] WIK-Consult "Cross-Submission in response to the Commerce Commission's Further draft pricing review determination for Chorus' unbundled bitstream access and Further draft pricing review determination for Chorus' unbundled copper local loop service including the revised cost model and its reference documents" CONFIDENTIAL, 22 September 2015, paragraph [94].

[1035] The 49% is based on updated 2014 EDB information disclosure data, see http://comcom.govt.nz/dmsdocument/13802.

[1036] We have excluded lines above 1kV. Most domestic premises are serviced by lines of less than 1kV and this provides a useful proxy for distribution lines.

**Table D2: Estimated customers served by aerial infrastructure by EDB area**[1037]

| | Customer base | Estimated % of EDB customer overhead | Average number of customers served by overhead |
|---|---|---|---|
| Alpine Energy | 31,212 | 56% | 17,496 |
| Aurora Energy | 82,656 | 27% | 22,372 |
| Buller Network | 4,578 | 78% | 3,583 |
| Centralines | 8,328 | 75% | 6,217 |
| Counties Power | 37,507 | 60% | 22,322 |
| Eastland Network | 25,556 | 67% | 17,158 |
| Electra | 112,875 | 53% | 59,691 |
| Electricity Ashburton | 17,727 | 25% | 4,421 |
| Electricity Invercargill | 17,247 | 7% | 1,145 |
| Horizon Energy | 24,722 | 45% | 11,188 |
| MainPower | 36,717 | 30% | 10,917 |
| Marlborough Lines | 24,445 | 56% | 13,793 |
| Nelson Electricity | 9,067 | 18% | 1,639 |
| Network Tasman | 37,291 | 47% | 17,579 |
| Network Waitaki | 12,306 | 80% | 9,790 |
| Northpower | 54,134 | 66% | 35,821 |
| Orion | 189,962 | 41% | 77,046 |
| OtagoNet | 14,798 | 94% | 13,973 |
| Powerco | 321,957 | 58% | 187,790 |
| Scanpower | 6,770 | 64% | 4,347 |
| The Lines Company | 23,499 | 76% | 17,842 |
| The Power Company | 34,574 | 80% | 27,620 |
| Top Energy | 30,603 | 26% | 7,953 |
| Unison | 109,316 | 33% | 35,885 |
| Vector | 536,035 | 43% | 230,132 |
| Waipa Networks | 23,830 | 66% | 15,802 |
| Wellington Electricity | 164,789 | 49% | 80,428 |
| WEL Networks | 84,707 | 41% | 34,335 |
| West Power | 13,092 | 52% | 6,743 |
| **Total** | **2,090,300** | **48%** | **995,028** |

D165 These percentages are consistent with our view that the hypothetical efficient operator would seek to roll-out the network aerially where EDBs currently deploy their network aerially, given this is the most efficient approach.

[1037] Data sourced from http://comcom.govt.nz/dmsdocument/13802.

D166 We accept Network Strategy's and WIK's submissions that while Vector's submission suggests that 65% of their poles could be used without further investment, this does not imply that the remaining 35% of the network cannot be used. The extent to which the hypothetical efficient operator would receive permission to deploy their network in areas without an existing aerial network also remains unclear.

D167 We have also considered whether the degree of aerial deployment should be smaller (as Chorus noted in its submission) or larger (as WIK noted in its submission). However, we have received no further data in submissions that justifies moving to a new approach or setting a new level of deployment. Accordingly, we are comfortable that our approach yields the best available estimate. Therefore we will continue to set the degree of aerial deployment at the degree of aerial deployment used by EDBs minus 2%.

**Cost of deployment**

*Our initial views*

D168 The scenario that TERA modelled in the December 2014 UCLL draft determination paper was essentially a "joint build" between the hypothetical efficient operator and EDBs. TERA assumed no existing aerial network and modelled a joint roll-out between the hypothetical efficient operator and the EDB with costs allocated equally between the two.

D169 Both Chorus and Vodafone submitted that the scenario modelled was not realistic because the EDBs' poles would remain in place. Therefore, it would be in both parties' interests to negotiate for the hypothetical efficient operator to pay a fee to use the EBDs' poles. [1038,1039]

D170 We agreed with Chorus' and Vodafone's submissions. So, in the July 2015 UCLL further draft determination paper, we changed the model to reflect a situation where poles on the major side of the road, generally owned by EDBs, continued to exist but where poles on the minor side of the road, generally owned by telecommunication companies, ceased to exist. This is consistent with our framework,[1040] which holds that the EDBs' infrastructure remains in place.

D171 We then applied the following assumptions.

D171.1 The hypothetical operator would rent access to the EDBs' poles for the purpose of distributing its network and running lead-ins into buildings on the major side of the road.

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[1038] Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and Process and Issues Update Paper for the UCLL and UBA Pricing Review Determinations" CONFIDENTIAL, 20 February 2015, paragraph [140].

[1039] Vodafone "Cross submission to the New Zealand Commerce Commission on submissions to the Process Paper and Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access services (excluding TSO Boundary considerations)" CONFIDENTIAL, 20 March 2015, paragraph [H2.2].

[1040] See Chapter 2 for a discussion of the framework.

D171.2 The hypothetical efficient operator would build lead-in poles on the minor side of the road and from the distribution point to the building (when that building is remote).

D171.3 EDBs would rent access to the hypothetical operator's poles to provision buildings on the minor side of the road and from the distribution point to the building (when that building is remote).

D171.4 The hypothetical efficient operator would pay to replace 10% of EDB poles.

D172 We set the price of rental that the hypothetical efficient operator would pay to EDBs at $25 a pole based on data from Chorus and LFC contracts with EDBs.

D173 We also assumed a cost to obtain consent for installing poles on the minor side of the road of [ ]**CNZCI**, based on Chorus' data.[1041]

*Submitters' views*

D174 In its submission on the July 2015 further draft determination, Network Strategies disagreed with our costs for replacing poles and renting poles because they were based purely on Chorus' data.[1042] However, in its cross submission on the July 2015 further draft determination, Network Strategies noted that the 10% level of replacement was broadly consistent with Vector's data. It also noted that Analysys Mason has advised the Finnish regulator that generally almost all poles would be re-used.[1043]

D175 Spark and Vodafone supported Network Strategies' position that the pole lease costs are too high because we relied on Chorus' data.[1044,1045]

D176 In contrast, Chorus submitted that the pole lease costs were too low because we relied solely on LFC data. Chorus provided an estimate of their actual contractual costs based on new and updated contracts.[1046]

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1041 Chorus "Submission in response to the Commerce Commission's Consultation paper outlining its proposed view on the regulatory framework and modelling approach for UBA and UCLL services (9 July 2014)" CONFIDENTIAL, 6 August 2014, paragraph [374.2].

1042 Network Strategies "Final report for Spark New Zealand and Vodafone New Zealand - Revised draft determination for the UCLL and UBA price review" 13 August 2015, pp. 57-58.

1043 Network Strategies "Final report for Spark New Zealand and Vodafone New Zealand - Response to submissions on revised draft determination - Pricing review - UCLL and UBA Final Pricing Principle" CONFIDENTIAL, 24 September 2015, p. 50.

1044 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" CONFIDENTIAL, 13 August 2015, paragraphs [179-183].

1045 Vodafone "Submission to the New Zealand Commerce Commission on further draft pricing review determination for Chorus' unbundled copper local loop service and further draft pricing review determination for Chorus' unbundled bitstream access service" CONFIDENTIAL, 13 August 2015, paragraphs [I1.1-I1.3].

1046 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services - Public version" 2 July 2015, paragraphs [123-126] and Appendix A.

D177 Network Strategies submitted that the figures Chorus provided were incorrect and included both the costs of distribution and installation rather than just distribution. It also argued that Chorus should calculate the weighted average price per pole based on pole number data rather than customer data.[1047]

D178 Chorus submitted that the consenting costs we used reflect the cost of deployment in Auckland, rather than the nationwide cost of consenting. It also submitted that the type of network the hypothetical efficient operator would try to deploy would require a notified consenting process. On this basis, it estimated that the hypothetical efficient operator would incur a [ ]**CNZCI** cost for consent. Chorus' estimate was based on its consenting costing for UFB, scaled to reflect the extra cost associated with notified consents.[1048]

D179 Network Strategies cautioned using the actual cost of consent for service companies in the early stages of UFB deployment, since these costs are not likely to reflect efficient costs. It also argued that we should consider the impact of the new National Environmental Standard for Telecommunication Facilities.[1049]

*Analysis and final decisions*

D180 We acknowledge that the 10% pole replacement cost draws on Chorus' data. We have not found any other data that suggests this estimate is unreasonable. Therefore, our view is that the Chorus data provides the best information for the number of EDB poles a hypothetical efficient operator would have to replace in deploying a network in New Zealand. We note that as Network Strategies points out, Vector's evidence is broadly consistent with this percentage. So, we are comfortable with this estimate.

D181 We have decided to apply the following assumptions.

D181.1 Poles on the major side of the road, generally owned by EDBs, continue to exist but poles on the minor side of the road, generally owned by telecommunication companies, cease to exist.

D181.2 The hypothetical operator would rent access to the EDBs' poles for the purpose of distributing its network and running lead-ins into buildings on the major side of the road.

D181.3 The hypothetical efficient operator would build lead-in poles on the minor side of the road.

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1047 Network Strategies "Final report for Spark New Zealand and Vodafone New Zealand - Response to submissions on revised draft determination - Pricing review - UCLL and UBA Final Pricing Principle" CONFIDENTIAL, 24 September 2015, pp. 51-52.

1048 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services - Public version" 2 July 2015, paragraph [127] and Appendix B.

1049 Network Strategies "Final report for Spark New Zealand and Vodafone New Zealand - Response to submissions on revised draft determination - Pricing review - UCLL and UBA Final Pricing Principle" CONFIDENTIAL, 24 September 2015, p. 54.

D181.4 EDBs would rent access to the hypothetical operator’s poles to provision buildings on the minor side of the road.

D182 With respect to the pole rental price in our July 2015 UCLL further draft determination paper, we note that the $25 price we set was based on considering data from both Chorus and LFC.

D183 Even so, we recognise that the pole cost used did not reflect the price of pole rental across the country, and that using a weighted average approach would be more appropriate. It would also be more consistent with our approach to determining aerial deployment, in that it uses national data rather than data from a single area.

D184 Accordingly, we requested further information under a section 98 request from Chorus to assess its submission that the price it pays for distribution is significantly higher than the $25 set in the model. We note that, in providing us this information, Chorus acknowledged that the calculations in its submission were overstated.

D185 As discussed above, we maintain the view that the hypothetical efficient operator would enter into reciprocal agreements with the EDBs to use each other’s poles for running lead-ins to buildings. In these cases, we believe that the hypothetical efficient operator would effectively pay a small fee to the EDBs to reflect the cost of distribution.

D186 However, we note that the hypothetical efficient operator would use more of the EDBs poles than vice versa. In our view the EDB would seek to recover the full price of its pole where it does not receive the corresponding benefit of access to the hypothetical efficient operator’s pole.

D187 To determine the prices to set in the model, we have first determined the appropriate price for poles where a reciprocal agreement exists. We have reviewed contracts from both Chorus and LFCs to find cases where a reciprocal agreement exists and explicitly sets a different price for:

D187.1 poles used for distribution or distribution and lead-ins; and

D187.2 poles used solely for provisioning.

D188 We find that all of these contracts set a yearly per price of [ ]**CNZCI** for poles used for distribution and lead-ins and a [ ]**CNZCI** for poles used for lead-ins only. Therefore, for the purposes of our model, the hypothetical efficient operator would pay [ ]**CNZCI** to use the EDBs’ poles and receive [ ]**CNZCI** for allowing the EDBs to use its poles.

D189 Where both the hypothetical efficient operator and the EDB would own a pole, the net payment the hypothetical efficient operator would make is [ ]**CNZCI**. Therefore, for cases where both the EDB and the hypothetical efficient operator would own a pole, we set the hypothetical efficient operator’s net yearly payment at [ ]**CNZCI** a pole.

D190 For additional EDB poles, we set a price based on the weighted (by customer numbers) average rental price of distribution poles as these poles will be used for distribution. We calculate this average using Chorus and Ultrafast Fibre data. This price is [ ]**CNZCI,UFFCI** for each pole yearly. We set out our calculations in the table below:

**Table D3: Weighted average cost of distribution**

| **EDB** | **Telco** | **Customer Numbers** | **Weight** | **Annual Pole Rental Cost of Distribution and Provisioning** |
|---|---|---|---|---|
| Aurora (Delta) | Chorus | 22,372 | 0.030 | [ ]**CNZCI** |
| Counties Power | Chorus | 22,322 | 0.030 | [ ]**CNZCI** |
| Eastland | Chorus | 17,158 | 0.023 | [ ]**CNZCI** |
| Electra | Chorus | 59,691 | 0.079 | [ ]**CNZCI** |
| Network Tasman | Chorus | 17,579 | 0.023 | [ ]**CNZCI** |
| Powerco | Chorus/UFF | 187,790 | 0.250 | [ ][1050]**CNZCI, UFFCI** |
| Powernet (Electricity Invercargill) | Chorus | 1,145 | 0.002 | [ ]**CNZCI** |
| Powernet (OtagoNet) | Chorus | 13,973 | 0.019 | [ ]**CNZCI** |
| Powernet (The Power Company) | Chorus | 27,620 | 0.037 | [ ]**CNZCI** |
| Unison | Chorus | 35,885 | 0.048 | [ ]**CNZCI** |
| Vector | Chorus | 230,132 | 0.306 | [ ]**CNZCI** |
| Westpower | Chorus | 6,743 | 0.009 | [ ]**CNZCI** |
| Waipa | UFF | 23,830 | 0.032 | [ ]**UFFCI** |
| WEL Networks | UFF | 84,707 | 0.113 | [ ]**UFFCI** |
| | **Total** | **750,947** | **Weighted Average** | **[ ]CNZCI, UFFCI** |

D191 We also considered weighting contract prices by actual pole numbers rather than customer numbers, but this data does not exist.

D192 In summary, we set a net price for the hypothetical efficient operator of [ ]**CNZCI** a pole, for all poles where a reciprocal arrangement exists. We set a price of [ ]**CNZCI, UFFCI** that the hypothetical efficient operator would pay for poles where a reciprocal agreement is not in place. In terms of the value for the consenting costs, we have reviewed Chorus' estimates of consenting cost. We note that they are based on the costs of a notified consent process. We do not believe that the hypothetical efficient operator would need to undertake a notified consent

1050 Based on the average price in Chorus' and UFF's contracts.

process. This is because it will simply be replacing poles that previously existed, so no additional visual impact would result.

D193 We have attempted to scale down Chorus' cost estimate to reflect this.[1051] While this required us to apply a number of assumptions, the result of this exercise generated a total price of about [ ]**CNZCI**. Therefore, we believe that our [ ]**CNZCI** estimate is the best available.

D194 We understand that changes to the National Environmental Standards have recently been considered. If implemented, these changes may impact the real-world deployment costs we are estimating. However, we are conducting a point in time TSLRIC analysis, which among other things, requires us to model deployment on the basis of deployment rules/guidelines as they apply to network operators today.

## Underground infrastructure sharing

### Purpose

D195 This section sets out in more detail our final decisions on the level of underground infrastructure sharing with EDBs, the benefits of this sharing, and the level of sharing of FWA towers with mobile operators.

### What it is and why it is relevant to TSLRIC

D196 Underground infrastructure sharing refers to the sharing of trenches (and sometimes ducts) between parties that both deploy cables underground for the purpose of distributing their network to end-users.

D197 Sharing underground infrastructure can reduce the cost of deploying underground infrastructure as the cost is split between two parties. Therefore, it is important that we try to set a realistic level of infrastructure sharing in the TSLRIC model to avoid setting a TSLRIC price that is too high or too low.

### Our final decisions

D198 Our final decisions are to:

D198.1 include 5% of underground infrastructure sharing with EDBs;

D198.2 maintain the savings generated from infrastructure sharing at 50%, but not include any savings for the cost of installing ducts.

D199 The main reasons for our final decisions are:

D199.1 we recognise that the hypothetical efficient operator would look to share infrastructure wherever possible;

[1051] We did this by applying Chorus' non-notified UFB costs to all consents. This cost was less than the [ ]**CNZCI** that we consulted on but we note that legal costs are not included in this amount. Although we are uncertain of any legal costs, we feel that this exercise shows that our estimate is reasonable.

D199.2 it would not be practical to reopen existing underground infrastructure to install the hypothetical efficient operator's infrastructure. Therefore, this would only take place when EDBs are looking to deploy their network underground;

D199.3 we base the extent of underground infrastructure sharing and the cost of infrastructure sharing on the best local current practice data that we have available. This is because we believe this is most representative of the conditions the hypothetical efficient operator would face.

**Extent of underground infrastructure sharing**

*Our initial views and views of submitters*

D200 In our December 2014 UCLL draft determination paper, we did not consider that our hypothetical efficient operator might share underground infrastructure with EDBs.

D201 WIK, Network Strategies, Spark, and Vodafone all submitted in response that the hypothetical efficient operator would seek to share the cost of underground infrastructure.[1052,1053,1054,1055] WIK submitted that, in its experience, the relevant range of trenching cost reductions due to sharing were 5% to 30% of trenching cost.[1056,1057] Chorus also acknowledged that some degree of infrastructure sharing was likely to occur, but submitted that it should not take place in more than 5% of the network.[1058]

D202 In light of these submissions, in our July 2015 UCLL further draft determination paper, we re-evaluated the question of infrastructure sharing by our hypothetical efficient operator.

D203 We considered that re-opening trenches and/or adding cables to existing ducts was unlikely to be a practical or economically-viable solution. Further, the market for

[1052] WIK-Consult "Submission in response to the Commerce Commission's Draft pricing review determination for Chorus' unbundled bitstream access and unbundled copper local loop services including the cost model and its reference documents" CONFIDENTIAL, 20 February 2015, paragraph [117 and 389-390].

[1053] Network Strategies "Final report for Spark New Zealand and Vodafone New Zealand - Modelling Fixed Wireless Access" CONFIDENTIAL, 20 February 2015, pp. 47-50.

[1054] Spark "Submission on UBA and UCLL FPP pricing review determination" CONFIDENTIAL, 20 February 2015, paragraph [68].

[1055] Vodafone "Submission on process paper and draft pricing review determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and comments on Analysys Mason's TSLRIC models" 20 February 2015, paragraph [F1.2].

[1056] WIK-Consult "Submission in response to the Commerce Commission's Draft pricing review determination for Chorus' unbundled bitstream access and unbundled copper local loop services including the cost model and its reference documents" CONFIDENTIAL, 20 February 2015, paragraph [390].

[1057] Since we assumed a 50% cost saving from the proportion of the network shared, and we assumed that 5% of underground infrastructure would be saved, the total cost savings from our July 2015 UCLL further draft determination paper is equal to 2.5%.

[1058] Chorus "Cross submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and Process and Issues Update Paper for the UCLL and UBA Pricing Review Determinations" CONFIDENTIAL, 20 March 2015, paragraph [128].

duct access in New Zealand is not significant. Therefore, we believed that underground infrastructure sharing would only be possible when the different kinds of infrastructure were rolled out simultaneously.

D204 We observed that in a TSLRIC context, where the hypothetical efficient operator is assumed to be rolling out its network overnight and the EDBs' infrastructure is already in place, significant underground infrastructure sharing with EDBs seemed unlikely.

D205 If underground infrastructure sharing were to happen, it would be EDBs taking advantage of the hypothetical efficient operator's roll-out. This would be particularly relevant for electricity companies wanting to underground overhead power lines.

D206 According to Vector, the decision to underground in specific areas depends on a number of criteria, including:[1059]

D206.1 the condition of the lines and equipment in the area;

D206.2 their performance history (capacity and faults);

D206.3 the number of customers who will benefit; and

D206.4 the level of other utility works planned for each area.

D207 In our July 2015 UCLL further draft determination paper, to determine what percentage of underground infrastructure sharing could be expected, we looked at data from the LFCs.

D208 UltraFast Fibre shares between [ ]**UFFCI** of its underground network with other utilities depending on the area, with the average for the total network being [ ]**UFFCI**.

D209 Enable lists the level of trench sharing as [ ]**ECI** and only pertaining to the existing network where some trenching was shared with [ ]**ECI**.

D210 Against that background, we disagreed with WIK's statement that proper sharing assumptions would reduce the trenching costs by as much as 30%.

D211 The combination of the data provided by LFCs, Chorus' submission, and the lower end of WIK's range led us to include 5% of underground infrastructure sharing with EDBs.

D212 Spark and WIK have submitted that they are concerned that we have used Chorus' estimate which is below the lower end of the range indicated by WIK.[1060,1061] Spark

[1059] http://vector.co.nz/undergrounding.

[1060] Spark "Submission on UBA and UCLL FPP further draft pricing review determination" CONFIDENTIAL, 13 August 2015, paragraph [184].

[1061] WIK-Consult "Submission on UBA and UCLL FPP further draft pricing review determination" CONFIDENTIAL, 13 August 2015, paragraph [286].

argued that current practices are not necessarily indicative of what will happen in the future. It submitted that a 10% level of infrastructure sharing would be more reasonable.[1062] WIK argued that given New Zealand's favourable conditions for infrastructure sharing, a 30% level of infrastructure sharing would be more realistic.[1063]

D213 Analysys Mason provided a range of international evidence to support a 5% level of infrastructure sharing. It provided a series of data points that indicate that between less than 1% and 12% of international underground infrastructure networks are currently shared. It also noted a report from the Swedish Government that highlighted the complexities with trench sharing which may limit its use in practice.[1064]

D214 Wigley and Company argued that the hypothetical efficient operator would share infrastructure with other UFB networks. It also submitted that we did not respond to its submission in writing.[1065]

*Analysis and final decisions*

D215 We note that Spark and WIK have not provided us with any further data to justify their submissions. Given the real-world evidence from Chorus and LFCs, we consider 5% infrastructure sharing to be the best estimate.

D216 In Chapter 2 we explain why the LFC/Chorus UFB networks would not co-exist with the hypothetical efficient operator's network. As a consequence, we have assumed that the hypothetical efficient operator serves all copper and fibre demand, including UFB demand that is currently served by the LFCs.[2] We note that Wigley and Company has supported the inclusion of all UFB demand in the demand used to determine the TSLRIC for the UCLL service.[3] We have not assumed any infrastructure sharing between the hypothetical efficient operator and the LFC/Chorus UFB infrastructure, as the latter do not exist in the hypothetical efficient operator scenario.

D217 Therefore, our final decision is that 5% represents a reasonable level of infrastructure sharing.

**Savings from infrastructure sharing**

*Our initial views and views of submitters*

D218 In our December 2014 UCLL draft determination paper and our July 2015 UCLL further draft determination paper, we assumed that where infrastructure sharing

[1062] Spark "Submission on UBA and UCLL FPP further draft pricing review determination" CONFIDENTIAL, 13 August 2015, paragraph [187].

[1063] WIK-Consult "Submission on UBA and UCLL FPP further draft pricing review determination" CONFIDENTIAL, 13 August 2015, paragraph [284].

[1064] Analysys Mason "Cross submission on UBA and UCLL FPP further draft pricing review determination" CONFIDENTIAL, 22 September 2015, pp. 21-22.

[1065] Wigley and Company "Submission on UBA and UCLL FPP further draft pricing review determination" 13 August 2015, paragraphs [11.1-11.3].

occurred, it would lead to a 50% cost saving relative to the cost where infrastructure was not shared. This is because we assumed that the infrastructure costs would be shared equally between two parties and the cost of digging these trenches would not change.

D219 In its cross submission, Analysys Mason suggested that savings from infrastructure sharing are likely to be lower than 50%. This is because the total cost of installing shared underground infrastructure would be greater than the cost of installing underground infrastructure to be used by one party.[1066]

D220 Analysys Mason identified the cost of installing ducts and the cost of digging bigger trenches where separation between ducts is required. It pointed out that where infrastructure is shared, two ducts instead of one would need to be installed. As such, this portion of the cost would not be reduced. As a result, savings would range between 28% and 40% rather than the 50% assumed in our model.[1067]

D221 Analysys Mason also claimed that, in cases where a minimum level of separation is required between ducts, a larger trench would need to be dug. Analysys Mason noted that when both the extra cost of ducts and the cost of digging a larger trench are considered, the savings would be between 7% and 22%.[1068]

*Analysis and final decisions*

D222 We accept Analysys Mason's submission that no savings can be achieved on the cost of installing ducts. We have discussed this issue with TERA. TERA has confirmed that in its model the hypothetical efficient operator already pays the full cost of installing its ducts. Therefore, we have not changed the model in this regard.

D223 We have considered whether a minimum level of separation between ducts, and therefore larger trenches, would be widely required in the hypothetical world. We recognise that the network can be deployed in a number of ways (eg, ducts can be separated vertically or horizontally). Horizontal deployment in particular may lead to greater trenching costs for shared infrastructure relative to the cost of digging a trench for the hypothetical efficient operator alone. Depending on how costs were shared between the hypothetical operator and the EDB, this might mean that the cost savings the hypothetical operator achieved from sharing trenches would be less than 50%.

D224 Even so, given the extra cost involved in horizontal separation, we do not believe that there is a strong reason to believe that horizontal separation would be favoured over vertical separation. Therefore our view is that, on balance, a 50% cost saving seems the most likely outcome.

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[1066] Analysys Mason "Cross submission on UBA and UCLL FPP further draft pricing review determination" CONFIDENTIAL, 22 September 2015, pp. 20-21.

[1067] Analysys Mason "Cross submission on UBA and UCLL FPP further draft pricing review determination" CONFIDENTIAL, 22 September 2015, p. 20.

[1068] Analysys Mason "Cross submission on UBA and UCLL FPP further draft pricing review determination" CONFIDENTIAL, 22 September 2015, pp. 20-21.

# Attachment E: Asset valuation

### Purpose

E1 In this Attachment we explain our final decision on the appropriate asset valuation methodology to be used in our TSLRIC model.

E2 Specifically, in this Attachment we:

E2.1 outline our final decision on the appropriate asset valuation methodology for reusable and non-reusable assets;

E2.2 explain the relevance of asset valuation to TSLRIC;

E2.3 summarise what we have previously said on asset valuation with respect to TSLRIC;

E2.4 describe the key issues raised by submitters in relation to asset valuation during the FPP consultation process;

E2.5 recount our regulatory framework for carrying out the UCLL pricing review determination (as described in Chapter 2); and

E2.6 describe and assess the various options available to us, and explain our decision.

### Our final decision

E3 Our final decision is to use optimised replacement cost (ORC) for all assets as our asset valuation methodology to implement TSLRIC. The main reasons for this are as follows.

E3.1 ORC is consistent with our regulatory framework , which uses a hypothetical efficient operator building a new network from the ground up, and is unconstrained by the legacy choices made regarding the existing network that provides the regulated services. Our regulatory framework is not based on Chorus' actual costs .

E3.2 ORC is consistent with the forward-looking and long run features of the definition of TSLRIC.

E3.3 ORC is consistent with the relevant TSLRIC objectives/outcomes, in particular encouraging efficient build/buy decisions, allowing for efficient cost recovery and incentivising the regulated entity to minimise its costs.

E3.4 ORC is efficient in terms of static and dynamic efficiency, which is consistent with our interpretation of section 18(2) of the Act.

E3.5 ORC is most likely to best give effect to the section 18 purpose of promoting competition for the long-term benefit of end-users.

E4 As we explain in Chapter 2, we have remained open to revisiting our decision to adopt an approach based on the hypothetical efficient operator. Even so, we are satisfied that the hypothetical efficient operator model is the appropriate approach to implementing TSLRIC. An approach based on the hypothetical efficient operator does not preclude the use of asset valuation methodologies other than ORC, but we are satisfied that ORC is the most appropriate methodology in the context of our approach to implementing TSLRIC.

**Relevance of asset valuation to TSLRIC**

E5 Asset valuation is an important step in costing the hypothetical network elements that are involved in supplying the regulated UCLL service by the hypothetical efficient operator. Having identified the MEA required to efficiently supply the regulated service, these assets must be valued in order to establish the capital expenditure associated with the hypothetical network.

E6 An asset can broadly be valued according to either its historic cost, which reflects the actual cost of the asset when it was originally installed, or according to its current or replacement cost, which reflects the cost of replacing the asset at today's prices.

E7 The valuation of the relevant assets provides the capital expenditure requirement of the hypothetical network. This initial capital expenditure requirement can then be converted into an annual capital cost by applying a weighted average cost of capital (WACC), which provides for a return *on* the capital employed, and a depreciation profile, which provides for a return *of* capital over the expected economic life of the assets.[1069]

E8 In the following sections, we explain what we have previously said on asset valuation; the key issues raised by submitters during this FPP process; our regulatory framework for carrying out the UCLL pricing review determination and its relevance to our asset valuation decision; the asset valuation options available to us and the reasons why ORC is the most appropriate asset valuation methodology to apply to all assets.

**What we have previously said on asset valuation**

E9 Some submitters have made reference to our previous statements to criticise our position on asset valuation.[1070] Therefore, we consider it appropriate to briefly set out our previous statements on these matters.

E10 In summary and as discussed below, we have consistently: (i) noted that a range of asset valuation methodologies are open to us when implementing a TSLRIC-based price; and (ii) expressed a preference for ORC.

[1069] Capital costs are then combined with operating expenses and an allocation of overhead costs to build up an estimate of the TSLRIC for the regulated service.

[1070] See for example, Spark "Submission on UBA and UCLL FPP pricing review determination" 20 February 2015, paragraph [307].

*Our previous statements outside the scope of this FPP process*

E11 Our initial views on the application of a TSLRIC methodology were set out in a discussion paper in 2002, which examined the major conceptual and practical issues relevant to implementing a TSLRIC pricing methodology and included a section on asset valuation.[1071] We noted that a range of asset valuation methodologies could potentially be used, including opportunity cost, historic cost, replacement cost, or optimal deprival value.

E12 Following consideration of these options, we proposed to use ORC as the asset valuation methodology in estimating the TSLRIC concept of providing interconnection services.[1072] Submissions in response to the 2002 consultation generally agreed with the use of ORC.[1073] In our TSLRIC principles paper issued in 2004, we confirmed our view that ORC is the appropriate asset valuation methodology where the final pricing principle is a TSLRIC methodology.[1074] This was also the asset valuation approach that we proposed in our draft FPP determination on interconnection services issued in April 2005.[1075]

E13 In our 2010 submission to the Ministry of Economic Development (MED) consultation on the implications of structural separation, we included an appendix in which we discussed a number of potential options and pricing issues for the UBA service, noting that the appendix "should not be read as a full examination of these issues or a full list of potential options or complexities in setting prices.[1076] We commented that assets can be valued on either a forward-looking, current or historic basis, and that the rationale for using a forward-looking (replacement cost) approach is to ensure that "the correct pricing signals are given for entry, build or buy decisions".[1077] We also observed that in practice, the TSLRIC concept can use a combination of replacement costs and historic costs. While we noted that it was possible to use a combination of methodologies, such as historic costs for sunk investments and replacement costs for assets which were subject to realistic replacement, this was not intended as an endorsement of that combination or to

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1071 Commerce Commission "Application of a TSLRIC Pricing Methodology – Discussion Paper" 2 July 2002.

1072 Ibid, section 6.2. We noted that in bottom-up TSLRIC models, ORC is typically used and considered most consistent with TSLRIC. We also noted that even if existing assets were to be included as part of the MEA, historic costs are unlikely to reflect the forward-looking costs of providing the service.

1073 For example, TelstraClear submitted that "the asset valuation approach should be an optimised, forward-looking approach, consistent with TSLRIC principles. The optimal network architecture and technology choice should be determined". TelstraClear also noted that where a tilted annuity approach is used, ORC is required in order to allow the access provider to fully recover the cost of its investment (TelstraClear "Submission on the Commerce Commission's Discussion Paper 'Application of a TSLRIC Pricing Methodology – 2 July 2002' " 16 August 2002, paragraphs [49]–[50]).

1074 Commerce Commission "Implementation of TSLRIC Pricing Methodology for Access Determinations under the Telecommunications Act 2001 PRINCIPLES PAPER" 20 February 2004, paragraph [142].

1075 Commerce Commission "Draft Determination on the Application for Pricing Review for Designated Interconnection Services" 11 April 2005, paragraph [98]. We were not required to issue a final determination in this case, as the initial application for a pricing review was withdrawn following a commercial agreement between the parties.

1076 Commerce Commission "Commerce Commission Response to MED Discussion Document 'Regulatory Implications of Structural Separation'" October 2010, footnote 26.

1077 ibid, p. 27.

signal a change in our approach, and we did not in that submission express a preferred option for valuing assets in a TSLRIC-based pricing exercise.

*Our previous statements and draft decisions in this FPP process*

E14 The Act provides us with a particular definition of "TSLRIC":

> TSLRIC, in relation to a telecommunications service,—
>
> (a) means the *forward-looking* costs over the *long run* of the total quantity of the facilities and functions that are directly attributable to, or reasonably identifiable as incremental to, the service, taking into account the service provider's provision of other telecommunications services; and
>
> (b) includes a reasonable allocation of forward-looking common costs.

E15 We must apply TSLRIC in this pricing review determination.

E16 In our July 2014 regulatory framework and modelling approach paper, we noted that while there are different ways of interpreting forward-looking in the context of a TSLRIC methodology, it will generally involve looking at ORC.[1078, 1079]

E17 In our December 2014 UCLL draft determination, we considered a number of different asset valuation methodologies, including ORC, depreciated optimised replacement cost (DORC), and the dual asset valuation approach recommended by the European Commission (EC). Our preference was to use ORC to value all the assets of the hypothetical efficient operator, including both reusable and non-reusable assets. We listed the main reasons for preferring ORC. [1080]

E17.1 ORC was consistent with the interpretation of forward-looking costs in the definition of TSLRIC.

E17.2 ORC was consistent with our previous approach to TSLRIC and therefore with our (then) TSLRIC objective of predictability.

E17.3 ORC was likely to best incentivise the efficient build-or-buy choice and so is consistent with our objective of promoting efficient investment.

E18 We also considered the Supreme Court decision on the *Vodafone TSO* case,[1081] as well as the EC recommendation to value civil engineering assets using a historic cost approach. We concluded that neither the Supreme Court decision nor the EC

[1078] Commerce Commission "Consultation paper outlining our proposed view on regulatory framework and modelling approach for UBA and UCLL services" 9 July 2014, paragraph [129].

[1079] We acknowledged that there are differing views on the meaning of forward-looking costs, with both Telecom and Vodafone arguing that an ORC valuation should not be applied to assets which can be re-used by Chorus in supplying the UCLL service, and Chorus supporting the use of ORC. We also referred to a report submitted by Frontier Economics for Vodafone, Telecom, and CallPlus in February 2014, which claimed that long-lived re-usable assets should be valued in a way that recognises past recoupment of sunk costs, such as Depreciated ORC (DORC) (ibid, paragraphs [137] and [142]).

[1080] Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014, paragraph [637].

[1081] *Vodafone New Zealand Limited v Telecom New Zealand Limited* [2011] NZSC 138, [2012] 3 NZLR 153.

recommendation altered our view that an ORC approach is appropriate in the current context of implementing TSLRIC.[1082]

E19 In our July 2015 further draft determinations, we continued to prefer ORC as the most appropriate asset valuation methodology for this determination. Our main reasons were broadly those which are explained in this Attachment.

**Key issues raised by submitters during this FPP process**

E20 A range of views have been expressed by submitters on the asset valuation methodology that should be used for the TSLRIC modelling. The main issue relates to the treatment of certain classes of long-lived assets.

E21 A number of submitters argued that there is a distinct class of assets which would be unlikely to be replicated if the modelled entity had access to Chorus' current infrastructure, namely civil engineering assets including ducts, trenches, and manholes. These submitters argued that such assets should not be be valued on a replacement cost basis but instead should be valued in a way which takes account of the historical recovery of such costs by Chorus, ie, depreciated historic cost. Submitters who argued for use of depreciated historic cost in general contended that this valuation method should be applied to assets which Chorus is re-using in the UFB roll-out.

E22 The key submissions made by interested parties included the following:

E22.1 Chorus: ORC is the only option available under TSLRIC; it is forward-looking and is consistent with a number of key TSLRIC objectives/outcomes, our previous decisions on TSLRIC and with the Court of Appeal's characterisation of TSLRIC.

E22.2 Chorus: When properly implemented, depreciated ORC (DORC) is equivalent to ORC in this context.

E22.3 Chorus: Some submitters have been inconsistent in supporting the use of an "efficient Chorus" for the asset valuation decision, and a hypothetical efficient operator construct in other areas (such as aerial deployment).

E22.4 Spark, Vodafone, Wigley and Company: The use of ORC will lead to over-recovery of costs and will not promote competitive outcomes such as improved efficiency, innovation, and lower prices.

E22.5 Spark: Ascribing a value to assets that will not be replaced does not meet the "long run" requirement in the definition of TSLRIC.

E22.6 Spark, Russell McVeagh, Wigley and Company: The use of ORC is inconsistent with the *Vodafone TSO* case and the *Telstra* case, which are relevant precedents.[1083, 1084]

[1082] Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014, paragraphs [660] and [693].

E22.7 Spark: To adopt a valuation methodology (excluding re-use) that permits Chorus to recover the cost of assets already recovered or that will not be replaced is unlawful. In that context our task is to identify the efficient costs of providing a real-world service (Russell McVeagh); a rigid focus on a new network built "from scratch" cannot trump the relevant legal requirements.

E22.8 Wigley and Company: Professor Vogelsang allegedly supports the use of historic cost as being more predictable than ORC as still permitting Chorus to cover the costs of its copper network and generate a profit.

E22.9 On the potential impact of allowing re-use:

E22.9.1 Spark: our estimate in July 2015 (a 9% reduction in the UCLL price) is significant.

E22.9.2 Vodafone, WIK: we had under-estimated the impact of re-use in a New Zealand context.

E22.9.3 Chorus, Analysys Mason: we had over-estimated the impact of re-use in a New Zealand context.

E22.10 WIK: The use of ORC is inconsistent with our approach to network optimisation.

E22.11 Spark: The use of ORC is inconsistent with Chorus and Local Fibre Companies (LFCs) re-using their existing assets in their UFB deployments, which is a guide to the conduct of a cost-minimising hypothetical efficient operator.

E22.12 Spark, Vodafone, Wigley and Company: More weight should be placed on the European Commission's recommendation to use a dual asset valuation methodology.

E22.13 Wigley and Company: There is no reason why the hypothetical efficient operator would use EDB poles but not pre-existing fibre infrastructure, including Chorus'.

E23 For the reasons set out in the following sections, after considering all relevant submissions including those summarised above, our final decision is that ORC should be used to value all assets of the hypothetical efficient operator in the present context.

[1083] *Vodafone New Zealand Limited v Telecom New Zealand Limited* [2011] NZSC 138, [2012] 3 NZLR 153.
[1084] *Application by Telstra Corporation Ltd* [2010] ACompT 1.

**Our regulatory framework for carrying out the UCLL pricing review determination**

E24 As explained in Chapter 2 and earlier in this Attachment, we must apply TSLRIC in this pricing review determination.[1085]

E25 TSLRIC is defined in the Act as the "forward-looking costs over the long run of the total quantity of the facilities and functions that are directly attributable to, or reasonably identifiable as incremental to, the service, taking into account the service provider's provision of other telecommunications services".[1086] The definition of TSLRIC also includes a reasonable allocation of forward-looking common costs.

E26 The Act's definition of TSLRIC provides guidance to us, but it is not determinative on the approach to be taken on the valuation of assets.

E27 As explained in Chapter 2:

E27.1 We use the concept of a hypothetical efficient operator to guide us in giving effect to the regulatory framework. The hypothetical efficient operator builds and operates an entirely new network today from scratch, using assets collectively referred to as the modern equivalent asset (MEA) to provide the relevant regulated services.

E27.2 The hypothetical network is unconstrained by legacy choices made by an incumbent provider regarding the design of the network, the nature of assets or the mix of technology employed. This involves the assumption that all assets within the legacy fixed telecommunications network no longer exist, and modern and efficient technology is used to build and operate the modelled network.

E27.3 Our approach is consistent with the economic theory behind the TSLRIC concept, and also with the Court of Appeal's characterisation of TSLRIC.[1087]

E27.4 Although the concept of the hypothetical efficient operator guides our approach to implementing TSLRIC, we have not allowed the concept to dictate the outcome of individual decisions or to trump the legal requirement to implement TSLRIC in accordance with section 18. Similarly, while we have endeavoured to develop a model that is internally consistent,[1088] we recognise that there are degrees of consistency and that a departure from a guiding principle (or revisiting a guiding principle) might be justified in particular circumstances. We explain below how we have

[1085] Telecommunications Act 2001, Schedule 1, Part 2, Subpart 1.

[1086] Telecommunications Act 2001, Schedule 1, clause 1.

[1087] *Chorus v Commerce Commission* [2014] NZCA 440, paragraph [30].

[1088] In the *Telstra* case (*Application by Telstra Corporation Ltd* [2010] ACompT 1), the Australian Competition Tribunal also noted the importance of consistent modelling decisions at paragraph [99]: "TSLRIC+ is dependent on the quality of the cost inputs and assumptions made in relation to them for its utility. They must reflect 'forward-looking best available technology and practices consistent with a real-world network architecture and actual conditions'. The input values must be consistent with each other and with the purpose of the modelling" (emphasis added). The *Telstra* case is further discussed below.

considered, on their own merits, the various candidate valuation methodologies, and why we have decided to use ORC.

E28 As noted in Chapter 2, submitters have generally agreed throughout this FPP process on the above conceptual basis for implementing TSLRIC, with submissions from Spark,[1089, 1090] Chorus,[1091] Vodafone,[1092, 1093] Wigley and Company,[1094] and WIK[1095] supporting the use of the hypothetical efficient operator to implement TSLRIC. In its September 2015 cross submission, Wigley and Company state that:[1096]

> The one element of common ground between Chorus and our RSP and consumer representative clients is that [quoting Chorus] "The historic costs of network deployment … are irrelevant in calculating a forward-looking long run incremental total cost of the service … forward-looking costs reflect the costs that a network operator would incur if it built a new network today using assets collectively referred to as the modern equivalent asset". (emphasis added)

E29 According to Wigley and Company, this conceptual basis counts against the use of Chorus' actual costs.[1097] Spark also submitted that a "TSLRIC model will inevitably depart from Chorus' actual cashflow".[1098] This is consistent with the Court of Appeal, who has also described TSLRIC as "the costs of an efficient access provider over a sufficient period of time (long run), on a "forward-looking" basis (reflecting the notional costs to an operator if it built a new network) rather than of Chorus's actual costs."[1099]

E30 In making our final asset valuation decision, we were also guided by the relevant TSLRIC objectives/outcomes set out in Chapter 2. Spark agreed with the objectives,

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1089 Spark "UBA and UCLL FPP pricing review draft decision" 20 February 2015, paragraph [36].

1090 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" 13 August 2015, paragraph [25].

1091 Chorus "Submission for Chorus in response to Draft Ricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and Process and Issues Update Paper for the UCLL and UBA Pricing Review Determinations" 20 February 2015, paragraphs [101]–[102].

1092 Vodafone "Submission on process paper and draft pricing review determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and comments on Analysys Mason's TSLRIC models" 20 February 2015, at executive summary "ii)".

1093 Vodafone "Submission to the New Zealand Commerce Commission Further Draft Pricing Review Determination for Chorus' Unbundled Copper Local Loop Service and Further Draft Pricing Review Determination for Chorus' Unbundled Bitstream Access Service" 13 August 2015, paragraph [A4.1].

1094 Wigley and Company "Submission on draft pricing review determination for UBA and UCLL services" 20 February 2015, paragraphs [5.18e] and [2.31].

1095 WIK-Consult "Submission In response to the Commerce Commission's "Further draft pricing review determination for Chorus' unbundled bitstream access service" and "Further draft pricing review determination for Chorus' unbundled copper local loop service" including the revised cost model and its reference documents, paragraph [172].

1096 Wigley and Company "Cross-submission in relation to UCLL and UBA draft pricing review determinations" 24 September 2015, paragraph [6.11].

1097 Ibid.

1098 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" 24 September 2015, paragraph [21].

1099 *Chorus v Commerce Commission* [2014] NZCA 440 at [30].

but submitted that key aspects of the efficiency objectives have not been adequately taken into account in our approach to asset valuation.[1100] We discuss this further below. Finally, we have given effect to the requirement to adopt the decision that we believe is most likely to best give effect to the section 18 purpose statement.

**Setting out the options available to us**

E31 TSLRIC-based pricing models can utilise a number of approaches to asset valuation other than ORC and it is open to us to choose such an approach.

E32 The following valuation options have been discussed by submitters and are considered as part of our final determination. The first three options are replacement cost-based approaches, and the remaining option is based on historic costs.

E32.1 Optimised Replacement Cost (ORC): new assets are installed in the optimised network and are valued at their current replacement cost (which is recovered over the expected economic life of the assets). Chorus supported this approach .[1101, 1102]

E32.2 Optimal deprival value (ODV): reflects the cost to the asset owner if deprived of the asset. ODV has been referred to by Wigley and Company, and by Spark at the FPP conference.[1103, 1104]

E32.3 Depreciated Optimised Replacement Costs (DORC): similar to ORC, but taking into account the elapsed life of the asset (with costs recovered over the expected remaining economic life of the assets). This approach has previously supported by Spark and Frontier Economics.[1105, 1106]

E32.4 Historic cost/re-use: based on the original cost of the asset. Spark, Vodafone, WIK, and Wigley and Company supported this approach in respect of certain types of asset.[1107, 1108, 1109, 1110, 1111, 1112] These submitters

1100 Spark “Further draft pricing review determination for Chorus’ UBA and UCLL services” 13 August 2015, paragraph [202].

1101 Chorus “Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and Process and Issues Update Paper for the UCLL and UBA Pricing Review Determinations” 20 February 2015, paragraphs [89]–[90].

1102 Chorus “Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services (2 July 2015)” 13 August 2015, paragraph [178].

1103 Wigley and Company “Submission on draft pricing review determination for UBA and UCLL services” 20 February 2015, paragraphs [13.2]–[13.3].

1104 Commerce Commission, "UBA and UCLL pricing review determination conference transcript", 15-17 April 2015, p. 107.

1105 Telecom "Submission on Process and issues paper for determining a TSLRIC UCLL price” 14 February 2014, paragraphs [23]–[24].

1106 Frontier Economics “Determining a TSLRIC price for Chorus’ UCLL service” February 2014.

1107 Spark “UBA and UCLL FPP pricing review draft decision” 20 February 2015, paragraph [57]; Spark “Further draft pricing review determination for Chorus’ UBA and UCLL services” 13 August 2015, paragraphs [205]–[206].

generally support the EC recommendation to use a “dual asset valuation” approach involving historic cost for reusable and “non-replicable” assets, and ORC for “replicable” assets.

E33 According to the EC, reusable civil engineering assets such as ducts, trenches, and poles are unlikely to be replicated. Under the EC’s recommended costing methodology, National Regulatory Authorities (NRAs) should value all assets in the regulatory asset base (RAB) of the modelled network on the basis of replacement cost, except for reusable civil engineering assets.[1113]

E34 Some submitters argue that we are constrained in terms of the asset valuation options that we are able to consider in the context this TSLRIC exercise. Some examples are listed below.

E34.1 Chorus argued that the only option available to us is ORC, as the definition of TSLRIC excludes historical considerations, and the use of historic costs would be a departure from the orthodox forward-looking TSLRIC concept.[1114]

E34.2 Wigley and Company argued that an approach which does not value existing assets such as trenches at “historical or other reduced cost … is not available as it does not apply and is contrary to the judgment of the Supreme Court in *Vodafone v Telecom*”.[1115]

E35 We disagree. While we see advantages and disadvantages with different asset valuation options, we believe that a range of asset valuation methodologies is open to us. As noted above, we have consistently expressed this view, and we have not received any compelling submission that led us to change our view. The determination of an appropriate approach to asset valuation is a standard issue in

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[1108] Vodafone "Submission on process paper and draft pricing review determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and comments on Analysys Mason's TSLRIC models" 20 February 2015, paragraph [F1.4].

[1109] WIK “Submission in response to the Commerce Commission’s “Draft pricing review determination for Chorus’ unbundled bitstream access service” and “Draft pricing review determination for Chorus’ unbundled copper local loop service”” 20 February 2015, paragraph [1.1.2].

[1110] Wigley and Company “Submission on draft pricing review determination for UBA and UCLL services” 20 February 2015, paragraph [14.3].

[1111] Wigley and Company “Submission on Further Draft Pricing Review UCLL and UBA Determinations” 13 August 2015, Section 10.

[1112] Wigley and Company “Cross-submission in relation to UCLL and UBA draft pricing review determinations” 24 September 2015, paragraph [7].

[1113] EC “COMMISSION RECOMMENDATION of 11.9.2013 on consistent non-discrimination obligations and costing methodologies to promote competition and enhance the broadband investment environment”, paragraph [33].

[1114] Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and Process and Issues Update Paper for the UCLL and UBA Pricing Review Determinations" 20 February 2015, paragraphs [89]–[90].

[1115] Wigley and Company “Submission on draft pricing review determination for UBA and UCLL services”, 20 February 2015, paragraphs [13.2]–[13.3].

TSLRIC-based prices, and we can see no indication that Parliament intended to restrict the range of options normally available.

E36 We have set out our assessment of the various asset valuation options in the following sections, which includes our views on the approach taken by the *Vodafone TSO* case, the Australian Competition Tribunal *Telstra* case, and the EC approach. The discussion of options necessarily overlaps since submitters have often made their points by comparing one methodology to another.

**Option 1: Optimised Replacement Cost**

E37 In this section we set out the reasons for our decision to use ORC as our asset valuation methodology for all assets when implementing this TSLRIC. In summary, ORC:

E37.1 is consistent with our regulatory framework, including the concept of the hypothetical efficient operator;

E37.2 is consistent with the forward-looking and long run features of the definition of TSLRIC;

E37.3 is consistent with the relevant TSLRIC objectives/outcomes;[1116]

E37.4 is efficient in terms of static and dynamic efficiency;

E37.5 is most likely to best give effect to the section 18 purpose statement.

E38 We also address the various criticisms that have been made of the ORC approach.

*ORC is consistent with our regulatory framework, including the concept of the hypothetical efficient operator*

E39 As discussed in Chapter 2, we have adopted the conventional approach of a hypothetical efficient operator building and operating an entirely new network from scratch, using modern efficient technology and which is not constrained by legacy decisions on network design or the types of assets employed.[1117] We have used this approach to guide our implementation of TSLRIC.

E40 In our view, the use of ORC, which is based on the cost of deploying new and efficient assets today, is aligned with the conventional approach described in the preceding paragraph. As has been noted by Network Strategies in their 2013 submission to MBIE, under the standard practice of TSLRIC modelling:[1118]

[1116] As we discuss in Chapter 2, the link between the TSLRIC objectives/outcomes (which are efficiency-based) and the objectives of section 18 is close. Setting a TSLRIC-based price that meets the TSLRIC objectives/outcomes will generally promote competition for the long-term benefit of end users.

[1117] As noted above, there has been general agreement among parties on this approach.

[1118] Network Strategies "Final report for Vodafone New Zealand: Review of the Telecommunications Act 2001" 13 September 2013, p. 24.

> Regulators typically develop a bottom-up economic / engineering cost model to estimate TSLRIC prices. This involves estimating the cost of replicating the functionality of the network if it had to be built from scratch today. Current market or replacement cost is applied, the network is dimensioned to meet current (and forecast) demand and the number and type of modern equivalent assets (MEA) that need to be costed are estimated.

E41 Chorus supported the use of ORC as it enables a forward-looking efficient price to be set which is consistent with the concept of a hypothetical efficient operator.[1119]

*ORC is consistent with the forward-looking and long run features of the definition of TSLRIC*

E42 In Chapter 2, we discuss the elements of the definition of TSLRIC, including "forward-looking" and "long run". We note that forward-looking costs reflect the current and ongoing future costs of providing the regulated service. Historic costs that have already been incurred, and the accounting costs that are recorded in a business' financial accounts, are not necessarily the same as forward-looking costs (although they may be informative in some circumstances). We also conclude in Chapter 2 that it is appropriate to consider the "long run" as a time period over which all costs, including sunk costs, are variable.

E43 According to Spark, forward-looking costs "must be costs that the access provider can reasonably be expected to incur within a reasonable (finite) period" and "can, in some but not all circumstances, include historic costs". [1120] Spark submitted that forward-looking costs are only those that an efficient operator would incur, and must exclude costs that an access provider will never incur.

E44 Spark did not define what it considers to be a "reasonable (finite) period". However, in discussing the "long run" element of TSLRIC, Spark supported Baumol's definition of the long run as being a "period so long that all of a firm's contracts will have run out, its present plant and equipment will have been worn out or rendered obsolete and will therefore need replacement." According to Spark, this definition of long run is consistent with the definition of TSLRIC. [1121]

E45 Having supported this definition of the 'long run', Spark submitted that there are certain classes of assets – particularly sunk and reusable assets – which Spark claims in the long run would not be replaced. Spark submitted that such assets do not warrant a value.[1122]

E46 We disagree with Spark. In our view, it is inconsistent to claim that sunk and reusable assets such as ducts will not be replaced in the long run, when the long run is defined as a period within which a firm's "present plant and equipment" will require replacement. For the UCLL service, "present plant and equipment" includes

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[1119] Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services (2 July 2015)", 13 August 2015, paragraphs [178.1]–[178.2].

[1120] Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" 13 August 2015, paragraph [39].

[1121] Ibid, paragraphs [49]–[50].

[1122] Ibid, paragraph [51].

ducts.[1123] The definition of the long run which Spark supported as being consistent with TSLRIC is in our view aligned with the concept of a new replacement network being constructed, which includes the underground infrastructure which would be used in such a deployment.

E47 For ducts, as explained in Attachment H, we have used an economic life of 50 years which we consider reflects the long-lived nature of these assets. As we noted in the July 2015 further draft determination, no party has argued that the asset life for ducts should be longer than 50 years.[1124] We therefore consider the argument that ducts will not be replaced in the long run to be problematic. If an economic life of 50 years is considered appropriate for the purposes of allowing for the recovery of the cost of that asset, that asset will by definition require replacement at the end of its economic life. As noted by Professor Vogelsang, even ducts will have to be replaced eventually.[1125]

E48 Sapere also argued that Spark's approach confuses short-run incremental cost with TSLRIC,[1126] and there is no economic justification to remove passive infrastructure asset values from the TSLRIC modelling. The capital costs associated with the modelled network are recovered over the expected lifetime of the assets using a tilted annuity, the parameters of which reflect the expected economic life of the asset, expected price trends, and the cost of capital.

E49 Wigley and Company argued against the use of ORC for assets that will not be replaced, although in the same paragraph agrees with the notion that "historic costs of network deployment … are irrelevant in calculating a forward-looking long run incremental total cost".[1127]

E50 WIK has also previously noted that a drawback of using historic costs as a basis for valuing assets is that historic costs may not be informative about forward-looking costs.[1128]

E51 We consider that the costs historically incurred by Chorus in deploying ducts are unlikely to reflect, in the words of the Court of Appeal, "the costs of an efficient access provider over a sufficient period of time (long run), on a "forward-looking"

[1123] The exclusion of sunk and reusable assets such as ducts would also appear to be inconsistent with the reference to "total quantity" of facilities and functions which is part of the definition of TSLRIC in the Act.

[1124] Commerce Commission "Further draft pricing review determination for Chorus' unbundled bitstream access service" 2 July 2015, paragraph [1272].

[1125] Professor Vogelsang "Review of some Submissions on the Commerce Commission's July 2, 2015, draft determination on UCLL/UBA pricing", 26 November 2015, paragraph [75]. In a footnote to this paragraph, Professor Vogelsang noted that the eventual need for ducts to be replaced "is why WIK's (2010) modelling of "brownfield" costs was based on expected remaining lives of such assets of about twenty years rather than infinity."

[1126] Sapere "Cross-submission on UCLL and UBA Price Determination Issues" 22 September 2015, paragraph [82].

[1127] Wigley and Company "Cross-submission in relation to UCLL and UBA draft pricing review determinations" 24 September 2015, paragraph [6.11].

[1128] WIK, "Wholesale pricing, NGA take-up and competition" 7 April 2011, p. 23.

basis (reflecting the notional costs to an operator if it built a new network) rather than of Chorus's actual costs."[1129]

E52 In our view, the use of ORC is consistent with the forward-looking and long run elements of TSLRIC.

*ORC is consistent with the relevant TSLRIC objectives/outcomes which have guided our decision*

Efficient investment

E53 The use of ORC is consistent with efficient investment by promoting entry decisions which take into account the cost of building a new network infrastructure or the cost of purchasing regulated access to existing infrastructure. This is because it sets a price at which an efficient operator would be indifferent between building their own network and buying access to an existing network, and will encourage build by an operator who can do so at a lower cost.

E54 As the Body of European Regulators for Electronic Communications (BEREC) has noted, the use of asset values based on the replacement cost should encourage efficient build-or-buy decisions where there is the prospect of entry.[1130]

E55 Network Strategies has also observed that the reasons underpinning the use of a TSLRIC approach, which is based on "the cost of replicating the functionality of the network if it had to be built from scratch today", include:

E55.1 that it provides appropriate incentives for efficient entry and exit; and

E55.2 that it encourages efficient investment by both prospective service providers (who will base their decisions on whether to build their own network or rent) and incumbent access providers.[1131]

E56 Encouraging such build-or-buy decisions is therefore an important rationale which is relevant in the New Zealand context where there has been competitive bypass of parts of Chorus's UCLL network by LFCs. In our view, by maintaining incentives for efficient infrastructure-based investment by both access seekers and access providers, the use of ORC is likely to facilitate competition such as that emerging between LFCs and Chorus. This will provide long-term benefits for end-users both in terms of pricing and innovative new services.

E57 Spark argued that we had not advanced sufficient evidence to support this reasoning, and that migration of end-users to fibre is inevitable regardless of copper pricing. According to Spark, there will be greater benefits to end-users if fibre

[1129] *Chorus v Commerce Commission* [2014] NZCA 440 at [30].

[1130] BEREC "BEREC response to the Commission's Questionnaire on costing methodologies for key wholesale access prices in electronic communications" 9 December 2011, p. 19.

[1131] Network Strategies "Final report for Vodafone New Zealand: Review of the Telecommunications Act 2001" 13 September 2013, p. 24.

investment continues as required under the UFB and copper pricing is not artificially inflated.[1132]

E58 Conversely, Chorus submitted that ORC generates the correct build/buy incentives to ensure efficient cost recovery.[1133]

E59 As we have discussed, the TSLRIC objective of promoting efficient build-or-buy decisions remains a relevant consideration in the New Zealand context, where there have been recent examples of competitive bypass of Chorus' UCLL network by the LFCs. The LFC networks collectively cover approximately 22% of New Zealand, and further potential bypass may occur as a result of the Government's expansion of the UFB initiative (from 75% to 80% of New Zealand).

E60 Other regulators have revisited the build/buy rationale for setting regulated access prices on the basis that competitive bypass of the local loop network is considered unlikely. For example, the ACCC has moved away from TSLRIC-based price for fixed access services and towards a "building blocks" approach.[1134] The EC is recommending the use of historic costs for non-replicable assets and is also encouraging the deployment of next generation access (NGA) networks through mandating access to ducts.

E61 However, as explained in Chapter 2 and later in this Attachment, we consider that there are some important differences between the context of setting the TSLRIC price in New Zealand, and the circumstances of the *Telstra* case and the EC recommendation. In particular:

E61.1 we cannot move away from the Act's definition of TSLRIC (which is forward-looking);

E61.2 the *Telstra* case was concerned with estimating Telstra's ongoing costs rather than the costs of a hypothetical efficient operator;

E61.3 the *Telstra* case involved a different approach to the MEA and optimisation; and

E61.4 the EC and the *Telstra* case placed less weight on build-buy considerations.

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1132 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" 13 August 2015, paragraph [233].

1133 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services (2 July 2015)" 13 August 2015, paragraph [178.3].

1134 In its 2010 review of accessing pricing principles for fixed line services, the ACCC noted that the building blocks approach could be implemented using a range of asset valuation approaches, ranging from scrap value to ORC. The ACCC proposed an initial RAB value based on depreciated actual cost. See ACCC "Review of the 1997 telecommunications access pricing principles for fixed line services Draft Report" September 2010, section 5. As noted below, in implementing its "building blocks" approach in its July 2011 final access determination, the ACCC also took into account the importance of price stability.

E62 On balance, there is not a sufficiently strong case to follow the EC and move away from the conventional approach to implementing a forward-looking TSLRIC-based price.[1135]

E63 We also disagree with Spark that copper pricing is "artificially inflated" as a result of our decision to apply ORC to all assets. It appears that Spark is referring to the effect of valuing certain assets at ORC, rather than using the historic cost actually incurred by Chorus. We explain in this Attachment why we consider that adopting ORC will best implement TSLRIC and promote the section 18 purpose statement. We therefore disagree that it involves artificially inflating copper pricing.

Efficient cost recovery

E64 We consider that the use of ORC is consistent with the TSLRIC objective of allowing for efficient cost recovery. In determining the ORC of the MEA, costs are based on the most efficient technology used to supply the regulated service. The modelled network is subject to optimisation to ensure that it is deployed in an efficient manner. The resulting quantity of assets required in the deployment of the modelled network is then valued to ensure that the long run costs of building the network are captured.

E65 Sapere argued that Spark's proposal to exclude the cost of sunk and reusable assets would prevent a supplier from recovering its costs:[1136]

> If Spark's proposal were adopted, a supplier that has the majority of relevant assets already in place would face a TSLRIC price that tends to zero. When faced with the prospect of being unable to recover sunk investment, investors would be very reluctant to commit. That is, a rational investor would anticipate the kind of regulatory opportunism that the Spark approach entails and reduce or curtail investment accordingly.

E66 We agree with Sapere that it would not be appropriate to exclude sunk and reusable assets, and that the use of ORC applied to such assets will produce capital costs which reflect the forward-looking long run costs of the modelled network.[1137]

E67 We also note that the TSLRIC objective/outcome of allowing for the recovery of efficient costs could be jeopardised by switching between valuation methodologies partway through the life of the asset. For example, for assets with a positive price trend (such as ducts), a tilted annuity will tend to result in a back-loaded profile of capital charges, which increase over time in line with the positive tilt. By contrast, the use of historic cost valuation is likely to result in a front-loaded profile of declining annualised capital costs where straight-line depreciation is used. This is

[1135] We also note that the ACCC recently reviewed and amended the pricing principle for fixed line access in Australia. In contrast to the EC varying the implementation of TSLRIC, the ACCC rejected TSLRIC and replaced it with a "building blocks" approach (ACCC "Review of the 1997 telecommunications access pricing principles for fixed line services Draft Report" September 2010).

[1136] Sapere "Cross-submission on UCLL and UBA Price Determination Issues" 22 September 2015, paragraph [71].

[1137] This point also relates to incentives for efficient investment, which is one of the TSLRIC objectives/ outcomes.

because the constant annual depreciation charge combines with a cost of capital applied to a declining net book value over time.

E68 In these circumstances, as CEG has previously noted, a switch from an ORC approach to a historic cost approach for certain assets (such as ducts) could risk undermining the expectation that the present value of regulated charges will be sufficient to recover efficient costs.[1138,1139] Such a change could be seen as a form of inconsistent regulation over time, and the resulting under-compensation could have a detrimental effect on future investment.

Minimisation of costs by the regulated entity

E69 A TSLRIC price based on the costs of a hypothetical efficient operator building a new network rather than on the actual costs of the regulated entity, also provides an incentive for the regulated entity to minimise its costs.

E70 If regulated prices were determined on the basis of the actual costs incurred by the regulated entity (as under a historic cost approach), any cost reduction would flow more directly through into the asset base used to determine regulated prices. This will tend to reduce the incentives for the regulated entity to minimise costs in the first place.[1140] We expect these incentives to be stronger under TSLRIC which is based on ORC. Professor Vogelsang has expressed a similar view.[1141]

E71 Efforts by the regulated entity to minimise costs may still have some influence on the TSLRIC price, for example where the TSLRIC model is guided by real-world considerations. However, such a link will tend to be less direct as the regulated price would be based on the ORC of the hypothetical efficient operator rather than on the actual costs of the regulated entity.

*The use of ORC is efficient in terms of static and dynamic efficiency*

E72 Spark argued that while the conceptual framework that we have set out is appropriate for this TSLRIC exercise, the use of ORC does not produce the efficiency, innovation, and pricing outcomes consistent with a competitive market, which is the intent of *ex ante* regulation. In particular, Spark argued that the hypothetical efficient operator should be a proxy for the least cost provider of the regulated services.[1142] According to Spark, applying ORC to value sunk assets which will not be replaced will not permit these outcomes.[1143]

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1138 CEG "Non-replicable assets and forward-looking costs" August 2014, paragraphs [12] – [13], and [21].

1139 See also, Commerce Commission, "UBA and UCLL pricing review determination conference transcript", 15-17 April 2015, pp. 92–93.

1140 Some incentive may remain to the extent that the regulated entity can achieve and retain cost reductions between resets.

1141 Professor Vogelsang "Current academic thinking about how best to implement TSLRIC in pricing telecommunications network services and the implications for pricing UCLL in New Zealand" 25 November 2014, paragraphs [54]–[55].

1142 Spark's economic advisor has previously cautioned against focusing solely on cost efficiency. "Not only the prices of services today are in the interest of end-users and RSPs, but they are also interested in being served by a future proof technology allowing bandwidth growth on demand, *so that an approach solely*

E73 Spark argued that we have recognised that the potential impact of reusing ducts can produce a significant cost saving (lowering the UCLL price by 9%), and Spark submitted it is likely that the hypothetical efficient operator would take advantage of such an efficiency.[1144]

E74 Wigley and Company also referred to modelling choices which produce the lowest possible cost of supplying the regulated service.[1145]

E75 Chorus disagreed that the possible 9% reduction in the UCLL price represents an "efficiency" which has not been incorporated. According to Chorus, the 9% refers to the impact of "a departure from the forward-looking long run exercise that the Commission is required to implement."[1146,1147]

E76 Spark and Wigley and Company appeared to focus narrowly on static efficiency when considering individual modelling choices which produce the lowest possible cost of supplying the regulated service.

E77 As both Professor Vogelsang and Chorus have observed, this results in a series of modelling choices which may not be internally cohesive or consistent with our regulatory framework, particularly the concept of a hypothetical efficient operator.[1148] For example, in commenting on Spark's submission on the treatment of sunk costs, Professor Vogelsang stated:[1149]

> … my sense is that it mixes the TSLRIC approach with a path dependence approach, choosing the properties of each to come up with the lowest possible costs. If one wanted to achieve Spark's objective of efficient costs in the real world, one would have to use a top-down approach that starts from the incumbent's actual costs and adjusts for inefficiencies.

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*focused on cost efficiency does not fit the MEA concept*." (emphasis added). WIK "Cross submission In response to the Commerce Commission's "Consultation paper outlining our proposed view on regulatory framework and modelling approach for UBA and UCLL services" 20 August 2014, paragraph [10].

1143 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" 13 August 2015, paragraph [204].

1144 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" 13 August 2015, paragraph [206].

1145 Wigley and Company "Submission on Further Draft Pricing Review UCLL and UBA Determinations" 13 August 2015, paragraph [4.10].

1146 Chorus "Cross-submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services (2 July 2015)" 24 September 2015, paragraph [10].

1147 We further discuss the 9% sensitivity estimate of the potential impact of allowing reuse later in this Attachment. We note that a modelling framework which incorporates reuse of existing ducts would likely result in a number of changes to other modelling choices, such as in the area of the UCLL MEA, network optimisation, and the proportion of aerial network deployment.

1148 Chorus "Cross-submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services (2 July 2015)" 24 September 2015, paragraph [13].

1149 Professor Vogelsang "Review of some Submissions on the Commerce Commission's July 2, 2015, draft determination on UCLL/UBA pricing" 26 November 2015, paragraph [78].

E78 In this regard, we also agree with Chorus' cross submission that some submitters have been inconsistent in supporting the use of an "efficient Chorus" for the asset valuation decision, and the hypothetical efficient operator construct in other areas (such as aerial deployment).[1150]

E79 When considering whether a modelling choice such as asset valuation is efficient, we have considered both static and dynamic efficiencies. This approach is consistent with the High Court's comments regarding our IPP determination.[1151] It also relates back to the TSLRIC objectives/outcomes of cost minimisation, recovery of efficient costs, and efficient investment. The objectives of providing incentives for cost minimisation and recovery of efficient costs relate to productive efficiency, and we consider that the use of ORC is productively efficient as it ensures that the forward-looking costs of the total quantity of of facilities used by the hypothetical efficient operator are recovered over the expected full economic life of the MEA.[1152] We also consider that the use of ORC is efficient in a dynamic sense by providing incentives for efficient investment.

E80 In our view, it is not appropriate to make individual modelling decisions solely on the basis of minimising the cost of the UCLL service. We do not consider that such an approach would satisfy the TSLRIC objectives or the section 18 purpose statement. Nor are we aware of any international precedents for such an approach.

*Section 18 purpose statement considerations*

E81 We consider that ORC is the modelling decision that is most likely to best give effect to the section 18 purpose. In particular, as discussed above, we consider that the use of ORC is consistent with incentivising efficient investment decisions, especially in relation to competitive bypass of the regulated entity.

E82 This has been the case in New Zealand with the LFCs, and with the planned expansion of the UFB deployment. The LFCs have invested in competitive fibre-based networks which have bypassed Chorus' UCLL network. Such investment has been made against a backdrop of TSLRIC regulation of the existing copper access network with which the LFCs will be competing.

E83 As noted by both BEREC and Network Strategies, one of the objectives of TSLRIC-based price is to facilitate efficient build-or-buy decisions where there is the prospect of entry, by ensuring that the regulated price is no more than the cost of deploying a new network. Setting a regulated price below this level (in particular, once investment and entry decisions have been made) would risk discouraging future network-based entry. Such entrants would face the prospect of not being able to recover their costs as a result of the regulated price.

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[1150] Chorus "Cross-submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services (2 July 2015)" 24 September 2015, paragraph [13].

[1151] *Chorus v Commerce Commission* [2014] NZHC 690 at [34].

[1152] If past depreciation is to be taken into account, the depreciated asset value would have to be recovered over a shorter period reflecting the expected remaining economic life of the asset.

E84 A regulated access price which is set below ORC may be compatible with entry if access is provided to those specific assets which are valued below replacement cost. For example, if the UCLL price were to be based on a depreciated historic cost valuation applied to ducts, an entrant deploying its own network would find it difficult to compete with UCLL-based competitors, unless the entrant were able to gain access to the incumbent ducts. However, ducts access is not a designated service under Schedule 1 of the Telecommunications Act in New Zealand.

E85 On this basis, the use of ORC is likely to give best effect to the section 18 purpose to promote competition for the long-term benefit of end-users.[1153] The subsequent analysis of the competing alternatives in the rest of this Attachment has been guided by this consideration.

E86 Wigley and Company submitted that if the least cost asset valuation methodology is not adopted, the higher cost option must be justified under section 18 and quantitatively analysed.[1154] Wigley and Company claimed that the build/buy justification of ORC is not material, given the criticisms levelled by the Australian Competition Tribunal in the *Telstra* case.

E87 As noted in Chapter 2, a modelling approach which allowed for re-use of existing assets would move towards an "efficient Chorus", which could lead to irrational results. For example:

E87.1 If the "efficient Chorus" had the existing copper network at its disposal, it is not clear why it would construct a MEA. As noted above, such an approach applied to aged assets amounts to short-run incremental cost rather than TSLRIC, and this could discourage future investment which would not give best effect to section 18.

E87.2 An approach based on historic costs would produce a price that was not an objective measure of efficient cost, but instead would depend on Chorus' characteristics. For example, asset valuation would depend on the age of Chorus' assets. This path dependency would mean that the TSLRIC price would depend on when the exercise was conducted even though there had been no change in technology or demand. It could also give rise to a substantial price shock when the underlying assets require replacement.

E88 In our view, such possibilities would be inconsistent with this TSLRIC exercise we are required to conduct and would fail to generate a price which would send appropriate build/buy signals, particularly in relation to LFC investment.

E89 While we do not consider that we are required to quantitatively analyse the decision to adopt ORC, we have provided a sensitivity estimate of the potential impact of this modelling decision on the UCLL price. This was to show that the potential impact of

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[1153] The subsidised nature of the UFB deployment suggests that the prospect of further entry beyond the UFB programme may be limited.

[1154] Wigley and Company "Cross-submission in relation to UCLL and UBA draft pricing review determinations" 24 September 2015, paragraph [7.40].

allowing for re-use of existing ducts may not be as great in a New Zealand context as some parties had suggested.[1155] This sensitivity estimate is discussed further below. We also provide further commentary on the relevance of the *Telstra* case below.

*Criticisms of ORC*

E90 A number of submitters criticised the application of ORC to “non-replicable” assets such as ducts. They referred to the Supreme Court’s concerns over the use of replacement cost in the *Vodafone TSO* case, as well as to the Australian Competition Tribunal decision in the *Telstra* case. The main concern expressed by access seekers over the use of ORC is that it would result in over-recovery of costs. We turn to each of these criticisms below.

*Vodafone TSO case*

E91 The background to the *Vodafone TSO* case is described in Chapter 2. In summary, the case concerned the provision of residential telephone connections to commercially non-viable customers (CNVCs). Under the TSO regime in effect at the time, which was governed by Part 3 of the Act, Telecom had to meet a number of TSO obligations, including the provision of a residential telephone connection to CNVCs. Telecom was entitled to compensation for the “net cost” of meeting the TSO obligations, with the net cost determined by the Commission.[1156] The net cost was then shared between Telecom and other liable persons who provided telecommunications services to end-users.

E92 A number of submitters have argued that the Supreme Court’s decision in the *Vodafone TSO* case is a relevant consideration for us. The majority in the Supreme Court were critical of the decision to use a replacement cost valuation methodology for sunk legacy assets that were partially or wholly depreciated and would not in reality be replaced by Telecom in the future.[1157]

E93 For the reasons explained below, we consider that the Supreme Court’s concerns about the use of a replacement costs methodology are not applicable here.

E94 Chorus agreed that the *Vodafone TSO* case is distinguishable and not relevant to this FPP, due to fundamental differences in statutory context, and also pointed to the Court’s comments about the low precedent value of the case.[1158, 1159, 1160]

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1155 For example, WIK had claimed that based on a WIK 2011 study, the impact of allowing for re-use could be between 13% and 17% of the TSLRIC estimate. See WIK-Consult “Submission on the Commerce Commission’s analytical frameworks for considering an uplift to the TSLRIC price and/or WACC” 8 May 2015, paragraph [117].

1156 Section 5 of the Act defines net cost as “the unavoidable net incremental cost to an efficient service provider of providing the service required by the TSO instrument to commercially non-viable customers.”

1157 *Vodafone New Zealand Limited v Telecom New Zealand Limited* [2011] NZSC 138 at [70]–[72].

1158 Chorus "Cross submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and Process and Issues Update Paper for the UCLL and UBA Pricing Review Determinations" CONFIDENTIAL, 20 March 2015, paragraph [285].

E95 Vodafone indicated that the *Vodafone TSO* case does not have much to say in the context of asset valuation, other than in relation to the question of asset stranding.[1161,1162]

E96 On the other hand, other submitters (particularly Spark, Russell McVeagh, and Wigley and Company) argued that the case is relevant to us. In particular, they submitted the following.

E96.1 Although the statutory context of the *Vodafone TSO* case was not entirely aligned with the current regulatory framework, the Supreme Court established that the calculation of efficient costs does not allow sunk assets to be valued at current replacement costs when it is clear that those assets will not be replaced.[1163]

E96.2 The Commission's task in that case (identifying efficient costs of providing a service or identifying the costs that would be incurred by an efficient service provider) is not so removed from our present task that the Supreme Court's guidance should be disregarded;[1164] the distinction between an efficient service provider (that is a proxy for a firm which will continue to employ old assets) and a hypothetical network operator building a new network from scratch does not make the Supreme Court's observations irrelevant because the Commission cannot permit its modelling decisions to trump legal requirements.

E96.3 The fact that the *Vodafone TSO* case was concerned with backward-looking compensation (ie, "the fact that the TSO process set prices for a specified period that was in the immediate past, rather than in the immediate future") rather than forward-looking makes no difference to the logic applied by the Court. [1165, 1166]

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[1159] Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services (2 July 2015)" 13 August 2015, paragraph [180].

[1160] Chorus "Cross-submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services (2 July 2015)" 24 September 2015, Appendix B.

[1161] Commerce Commission, "UBA and UCLL pricing review determination conference transcript", 15-17 April 2015, p. 221.

[1162] Vodafone "Submission on process paper and draft pricing review determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and comments on Analysys Mason's TSLRIC models" 20 February 2015, paragraph [D8.1(e)].

[1163] Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" 13 August 2015, paragraphs [219]–[220].

[1164] Russell McVeagh "Chorus submission on further draft UCLL and UBA pricing reviews" 24 September 2015, paragraph [37].

[1165] Spark "UBA and UCLL FPP pricing review draft decision" CONFIDENTIAL, 20 March 2015, paragraph [123].

[1166] Spark "Submission on UBA and UCLL FPP pricing review determination" 20 February 2015, paragraph [333].

E96.4 The case was actually concerned with forward-looking costs which were based on TSLRIC modelling.[1167, 1168, 1169]

E96.5 The only significant difference with the present circumstances is that the TSO case concerned "pure TSLRIC" (and not TSLRIC+, which includes common costs).[1170]

E96.6 The majority of the Supreme Court drew support from its decision from a decision of the Australian Competition Tribunal (the *Telstra* case), which decided that the replacement cost approach was not appropriate for the relevant circumstances. [1171, 1172]

E96.7 The Supreme Court said that the last TSLRIC exercise undertaken by the Commission ended up as historic cost, and historic cost is the predictable approach rather than ORC.[1173]

E97 While we acknowledge Wigley and Company's and Network Strategies' comments made at the conference that the TSO decision could be characterised as forward-looking, we remain of the view that the decision in the *Vodafone TSO* case is distinguishable for purposes of this FPP process. [1174,1175]

<u>Our circumstances are different from the Vodafone TSO case</u>

E98 The issues in the *Vodafone TSO* case arose out of the specific context of calculating the "net cost" to an efficient service provider of meeting the TSO obligations.[1176]

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1167 Wigley and Company "Submission on draft pricing review determination for UBA and UCLL services" 20 February 2015, paragraph [13.12].

1168 Wigley and Company "Submission on Further Draft Pricing Review UCLL and UBA Determinations", 13 August 2015, paragraph [10.3].

1169 Wigley and Company "Cross-submission in relation to UCLL and UBA draft pricing review determinations" 24 September 2015, paragraphs [7.15]–[7.28].

1170 Wigley and Company "Submission on draft pricing review determination for UBA and UCLL services" 20 February 2015, paragraph [13.10].

1171 Spark "Submission on UBA and UCLL FPP pricing review determination" 20 February 2015, paragraph [333].

1172 Russell McVeagh "Memorandum to Telecom on UCLL and UBA Final Pricing Reviews" 30 April 2014, paragraphs [9(b)] and [12].

1173 Wigley and Company "Submission on Further Draft Pricing Review UCLL and UBA Determinations", 13 August 2015, paragraph [10.7].

1174 Wigley and Company "Submission on draft pricing review determination for UBA and UCLL services" 20 February 2015, paragraph [13.10].

1175 Commerce Commission, "UBA and UCLL pricing review determination conference transcript", 15-17 April 2015, pp. 224 and 226.

1176 As noted above, "net cost" was defined under section 5 of the Act. Under s 84(1) of the Act, the calculation of net cost must take into account two considerations (i) the range of direct and indirect revenues and associated benefits derived from providing telecommunications services to commercially non-viable customers, less the costs of providing those telecommunications services to those customers and (ii) the provision of a reasonable return on the incremental capital employed in providing the services to those customers.

E99 The Court was concerned to ensure that the objective standard of an efficient service provider provided an effective cap on Telecom's recoverable costs.[1177] This meant that the assessment of net cost had to be based on the capital actually employed by Telecom (subject to efficiency considerations), otherwise the "cap" might be higher than the costs actually incurred.[1178] If the net cost amount exceeded Telecom's actual costs, then Telecom could receive windfall profits and its competitors would be placed at a competitive disadvantage against the then vertically-integrated Telecom.[1179]

E100 In these circumstances, the Court found it was an error to conduct a hypothetical exercise that valued depreciated assets at optimised replacement cost where Telecom was unlikely to replace such assets. The Court found that this approach would "artificially inflate" the value of the existing assets (what the Supreme Court referred to as a "free lunch").[1180] The Court stressed that in the context of the definition of "net cost", the efficient service provider was intended "to be a proxy for a firm which will continue to employ old assets",[1181] and its costs "must be construed as meaning '… cost to Telecom acting efficiently'."[1182] In other words, the efficiency cap in the TSO context had to be tied closely to Telecom's actual costs (subject to optimisation) and could not be based upon those of a hypothetical network operator building a network from scratch.

E101 In our view, the Supreme Court's concerns about the adoption of a replacement cost methodology in the TSO context do not apply generally to economic regulation or to TSLRIC-based prices in particular. As explained in Chapter 2, both Blanchard J and Elias CJ noted that the decision would have limited precedential value because of the "unique nature of the Part 3 regime" and subsequent legislative changes.[1183] In its Input Methodologies judgment, the High Court noted that the *Vodafone TSO* case dealt with the meaning of the specific statutory definition of "net cost" rather than the use of a more broadly expressed decision-making power.[1184]

E102 Therefore, we consider that the Supreme Court was careful to confine its comments to the old TSO "net cost" regime, and was not intending either to determine a single approach to asset valuations or to prevent us from taking into account different factual contexts.

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1177 At [9] per Elias CJ. See also *Vodafone New Zealand Ltd v Telecom New Zealand Ltd* HC Wellington CIV-2008-485-2194, 1 April 2010, at [64]-[65] per Winkelmann J.

1178 At [70]-[71] per Blanchard, McGrath and Gault JJ; and at [81]-[83] per Tipping J. See also *Vodafone New Zealand Ltd v Telecom New Zealand Ltd* HC Wellington CIV-2008-485-2194, 1 April 2010, at [67] and [72]-[74] per Winkelmann J.

1179 *Vodafone New Zealand Ltd v Telecom New Zealand Ltd* HC Wellington CIV-2008-485-2194, 1 April 2010, at [74] per Winkelmann J.

1180 *Vodafone New Zealand Limited v Telecom New Zealand Limited* [2011] NZSC 138 at [70] per Blanchard, McGrath and Gault JJ.

1181 At [70] per Blanchard, McGrath and Gault JJ.

1182 At [82] per Tipping J.

1183 At [7] and [64].

1184 *Wellington International Airport Ltd v Commerce Commission* [2013] NZHC 3289 at [999].

E103 In determining the TSLRIC price, we have adopted the conventional approach under which a hypothetical efficient operator is building and operating an entirely new network from scratch, using modern efficient technology and which is unconstrained by legacy decisions on network design or the types of assets employed.

E104 In particular, we consider that this approach is preferable to modelling an efficient incumbent which reuses Chorus's existing assets in terms of the section 18 purpose statement and meeting the relevant TSLRIC objectives/outcomes. As discussed above, we have considered the submissions made by the various parties both generally and in the context of asset valuation in particular, and continue to hold this view.

E105 As a result, our modelling exercise does not involve the costs of a firm which continues to employ old assets. Rather, we are concerned with the costs of building a new network from scratch. In our view, this is a key difference between the modelling exercise referred to by the majority of the Supreme Court, and our TSLRIC model.

E106 Wigley and Company and Russell McVeagh both referred to our previous statements which noted similarities between the TSO net cost assessment and TSLRIC modelling.[1185, 1186] However, given the differences discussed above, we consider that it is appropriate to use a replacement cost valuation methodology in this pricing review determination.

E107 We also disagree with the suggestion by Wigley and Company that historic cost must be the predictable choice because the "last TSLRIC exercise by the Commission ended up as historic cost. The Supreme Court said so."[1187] As discussed above, the Supreme Court decision concerned the specific context of determining the "net cost" of providing a service to CNVCs under the old Part 3. It is not a general authority that a TSLRIC-based price will necessarily require the use of historic costs, and the Supreme Court emphasised that it was not seeking to set a precedent for TSLRIC modelling generally.

E108 While the hypothetical efficient entity we have modelled in determining TSLRIC is subject to real-world constraints, it stands alone from Chorus, and does not seek to fully replicate Chorus' characteristics. In limited cases we have referred to some characteristics of Chorus' network to inform our hypothetical efficient operator modelling. This does not mean that we are modelling an efficient version of the incumbent. We have done this where it is simply impractical to model a pure hypothetical efficient operator network and where doing so would arguably give rise to a greater risk of regulatory error.

1185 Wigley and Company "Cross-submission in relation to UCLL and UBA draft pricing review determinations" 24 September 2015, paragraph [7.19].

1186 Russell McVeagh "Chorus submission on further draft UCLL and UBA pricing reviews" 24 September 2015, paragraph [37].

1187 Wigley and Company "Submission on Further Draft Pricing Review UCLL and UBA Determinations" 13 August 2015, paragraph [10.7].

E109 Accordingly, the issue of Chorus receiving a "free lunch" does not arise. In the *Vodafone TSO* case, the concern was whether Telecom was overcompensated for investments actually made.[1188] Here, our task is to set a price according to TSLRIC which we and submitters agree is best set relative to the forward-looking efficient costs of the hypothetical efficient operator, rather than the past costs of the regulated entity.[1189]

E110 Putting that another way, we do not consider that concepts such as "windfall gains" or "windfall losses" are particularly relevant. A price determined according to TSLRIC does not attempt to regulate the incumbent's revenues such that it earns a normal return on its actual investments. Rather, it attempts to set a forward-looking price based on modern technology and irrespective of the incumbent's past investment decisions.

E111 We also note that while some parties have highlighted the potential for windfall gains relative to returns on past investments arising from individual modelling decisions, such as on asset valuation,[1190] other parties have highlighted the potential windfall losses for the regulated entity, such as due to demand, network deployment, the UCLL MEA decision and input costs. For example, L1 Capital listed the modelling choices which it considers undercut the actual costs faced by Chorus and LFCs.[1191]

E112 In our view, such potential gains and losses are the inevitable result of setting a price independently of Chorus' actual past investments. We do not consider that this is a problem or suggests that the TSLRIC price should become a backward-looking exercise designed to secure Chorus a normal return on its past costs. We consider that such a backward-looking approach would be inconsistent with:

E112.1 our regulatory framework including the definition of TSLRIC;

E112.2 section 18 purpose statement considerations;

E112.3 the concept of the hypothetical efficient operator deploying a new network using modern equivalent assets (and upon which there is general agreement between parties); and

E112.4 the TSLRIC objectives/outcomes.

E113 As we note below, TSLRIC is forward-looking, and should focus on costs of new investments, not on a "building blocks" approach which might directly attempt to model a reasonable return on past costs.

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[1188] *Vodafone New Zealand Limited v Telecom New Zealand Limited* [2011] NZSC 138 at [41].

[1189] In the *Vodafone TSO* case Elias CJ noted the difference between the TSO context (where we were required to calculate the incremental cost of serving uneconomic customers) and price regulation (which is the current context) in the selection of a valuation methodology (at [15]).

[1190] We discuss further below the estimates of the sensitivity of the UCLL price to the decision on re-use.

[1191] L1 Capital, 13 August 2015, pp. 2-4.

E114 We also note that the separation between Chorus' actual costs and the TSLRIC price was a factor that we took into account in determining that an uplift to our central WACC estimate was not necessary.[1192]

E115 As explained in Chapter 2, we revisited the adoption of our hypothetical efficient operator concept and considered whether it would be appropriate to replace it with a model of an operator that is an efficient version of Chorus.

E116 We remain of the view that our hypothetical efficient operator concept is the most appropriate approach to implementing TSLRIC. In particular, we consider that this approach is the best fit with the statutory requirement to model "forward-looking" and "long run" costs, and best serves the objectives/outcomes of TSLRIC and the section 18 purpose.

*The Telstra case also involved different circumstances*

E117 As explained in Chapter 2, the decision of Blanchard J in the *Vodafone TSO* case drew support from the decision of the Australian Competition Tribunal in the *Telstra* case.[1193]

E118 In the *Telstra* case, the Tribunal characterised the objective of the modelling exercise as being to estimate the "ongoing costs that Telstra would incur in providing ULLS as efficiently as possible".[1194] In the context of that objective, the Tribunal considered that:

E118.1 Telstra's TSLRIC-based price model (Telstra's Efficient Access (TEA) model) was not capable of estimating the efficient costs of supplying the ULLS because it was premised on a scorched node approach which "severely limited the optimisation of cable routes";[1195] and

E118.2 allowing Telstra a return on the replacement costs of a new network was inappropriate because it did not reflect the fact that Telstra already had trenches, ducts, etc, already in place. It would not reflect Telstra's "legitimate business interests", one of the criteria prescribed by the relevant legislation, because Telstra was only entitled to a reasonable return on its prudent past investment.[1196]

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[1192] See the discussion of "Other considerations" in Chapter 5 of this final determination.

[1193] In addition to the *Telstra* case, the Supreme Court also referred a decision by the United States Federal Communications Commission (FCC) in the context of the provision and funding of universal service (Federal Communications Commission "Report and Order in the Matter of Federal-State Joint Board on Universal Services", FCC 97-157). In that decision, the FCC supported the use of forward-looking economic costs for determining the level of universal service support, and rejected the use of embedded costs, which it equated to historic costs. The FCC proposed to value inputs at current prices. This is consistent with the view that we have taken, that in the context of a forward-looking economic costing exercise, it is appropriate to use ORC to value all inputs.

[1194] *Application by Telstra Corporation Ltd* [2010] ACompT 1, paragraph [230]. The ULLS in Australia is the Unconditioned Local Loop Service, which is the equivalent of the UCLL service in New Zealand.

[1195] Ibid, paragraphs [231] and [237].

[1196] Ibid, paragraphs [240-246].

E119 In Chapter 2, we discussed the *Telstra* case and why we consider that the context and circumstances of the Telstra decision are different than those currently in New Zealand. We summarise our position below.

E119.1 The question being considered by the Australian Competition Tribunal was different from the question with which we are concerned in the current process.

E119.2 It is not open to us to not apply a forward-looking version of the TSLRIC concept.

E119.3 The Tribunal noted that "the TSLRIC+ approach seeks to estimate Telstra's ongoing costs of providing the ULLS".[1197] In contrast, we do not see that our TSLRIC exercise (which is forward-looking) as being used to measure the incumbent's ongoing costs. Rather, we consider that it is appropriate in applying TSLRIC in our circumstances to look at the costs of a hypothetical efficient operator building and operating a new network. This is consistent with the Court of Appeal's characterisation of TSLRIC.[1198]

E119.4 Our approach to the relevant MEA differs from that taken by the Australian Competition Tribunal.

E119.5 Our TSLRIC model also incorporates a greater degree of optimisation than the TEA model with which the Tribunal was concerned.

E119.6 We take a different view to the Tribunal on the relevance of build/buy signals (as the current circumstances in New Zealand are different from those in the *Telstra* case).

E120 We do not consider that the concerns raised by the Australian Competition Tribunal about using a replacement cost valuation methodology are relevant in our context, because we are required by the Act to implement a forward-looking TSLRIC.

E121 In addition, we consider that build/buy incentives remain relevant in New Zealand. In particular:

E121.1 the *Telstra* decision was made in the context of the recently-contracted National Broadband Network project which involved the national deployment of fibre and the copper network ultimately being "cut off";

E121.2 by contrast, all parties in the present process appeared to accept that the copper network will remain relevant in significant areas of the country for some time. Thus, in New Zealand build versus buy incentives remain relevant;

E121.3 there has been competitive bypass of parts of Chorus' UCLL network by LFCs (using underground and aerial infrastructure), and further bypass may

[1197] ibid, paragraph [231].
[1198] *Chorus v Commerce Commission* [2014] NZCA 440 at [30].

emerge as a result of the Government's planned expansion of UFB. We therefore take a different view to the Tribunal on the relevance of build/buy signals.

E122 We therefore consider our approach is appropriate given the different context of the *Telstra* decision and the different circumstances in New Zealand.

E123 Finally, as explained earlier in this Attachment, we believe that our individual decisions (as applicable) and our overall decision best gives, or is likely to best give, effect to the section 18 purpose statement of promoting competition in telecommunications markets for the long-term benefit of end-users.

*Other criticisms of ORC*

E124 In Spark's view, both DORC and dual asset valuation are consistent with forward-looking costs and should therefore be considered as appropriate options for asset valuation.[1199]

E125 We discuss below the DORC and dual asset valuation methodologies, where we note that:

E125.1 The use of a DORC valuation is expected to produce the same annualised capital costs as ORC, when a tilted annuity approach is applied with parameters which are estimated in an unbiased manner. Spark agreed with this at the FPP conference, although it qualified its agreement since.[1200,1201] Chorus supported this view that the annualised cost of an ORC valuation when a tilted annuity approach is applied is equivalent to DORC.[1202]

E125.2 The use of a dual asset valuation approach as proposed by the EC involves the use of historic cost for non-replicable assets such as ducts, and replacement cost for other assets. However, we note that according to Spark's economic advisor, WIK, the use of historic costs is unlikely to be informative about forward-looking costs.[1203]

E126 Vodafone has also been critical of the use of ORC, claiming that it would result in Chorus being compensated twice for fully depreciated assets which remain in use. Vodafone noted WIK's estimate that the use of ORC results in a threefold inflation of Chorus' book value of the relevant assets.[1204] Vodafone supported WIK's

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1199 Spark "Submission on UBA and UCLL FPP pricing review determination" 20 February 2015, paragraph [316].

1200 Commerce Commission, "UBA and UCLL pricing review determination conference transcript", 15-17 April 2015, p. 108.

1201 Spark "Response to UBA and UCLL FPP conference questions" 28 May 2015.

1202 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services (2 July 2015)", 13 August 2015, paragraph [179].

1203 WIK, "Wholesale pricing, NGA take-up and competition" 7 April 2011, p. 23.

1204 Vodafone "Submission on process paper and draft pricing review determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and comments on Analysys Mason's TSLRIC models" 20 February 2015, paragraph [F1.2(b)].

recommendation that, given the difficulty of using a dual valuation methodology, a 20% deduction to investment value should be adopted.

E127 In terms of the EC approach, as explained in Chapter 2, we consider that there are some important differences between New Zealand and the European Union such that, on balance, there is not a sufficiently strong case to follow the EC and move away from the conventional approach to implementing a TSLRIC-based price.[1205]

E128 Having said this, it is our understanding that under the EC approach (as explained in Chapter 2), fully depreciated assets which remain in use would be removed from the asset base which is used to determine regulated prices. This would mean that although the asset continues to have an economic value, its cost would be set at zero by the regulator, and access would effectively be provided for free. As Spark noted at the FPP conference, the forward-looking value of an asset should reflect the value to the owner of retaining the asset, which in the case of an asset which remains in demand, would not be zero.[1206]

E129 In such cases, where an asset which has been fully depreciated in an accounting sense but remains in use, the issue appears to be more to do with the life of the asset that has been allowed for in determining the price (including any allowance which takes into account the risk of stranding). We consider that our final decision on asset lives, including 50 years in the case of ducts, is appropriate. We note that no interested party has submitted any evidence to suggest that the asset life for ducts should be longer than 50 years. We discuss asset lives in more detail in Attachment H.

E130 We note that WIK's comparison of the ORC value with Chorus' book value fails to take into account two important factors.

E130.1 First, an ORC valuation of any given asset will be recovered over the full economic life of the asset, whereas the depreciated book value of an asset will be recovered over a shorter period reflecting the expected remaining life of the asset.[1207]

E130.2 Second, the list of Chorus' assets to which WIK refers includes not only the "non-replicable" categories referred to by the EC (such as access ducts), but also a wide range of other asset types, including electronic equipment, copper and fibre cables, and IT-related categories.[1208] Of the asset

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[1205] We also note that the ACCC recently reviewed and amended the pricing principle for fixed line access in Australia. In contrast to the EC varying the implementation of TSLRIC, the ACCC rejected TSLRIC and replaced it with a building blocks approach (ACCC, "Review of the 1997 telecommunications access pricing principles for fixed line services Draft Report" September 2010).

[1206] Commerce Commission, "UBA and UCLL pricing review determination conference transcript", 15-17 April 2015, p. 107.

[1207] CEG make this point, for example CEG "Non-replicable assets and forward-looking costs", August 2014, paragraph [37].

[1208] WIK "Submission in response to the Commerce Commission's "Draft pricing review determination for Chorus' unbundled bitstream access service" and "Draft pricing review determination for Chorus' unbundled copper local loop service"" 20 February 2015, paragraph [45].

categories which WIK claim as being either fully or significantly depreciated, none are of the “civil engineering” category referred to by the EC. We are unaware of any RSP claiming that electronic equipment and cables, for example, should be valued at historic cost.

E131 As noted earlier in this Attachment, the definition of TSLRIC is forward-looking and in our view should focus on costs of building a new network, rather than the under-recovery or over-recovery of historically incurred costs of the regulated firm (or the existence of windfall gains or losses relative to a hypothetical normal return on investments made).

E132 In this regard, determining a regulated price under TSLRIC differs from a “building blocks” approach where the regulatory asset base is locked in with reference to the firm’s actual costs, as is the case under the regulatory framework in Part 4 of the Commerce Act 1986, and the “building blocks” approach adopted by the ACCC following its 2010 review of the pricing principles applicable to fixed access services in Australia.[1209]

E133 We note that Wigley and Company made specific reference to the treatment of easements under Part 4 of the Commerce Act, citing a quote from our 2010 Input Methodologies Reasons Paper:[1210]

> Easements are distinct from other sunk assets (such as network assets) because easement rights usually do not suffer physical deterioration or obsolescence, and are usually available to the supplier in perpetuity (i.e. do not need to be replaced). In light of these characteristics, the Commission considers opportunity cost or replacement cost valuations are inappropriate for existing easements.

E134 The above quote clearly distinguished easements, which do not suffer physical deterioration and are available in perpetuity (implying an infinite asset life), from other network assets. As noted elsewhere in this Attachment, ducts will need to be replaced eventually, and in the TSLRIC modelling, we used an asset life for ducts of 50 years, (as noted above, no party has submitted that the duct life should be longer than 50 years). We do not consider the above example of the valuation of easements to be relevant in the current circumstances.

E135 We recognised in our draft decisions that Chorus may have accumulated gains from supplying the UCLL service over time, although we did not consider this to be relevant for our TSLRIC exercise.[1211, 1212] As noted above, we remain of this view.[1213]

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[1209] The initial RAB value established by the ACCC was not based purely on historic cost. The ACCC considered a range of values, from depreciated actual cost to DORC, and made a number of adjustments in order to promote pricing stability. ACCC, “Inquiry to make final access determinations for the declared fixed line services”, July 2011, pp. 37-38.

[1210] Wigley and Company “Submission on draft pricing review determination for UBA and UCLL services” 20 February 2015, paragraph [12.14].

[1211] Commerce Commission, "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014, paragraph [643].

E136 Accurately determining whether or not the price we are setting will result in Chorus earning more than a normal return on its actual investments is a complex exercise and not an exact science (partly because it would involve an investigation of its historic costs and revenues).

E137 As we noted in one of our Input Methodologies reasons papers, "[d]etermining an appropriate level of remuneration in the future for capital investments regulated suppliers have made in the past (ie, for existing assets) is problematic."[1214] In addition, in the current context, we discuss some of the practical difficulties in implementing a dual asset valuation methodology later in this Attachment.

E138 However, in our view, we do not consider that such an investigation is helpful or relevant to determining TSLRIC, which is based on forward-looking long run costs and is informed by the conventional approach of modelling the costs of a hypothetical efficient operator and the relevant TSLRIC objectives/outcomes.

**Option 2: Optimal Deprival Value**

E139 As noted earlier, we have previously considered the use of optimised deprival value, which would be based on the cost to the asset owner if deprived of the asset.[1215] In practice, ODV equals the depreciated replacement cost, except where the asset would not be replaced. If the rational choice is not to replace the asset, then the ODV of the asset is equal to the economic value of the asset, where the economic value is the present value of expected net income.

E140 None of the submitters proposed that ODV be used as the asset valuation methodology.[1216]

E141 We have not used ODV in the pricing review determination.

**Option 3: Depreciated Optimised Replacement Cost**

E142 A number of access seekers have supported the use of DORC as an appropriate option for asset valuation, as it takes into account the elapsed life of the asset. For example, Spark's submission on the December 2014 UCLL draft determination paper

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1212 Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 2 July 2015, paragraph [1278].

1213 In this regard, we further note that in its Final Access Determination, the ACCC has stated its view that "on balance, Telstra is unlikely to have significantly under- or over-recovered depreciation on its network assets under the previous TSLRIC+ approach". ACCC "Inquiry to make final access determinations for the declared fixed line services" July 2011, p. 45.

1214 Commerce Commission "Input Methodologies (Electricity Distribution and Gas Pipeline Services) Reasons Paper" December 2010, paragraph [4.2.3]. We also noted that "establishing the initial RAB value is a particularly contentious task where it is undertaken midway through the lives of assets that were previously unregulated, or regulated under a different regime."

1215 Commerce Commission "Application of a TSLRIC Pricing Methodology – Discussion Paper" 2 July 2002, paragraph [189].

1216 ODV was however discussed at the FPP conference. See Commerce Commission, "UBA and UCLL pricing review determination conference transcript", 15-17 April 2015, pp. 99 and 107.

stated that DORC is consistent with efficient forward-looking costs.[1217] In February 2014, in a report commissioned by Vodafone, Spark, and CallPlus, Frontier Economics supported the use of DORC for assets such as ducts, and outlined an approach to obtain a DORC valuation, based on the asset's ORC valuation adjusted for the expected remaining life of the asset.[1218, 1219] Telecom (now Spark), CallPlus, InternetNZ, Consumer NZ, and TUANZ all supported Frontier's proposed approach.[1220]

E143 In its cross submission on the December 2014 UCLL draft determination, CEG argued that Network Strategies and WIK were incorrect to say that Chorus would receive a windfall as a result of using replacement costs instead of depreciated replacement costs. [1221] CEG argued that using DORC should give the same result as ORC when economic depreciation is used to determine annualised capital costs (such as is done through a tilted annuity). CEG noted that as an asset approaches the end of its useful life, its value falls, although this value must be recovered over a shorter period (ie, the remaining life of the asset, rather than the full life).

E144 At the FPP conference, CEG criticised the approach proposed by Frontier in its February 2014 submission to determine a DORC valuation, arguing instead that DORC should be forward-looking, and should reflect the costs saved by not having to replace the asset today. CEG noted that the revenues based on such a DORC valuation over the remaining life would be the same as using an ORC valuation over the full life of the asset.[1222]

E145 Spark agreed with CEG, provided the tilts and asset life are correctly estimated.[1223]

E146 However, in a written response to questions raised at the FPP conference, Spark qualified its agreement at the FPP conference:[1224]

> On the CEG premise, under specific circumstances – i.e. comparing an asset whose economic depreciation is modelled using a tilted annuity and where all the other parameters of the tilted annuity method (including a stable estimate of WACC and a linear price trend assumption) are identical – the depreciation charge will evolve in the same way in all periods during the life of the asset. Provided the specific circumstances remain constant, the use of a tilted annuity methodology has the effect that the HEO will have a modelled yearly depreciation cost comparable to that of an operator who invested earlier. As CEG note, this is

1217 WIK "Submission in response to the Commerce Commission's "Draft pricing review determination for Chorus' unbundled bitstream access service" and "Draft pricing review determination for Chorus' unbundled copper local loop service"" 20 February 2015, paragraph [316].

1218 Frontier Economics "Determining a TSLRIC price for Chorus' UCLL service: A Report Prepared for Vodafone New Zealand, Telecom New Zealand and CallPlus" February 2014, p. 36.

1219 See Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014, paragraph [676].

1220 Ibid, paragraph [677].

1221 CEG cross submission "Issues from submissions UCLL and UBA" March 2015, paragraphs [19]-[22].

1222 See Commerce Commission, "UBA and UCLL pricing review determination conference transcript", 15-17 April 2015, p. 103.

1223 Ibid, p. 108.

1224 Spark, "Response to UBA and UCLL FPP conference questions" 28 May 2015, paragraph [7].

simply maths. Unfortunately, this is only part of the equation as it does not take in to account the return "on" the capital employed.

E147 Spark went on to note that it did not support the blanket application of a replacement cost methodology, as such an approach overstates the efficient costs of providing the service when applied to assets that are not expected to be replaced in the future.

E148 Spark submitted that if such an approach were to be used, DORC was preferable over ORC. In Spark's view, the use of DORC more accurately captures the efficient return on capital (as the ORC-based return on capital will exceed the actual return required by the regulated firm); DORC is less susceptible to differences between expected and actual parameters (such as the asset lives and the tilts); and DORC reflects the remaining earning potential of the asset.[1225]

E149 We consider that DORC and ORC should produce the same results, as long as the parameters in the tilted annuity are correctly estimated in an unbiased manner.

E150 We also note that DORC will not produce the sort of outcome that proponents of asset re-use have in mind, namely to use depreciated historic cost over the remaining life of the asset.[1226] We discuss this approach later in this Attachment.

E151 In Table E1 below, we illustrate how the use of a depreciated replacement cost valuation approach, which takes into account the elapsed economic life of assets, can generate the same annualised capital costs as an ORC valuation approach. The examples below also show how the resetting of prices using ORC should ensure a consistent annualised capital cost, given the assumptions made around the tilt and asset life parameters that are used in the tilted annuity formula.

E152 Under Scenario 1 in Table E1, a new asset is installed with an initial asset value (AV) of $100, expected economic life of 10 years, WACC of 10%, and with an expected price trend (tilt) of 2% per annum. For example, in the first year of operation, the tilted annuity calculates an annual capital charge of $15.09, which is comprised of a return on capital (WACC) of $10 and a return of capital (depreciation) of $5.09. The annual capital charge gradually increases over time (reflecting the 2% price trend). The present value of the stream of annual capital charges is equal to the original investment value of the asset ($100).

E153 Scenario 2 shows the effect of implementing a DORC approach halfway through the life of the asset (year 6). Under this approach, the depreciated replacement cost of the asset would be based on the revenues expected over the remaining life of the asset. In the example, the depreciated replacement cost would be $65.50 (which is equivalent to the present value of the annual capital charges over years six to 10 in Scenario 1), and the tilted annuity would be applied to this value to determine the

[1225] Ibid, paragraphs [10]–[15].

[1226] Professor Vogelsang "Reply to Comments on my November 25, 2014, paper "Current academic thinking about how best to implement TSLRIC in pricing telecommunications network services and the implications for pricing UCLL in New Zealand"" 23 June 2015, paragraph [93].

annual capital costs over the expected remaining five years of the asset's life. As is highlighted in the table, these costs are identical to those determined over the same period under the ORC approach, as claimed by CEG and as agreed by Spark.

E154 Scenario 3 assumes that after five years, a new determination is made in which ORC is applied (ie, the asset is valued on the basis of a new replacement). The value of the new asset is based on the original asset value in the first determination ($100), indexed by the price trend (2% p.a.). This gives a new replacement cost of $110.41 at the start of the second determination. Using the same tilted annuity inputs (asset life 10 years, WACC 10%, and tilt 2%), the resulting annualised capital charges are again identical to those for the same years in the original ORC determination (Scenario 1) and where DORC was used to value the asset (Scenario 2).

**Table E1: ORC and DORC valuations**

| **Scenario 1**: ORC implemented at 1st determination (year 1) | | **Scenario 2**: DORC implemented at 2nd determination (year 6) | | **Scenario 3**: ORC implemented at 2nd determination (year 6) | |
|---|---|---|---|---|---|
| Initial AV | 100 | Initial AV (=PV of remaining charges) | 65.50 | Initial AV (=initial AV in 1st determination, indexed by Tilt) | 110.41 |
| WACC | 10% | WACC | 10% | WACC | 10% |
| Asset life (years) | 10 | Asset life (years) | 5 | Asset life (years) | 10 |
| Tilt | 2% | Tilt | 2% | Tilt | 2% |

| **Year** | **AV** | **Annual Capital Charge** | **WACC** | **Deprn** | **Year** | **AV** | **Annual Capital Charge** | **WACC** | **Deprn** | **Year** | **AV** | **Annual Capital Charge** | **WACC** | **Deprn** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 100.00 | 15.09 | 10.00 | 5.09 | | | | | | | | | | |
| 2 | 94.91 | 15.40 | 9.49 | 5.90 | | | | | | | | | | |
| 3 | 89.00 | 15.70 | 8.90 | 6.80 | | | | | | | | | | |
| 4 | 82.20 | 16.02 | 8.22 | 7.80 | | | | | | | | | | |
| 5 | 74.40 | 16.34 | 7.44 | 8.90 | | | | | | | | | | |
| 6 | 65.50 | 16.66 | 6.55 | 10.11 | 1 | 65.50 | 16.66 | 6.55 | 10.11 | 1 | 110.41 | 16.66 | 11.04 | 5.62 |
| 7 | 55.39 | 17.00 | 5.54 | 11.46 | 2 | 55.39 | 17.00 | 5.54 | 11.46 | 2 | 104.78 | 17.00 | 10.48 | 6.52 |
| 8 | 43.93 | 17.34 | 4.39 | 12.94 | 3 | 43.93 | 17.34 | 4.39 | 12.94 | 3 | 98.26 | 17.34 | 9.83 | 7.51 |
| 9 | 30.98 | 17.68 | 3.10 | 14.59 | 4 | 30.98 | 17.68 | 3.10 | 14.59 | 4 | 90.75 | 17.68 | 9.08 | 8.61 |
| 10 | 16.40 | 18.04 | 1.64 | 16.40 | 5 | 16.40 | 18.04 | 1.64 | 16.40 | 5 | 82.14 | 18.04 | 8.21 | 9.82 |
| | | | | | | | | | | 6 | 72.32 | 18.40 | 7.23 | 11.17 |
| | | | | | | | | | | 7 | 61.15 | 18.77 | 6.12 | 12.65 |
| | | | | | | | | | | 8 | 48.50 | 19.14 | 4.85 | 14.29 |
| | | | | | | | | | | 9 | 34.21 | 19.53 | 3.42 | 16.10 |
| | | | | | | | | | | 10 | 18.11 | 19.92 | 1.81 | 18.11 |

| | | | | | |
|---|---|---|---|---|---|
| NPV check | 0.00 | NPV check | 0.00 | NPV check | 0.00 |

E155 The scenarios shown in Table E1 confirm the view expressed by CEG and Spark that as long as the tilted annuity parameters are correctly estimated, the ORC and DORC approaches to asset valuation should produce the same annualised capital costs when applying a tilted annuity. Although Spark has claimed since the FPP conference that the return on capital employed has not been taken into account,[1227] the annualised capital charges shown in Table E1 above do include both a return of capital (depreciation) and a return on capital (WACC).

E156 The analysis above also indicates that the use of ORC at future resets should not lead to revaluation gains or losses, as long as the tilts are correctly estimated.

[1227] Spark "Response to UBA and UCLL FPP conference questions" 28 May 2015, paragraph [7].

E157 We are not persuaded by the reasons put forward by Spark since the FPP conference to prefer DORC over ORC.[1228] In particular, an ORC valuation will be recovered over the expected full economic life of the asset, while a DORC valuation would be recovered over a shorter period reflecting the expected remaining economic life of the asset.[1229] In addition, Spark has not demonstrated that DORC will be less susceptible to errors in the value of the tilted annuity parameters.

E158 Our view is that the use of a DORC valuation methodology should result in the same outcomes as ORC, as long as the parameters used in the tilted annuity are correct.[1230]

**Option 4: Historic cost**

E159 A number of access seekers have supported the use of historic cost valuation for certain classes of reusable and non-replicable assets such as ducts.

E160 As we have already noted, we consider that the application of ORC to sunk and reusable assets will produce capital costs which reflect the forward-looking long run costs of the modelled network. Instead, a supplier who had the majority of relevant assets already in place (as is the case with Chorus) would face a TSLRIC price that tends to zero. That would deter investment and for the reasons given in this Attachment, we consider that it would not promote the TSLRIC objectives/outcomes or the purpose of promoting competition for the long-term benefit of end-users of telecommunications services.

E161 We have described why we favour ORC over historic cost when determining a TSLRIC-based price in our discussion of ORC above. We now address some of the specific submissions made by access seekers in favour of historic cost.

*Asset re-use and infrastructure sharing*

E162 According to Vodafone, the proposal not to allow re-use of existing assets of telecommunications operators and other utilities is inconsistent with what a hypothetical efficient operator would do and Chorus' actual UFB deployment. Vodafone also claimed that the use of ORC would not take into account regulatory best practice such as the EC's recommendation.[1231]

E163 WIK also submitted that the application of ORC to all assets is not in line with current regulatory developments or operator behaviour,[1232] noting statements from Chorus

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[1228] Ibid, paragraphs [10]–[15].

[1229] As shown above, allowing for the different asset lives under an ORC valuation (Scenario 1 below) and a DORC valuation (Scenario 2) should produce the same annualised capital charges.

[1230] One drawback of a DORC methodology is that it requires additional information, in particular relating to the average age of the assets being valued (and the expected remaining life of the assets).

[1231] Vodafone "Submission on process paper and draft pricing review determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and comments on Analysys Mason's TSLRIC models" 20 February 2015, paragraph [F1.1].

[1232] WIK "Submission in response to the Commerce Commission's "Draft pricing review determination for Chorus' unbundled bitstream access service" and "Draft pricing review determination for Chorus' unbundled copper local loop service"" 20 February 2015, paragraph [37].

that 40% of its UFB deployment is based on existing trenching.[1233, 1234] WIK argued that a profit-maximising operator would re-use existing assets for the deployment of a new network as long as the opportunity cost of using existing assets are lower than the greenfield cost of a new replacement network.

E164 As we have explained above, we consider that it is appropriate to adopt the conventional approach under which a hypothetical efficient operator building and operating an entirely new network from scratch. Accordingly, the hypothetical network operator does not have Chorus' copper network available for re-use.

E165 We discuss the EC recommendation in Chapter 2 and elsewhere in this Attachment.

E166 Wigley and Company claimed that the hypothetical efficient operator would use LFCs' and Chorus' UFB infrastructure as that would remain after the copper network is notionally removed. According to Wigley and Company:[1235]

> … there is no logical reason why the HEO would be able to use electricity network poles and yet not be able to use other pre-existing assets such as fibre networks including Chorus' own infrastructure for a parallel network (even if ducting is shared). Similarly as to existing mobile infrastructure owned by MNOs where capacity can be leased.

E167 In Chapter 2 we explain why the LFC/Chorus UFB networks would not co-exist with the hypothetical efficient operator's network. As a consequence, we have assumed that the hypothetical efficient operator serves all copper and fibre demand, including UFB demand that is currently served by the LFCs.[1236] We note that Wigley and Company has supported the inclusion of all UFB demand in the demand used to determine the TSLRIC for the UCLL service.[1237] We have not assumed any infrastructure sharing between the hypothetical efficient operator and the LFC/Chorus UFB infrastructure, as the latter do not exist in the hypothetical efficient operator scenario.

E168 This differs from the case of the EDBs and mobile operators which Wigley and Company referred to, as the infrastructure of these other networks remain in place, serving the demand for both electricity and mobile services which currently reside on their networks). We have allowed for some sharing of infrastructure between the hypothetical efficient operator and other utilities such as electricity companies. Our approach to infrastructure sharing is discussed in Attachment D.

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1233 WIK "Submission in response to the Commerce Commission's "Draft pricing review determination for Chorus' unbundled bitstream access service" and "Draft pricing review determination for Chorus' unbundled copper local loop service"" 20 February 2015, paragraph [37].

1234 Ibid, paragraph [54].

1235 Wigley and Company "Cross-submission in relation to UCLL and UBA draft pricing review determinations", 24 September 2015, paragraph [7.4].

1236 In Attachment A, we note that the exclusion of UFB demand would lead to a situation where unit costs increase over time as demand transitions from copper to fibre-based services (referred to as a "death spiral").

1237 Wigley and Company "Submission on draft pricing review determination for UBA and UCLL services" 20 February 2015, paragraph [3.1]).

E169 It is therefore consistent with our regulatory framework to allow for some infrastructure sharing between the hypothetical efficient operator and the EDBs and mobile operators only (in respect of the deployment of fibre and FWA respectively).

*Views of Professor Vogelsang*

E170 Wigley and Company claimed that ORC valuation is inconsistent with Professor Vogelsang's view that re-use of existing civil works is usually the most efficient way forward, and that historic cost is generally more predictable than a replacement cost approach.[1238, 1239]

E171 We consider that Wigley and Company's characterisation of Professor Vogelsang's view on re-use is incomplete. Professor Vogelsang has made a number of observations and statements regarding the applicability of re-use and the European Commission's proposed approach to re-use in the New Zealand context. For example, Professor Vogelsang noted the points below.

E171.1 A move "from replacement cost to inflation-adjusted historic cost in the case of non-replicable assets can be viewed as a break with the classical TSLRIC approach" (25 November 2014, paragraph [17])

E171.2 "Taken together the differences between New Zealand and the EC on balance argue against abandoning the classical TSLRIC approach in favour of the EU modifications." (25 November 2014, paragraph [28])

E171.3 "Taking account of re-use would be wrong in the New Zealand context" (23 June 2015, paragraph [25])

E171.4 "The re-use approach would also hurt the predictability of the TSLRIC concept." (23 June 2015, footnote 17)

E172 We therefore consider that Professor Vogelsang's view on re-use in the current context is not inconsistent with our views.

*Consistency with our other modelling decisions*

E173 In WIK's view, an allowance for re-use is more consistent with other modelling decisions, including the use of scorched node optimisation and the use of existing sites for FWA.[1240]

E174 In its submission on the July 2015 further draft determination, WIK further elaborated its view that our network deployment approach, which uses "the architecture, the nodes and also major engineering principles of Chorus' existing

[1238] Wigley and Company "Submission on draft pricing review determination for UBA and UCLL services" 20 February 2015, paragraph [14.2].

[1239] Wigley and Company "Submission on Further Draft Pricing Review UCLL and UBA Determinations", 13 August 2015, paragraph [10.8].

[1240] WIK "Submission in response to the Commerce Commission's "Draft pricing review determination for Chorus' unbundled bitstream access service" and "Draft pricing review determination for Chorus' unbundled copper local loop service"" 20 February 2015, paragraphs [62]-[63].

network" only makes sense if the re-use of existing assets is allowed in the modelled network. According to WIK:[1241]

> … from a conceptual point of view the Commission did not apply the orthodox or traditional TSLRIC approach. Instead, it compromised towards "real world realities". In conducting this approach the Commission, however, made a major conceptual breach: The network deployment approach building the basis for the Commission's cost model only makes sense, has its justification and its costing logic only if the re-use of existing assets of the legacy network is part of the deployment of the modelled (fibre) network. … It is not logical nor efficient to build the network of the HEO on the (inefficient) structure of the incumbent operator and at the same time not to integrate the corollary of this assumption at the asset valuation or costing side of the determination.

E175 WIK concluded that the use of ORC is a conceptual error in our modelling, with the result that costs are inflated.[1242]

E176 Wigley and Company make a similar point, that we are applying a scorched node approach to optimisation "which enables widespread use of reusable assets."[1243]

E177 As discussed in Attachment C, we acknowledge that a scorched earth approach would be the conceptually consistent starting point for the modelled network deployed by the hypothetical efficient operator. However, for the reasons set out in Attachment C, we consider that our modified scorched node approach represents only a limited compromise to the scorched earth concept. We therefore disagree with WIK's claim that our modelling contains a "major conceptual breach" with the result that costs are inflated.

E178 In our view, our modelling choices in relation to both asset valuation (ORC) and network optimisation (informed only by the existing number and location of network nodes) are appropriately aligned with our regulatory framework.

*The EC and Australian approaches*

E179 The use of historic costs to set regulated access prices has some advantages, such as potentially ensuring there is neither over- or under-recovery of historically incurred costs. WIK has previously referred to this as an attraction of historic cost valuation.

E180 This also appears to have been a consideration which prompted the EC's recommendation on the treatment of what it refers to as reusable but "non-replicable" assets, as well as the ACCC's move away from TSLRIC-based price for fixed access services.

[1241] WIK "Submission in response to the Commerce Commission's "Further draft pricing review determination for Chorus' unbundled bitstream access service" and "Further draft pricing review determination for Chorus' unbundled copper local loop service"" 12 August 2015, paragraph [176].

[1242] ibid, paragraph [179].

[1243] Wigley and Company "Submission on draft pricing review determination for UBA and UCLL services" 20 February 2015, paragraph [12.2].

E181 As we have explained in Chapter 2, the EC has adopted a dual asset valuation model, which involves the application of an indexed historic cost valuation methodology for reusable assets and replacement cost for non-reusable assets.

E182 Spark submitted that "the EU approach to the re-use of existing assets rejected by the Commission is not novel, but correctly reflects the application of TSLRIC thinking provoked by the need to consider the impact of NGA networks on existing regulation."[1244]

E183 WIK also argued that our "orthodox" view of TSLRIC for the UCLL service is becoming outdated due to changes that have occurred in Australia and the European Union. WIK noted that under the EC's "brownfield" approach, regulators should not assume the construction of an entirely new civil infrastructure network for deploying NGA.[1245]

E184 However, for the reasons set out earlier, we consider that there are important differences between the New Zealand and the European Union regulatory frameworks, such that, on balance, there is not a sufficiently strong case to follow the EC and move away from the conventional approach to implementing our TSLRIC-based price. In our view, the EC approach for reusable civil engineering assets is unlikely to assist in determining a forward-looking TSLRIC.

E185 There are also a number of practical issues with the EC's recommended approach. For example, a decision would be required as to what types of assets are reusable and non-replicable (and to which historic costs would be applied). The EC refers to ducts, trenches and poles. However, in New Zealand, the UFB deployments by LFCs have involved LFCs bypassing existing Chorus ducts (through either using existing LFC ducts, installing new LFC ducts, and/or the use of aerial deployment), replicating at least some parts of Chorus's existing duct network. This indicates that some parts of Chorus' duct network should be considered replicable (ie, in LFC areas).

E186 In addition, it is not clear why the concept of reusable and non-replicable assets would be limited to duct, trenches, and poles. In pricing reviews where the MEA resembles the deployed FTTH network, more asset classes might be considered reusable, such as the fibre cables.[1246]

E187 Finally, the EC recommendation refers to the indexing of historic costs, although it is not clear how this would be implemented. As we note below, the use of price indexing could be expected to reduce the potential impact of allowing re-use.[1247]

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[1244] Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" 13 August 2015, paragraph [208].

[1245] WIK "Submission in response to the Commerce Commission's "Draft pricing review determination for Chorus' unbundled bitstream access service" and "Draft pricing review determination for Chorus' unbundled copper local loop service"" 20 February 2015, paragraph [42].

[1246] CEG has raised a similar issue as to why ducts and poles should be distinguished from other asset types such as fibre. CEG "Non-replicable assets and forward-looking costs", August 2014, paragraph [48].

[1247] Vodafone and WIK have also noted that there are practical difficulties in using a dual asset valuation methodology and that as a result, a more pragmatic approach should be considered. For example, E188 A number of submissions have also referred to recent developments in Australia. We note that in its 2010 review of pricing principles for fixed line access, the ACCC ended up moving away from the TSLRIC concept and towards a "building blocks" approach.[1248] According to the ACCC:[1249]

> In telecommunications, both in Australia and internationally, the forward looking perspective to measuring TSLRIC+ for fixed line services involved continually revaluing the existing sunk assets used in providing these services. This revaluation was based on the asset's optimised replacement cost and occurred each time a pricing determination was made. …
>
> In recent times, a consensus appears to have been reached among industry participants that a BBM ("building block model") should replace TSLRIC+ as the pricing approach to telecommunications services. All submissions to the Discussion Paper were in favour of moving to a BBM.

E189 The ACCC noted that the main difference between the BBM and TSLRIC+ is that under the former, asset values are "locked in" using an initial RAB as the basis for setting indicative prices.[1250,1251]

E190 The ACCC has moved away from the TSLRIC concept and replaced it with a "building blocks" approach for fixed line services in Australia. We are required to implement TSLRIC.

*Potential impact of allowing re-use*

E191 Given the difficulties of implementing the EC's approach in the context of a  cost model, WIK proposed a "pragmatic" allowance for asset re-use, by deducting 20% from the investment cost of a new network. WIK said that based on its experience, such a general deduction would reflect the difference between "brownfield" (with re-use) and "greenfield" (no re-use) costs of deployment.[1252]

E192 We note that WIK's 20% deduction is not substantiated or supported by evidence in WIK's submission.

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Vodafone has submitted that "Given the difficulty of using a dual valuation methodology, we recommend that the Commission adopts WIK's recommendation" to retain ORC for all assets and apply a 20% deduction to the investment value. See Vodafone "Submission on process paper and draft pricing review determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and comments on Analysys Mason's TSLRIC models" 20 February 2015, paragraph [F1.4]. WIK's proposal is discussed further below.

1248 ACCC "Review of the 1997 telecommunications access pricing principles for fixed line services Draft Report" September 2010.

1249 ibid, pp. 15 and 16.

1250 ibid, p. 17.

1251 The ACCC has also noted that "there is no uniquely 'correct' value for the initial RAB. An element of judgement is therefore required to determine a suitable range of potential values for Telstra's sunk investment in network assets and then to settle on a value within this range that forms a sound basis for estimating prices." ACCC, "Inquiry to make final access determinations for the declared fixed line services" July 2011, p. 37.

1252 WIK "Submission in response to the Commerce Commission's "Draft pricing review determination for Chorus' unbundled bitstream access service" and "Draft pricing review determination for Chorus' unbundled copper local loop service"" 20 February 2015, paragraph [59].

E193 WIK claimed that the 20% is based on "its experience" of the savings that can be achieved by a "brownfield" deployment that allows for re-use of assets. It is not clear to us how or to what extent WIK has taken account of factors such as the proportion of Chorus' underground network which is ducted (as opposed to directly buried) and hence capable of being re-used, and the average age of ducts in New Zealand relative to other jurisdictions in which WIK has experience.

E194 We note that according to information supplied by Chorus in response to a section 98 request, while Chorus has been targeting 40% of its UFB deployment using existing ducts, the proportion of Chorus' underground network that is ducted is significantly lower on a nationwide basis than it is in Chorus' UFB areas. Chorus has also been investing a significant amount in new ducts for the UFB build in recent years. The average investment in ducts in each of 2012, 2013, and 2014 was $[ ]**CNZCI** million, compared to an average annual investment of $[ ]**CNZCI** million over the period from 2005-2011.[1253]

E195 We asked TERA to estimate the impact of allowing re-use of existing ducts, based on the information provided in Chorus' response to the section 98 request, including the proportion of Chorus' underground network which is ducted and the 2014 net book value recorded for ducts. TERA estimated that the resulting price for the UCLL service would be approximately 9% lower than our base case price.

E196 A number of parties have commented on TERA's estimate of the potential impact of allowing re-use of existing ducts in New Zealand.

E197 WIK noted that as TERA's calculation was not made available to other parties, it had estimated that a re-use saving factor of approximately 28% of the corresponding investment would be required to generate the 9% reduction in the UCLL price. According to WIK, we did not make clear why Chorus' target of 40% of its UFB deployment using existing ducts had not been used by us. If 40% re-use is assumed, WIK estimated a reduction in the UCLL price of 13.8% in 2016, increasing to 14.3% in 2020.[1254]

E198 Analysys Mason estimated that the impact could be less than 0.9%.[1255]

E199 We note that the 9% estimate which we included in the July 2015 UCLL further draft determination was a sensitivity estimate to show that the potential impact of

[1253] Derived from Chorus "CONFIDENTIAL INFORMATION (CI) Copy of Response to Commerce Commission s98 request Q2 2".xlsx.

[1254] WIK "Cross-submission in response to the Commerce Commission's "Further draft pricing review determination for Chorus' unbundled bitstream access service" and "Further draft pricing review determination for Chorus' unbundled copper local loop service"" 22 September 2015, paragraphs [108]-[110].

[1255] Analysys Mason "Report for Chorus - UCLL and UBA FPP draft determination cross-submission – Public version" 22 September 2015, section 3.4.

allowing for re-use of existing ducts in a New Zealand context might not be as great as some parties expected. We mentioned several reasons for this.[1256]

E199.1 Although Chorus has been targeting 40% of its UFB deployment using existing ducts, the proportion of Chorus' underground network that is ducted is significantly lower on a nationwide basis than it is in Chorus' UFB areas.

E199.2 Chorus has also been investing a significant amount in new ducts for the UFB build in recent years.

E200 We disagree with WIK's assertion that we had not made clear why Chorus' target of 40% of its UFB deployment using existing ducts had not be used. As noted in the preceding paragraph, we explicitly stated in the July 2015 further draft determination that we did not use the 40% target to derive the re-use sensitivity estimate because the proportion of Chorus' underground network that is ducted and hence capable of being re-used is significantly lower on a nationwide basis than it is in Chorus' UFB areas. As a result, it would inappropriate to use the Chorus UFB target when determining the impact of allowing re-use on the geographically averaged national UCLL price.

E201 For this reason, we consider the WIK's estimate to overstate the likely sensitivity of the UCLL price to the level of re-use in a New Zealand context.

E202 In addition, we note the following.

E202.1 The 9% sensitivity was an estimate of the impact on the UCLL price of the re-use decision in isolation. For the reasons discussed, we consider that modelling a hypothetical efficient operator and using ORC will best meet the section 18 purpose statement and the relevant TSLRIC objectives/outcomes. Furthermore, a different approach (eg, "an efficient Chorus" instead of a hypothetical efficient operator) might result in changes to other modelling decisions which could have an offsetting effect. For example, the UCLL MEA, network optimisation, and the proportion of aerial network deployment.

E202.2 The European Commission approach on re-use, which a number of access seekers have supported, includes the indexation of historic costs in order to estimate the current costs of the regulatory asset base for the reusable legacy civil engineering assets.[1257] Where there is a positive price index (as is the case for ducts), this could be expected to reduce the impact of allowing for re-use of such assets.

E203 We therefore consider that the potential impact of allowing re-use in a New Zealand context is likely to be no more than 9%. In any case, for the reasons given in this

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[1256] Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 2 July 2015, paragraph [1314].

[1257] See European Commission "COMMISSION RECOMMENDATION of 11.9.2013 on consistent non-discrimination obligations and costing methodologies to promote competition and enhance the broadband investment environment", 11 September 2013, paragraphs [36]-[37].

Attachment, we consider that ORC is the most appropriate asset valuation methodology in the context of TSLRIC.

**Our final decision is for ORC applied to all assets**

E204 Having considered the points raised by submitters throughout this FPP process, our final decision is that ORC is the most appropriate asset valuation methodology to apply to all assets when implementing TSLRIC.

# Attachment F: Asymmetric risk

## Purpose

F1 This Attachment sets out in more detail how we have treated the issue of compensation for asymmetric risks in our TSLRIC model for the UCLL service.

## What it is and why it is relevant to TSLRIC

F2 We are required to set a cost-based price for the UCLL service using TSLRIC. There are a range of factors in the future which may affect costs, whose settings are uncertain. We do not adjust the price for all of the uncertain factors (risks) because sometimes these factors are equally likely to decrease costs as to increase them. However, some factors only have the potential to increase the price. These factors, collectively known as asymmetric risk, will change the expected cost to the hypothetical efficient operator.

F3 We must consider how to adjust the single price (or otherwise incorporate this risk into the modelled cost). If we fail to take into account the fact that even a hypothetically efficient operator would face these risks, this would cause us to undercompensate this operator. This would be a barrier to the development of a robust telecommunications network.

F4 The two main forms of asymmetric risk that are relevant here are:[1258]

F4.1 risks that arise through infrequent events that could produce large losses for the hypothetical efficient operator, such as natural disasters; and

F4.2 risks that derive from unpredictable events such as the threat of technology change, competitive entry or expansion.

F5 We have considered asymmetric risks in the context of regulating other services under Part 4 of the Commerce Act 1986. While a number of the issues we need to consider will be the same in the Part 4 and telecommunications contexts, we note that:

F5.1 in applying TSLRIC, we have chosen to model the costs of a hypothetical efficient operator building a new network. This is different to regulation under Part 4, where actual investment is recorded in the regulatory asset base and a return of and on capital is preserved, which significantly mitigates asset stranding risk; and

F5.2 our expectations are that the rate of technological change in telecommunications is greater than that for services regulated under Part 4. This creates a greater risk of asset stranding.

[1258] Commerce Commission "Input Methodologies (Electricity Distribution and Gas Pipeline Services) Reasons Paper" 22 December 2010, paragraph [H12.4].

F6 We have considered whether to provide for an *ex ante* allowance for asymmetric risks in the following categories:[1259,1260,1261]

F6.1 catastrophic risks;

F6.2 asset stranding due to technological change;

F6.3 asset stranding due to competitive developments; and

F6.4 asset stranding due to future regulatory decisions (re-optimisation).

**Our final decisions**

F7 Our final decisions in respect of asymmetric risks are:

F7.1 to provide for an *ex ante* allowance for the asymmetric risk of catastrophic events. This allowance is based on Chorus' costs but appropriate efficiency adjustments are applied (as discussed in Attachment M: Opex regarding the efficiency adjustments we apply to opex);

F7.2 to provide for an *ex ante* allowance for the asymmetric risk of asset stranding due to technological change by adopting asset lives that recognise the risk of asset stranding; and

F7.3 to not provide any *ex ante* allowance for the asymmetric risks of asset stranding due to competitive developments or future regulatory decisions.

**Catastrophic risks**

*Our preliminary views and views of submitters*

F8 In our December 2014 UCLL draft determination, we proposed to provide an *ex ante* allowance for catastrophic risk.[1262] Our reason for this was that we would expect the hypothetical efficient operator to prudently insure against catastrophic risk. We included an allowance for the asymmetric risk of catastrophic events in our TSLRIC model by:

F8.1 including costs for seismic bracing and backup generators; and

F8.2 including Chorus' insurance costs, which provide cover for catastrophic events.

[1259] Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014, paragraph [701.2].

[1260] We noted also in our December 2014 UCLL draft determination paper that we would not consider further the issue of an *ex post* allowance for asymmetric risks. We continue to hold this view.

[1261] Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 2 July 2015, paragraph [1329].

[1262] Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 2 July 2015, paragraph [1337].

F9 We received a number of submissions in response to this position. Chorus and CEG submitted that the costs that we included understated the costs Chorus incurred to minimise catastrophic risk.[1263, 1264] They also noted that not all events could be insured against.[1265]

F10 Conversely, WIK stated that allowing for catastrophe insurance and seismic strengthening provided sufficient compensation for the hypothetical efficient operator.[1266] Further, it noted that WACC parameters compensated for any residual catastrophic risk.[1267]

F11 In our July 2015 UCLL further draft determination paper, we noted that we used Chorus' own costs as a starting point to determine the cost of addressing catastrophic risk in the model. We also accepted that there may be some events that cannot be insured for. However, we felt that these risks do not create costs that would have a material impact on our final pricing decision. Therefore, we maintained the decision in our December 2014 UCLL draft determination.

F12 In its submission on the July 2015 UCLL further draft determination, Spark agreed that the hypothetical efficient operator would insure against catastrophic risk and supported applying an efficiency adjustment to Chorus' costs. However, Spark suggested that it would be more appropriate to use a bottom-up approach to determining the efficient cost, rather than relying on top-down accounting information.[1268]

F13 We received no other submissions on the subject on catastrophic risk on our July 2015 UCLL further draft determination.

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1263 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services" CONFIDENTIAL, 13 August 2015, paragraphs [671]-[672].

1264 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and Process and Issues Update Paper for the UCLL and UBA Pricing Review Determinations" CONFIDENTIAL, 20 February 2015, paragraph [673]; CEG "Uplift asymmetries in the TSLRIC price" CONFIDENTIAL, February 2015, paragraph [64].

1265 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and Process and Issues Update Paper for the UCLL and UBA Pricing Review Determinations" CONFIDENTIAL, 20 February 2015, paragraph [674]; CEG "Uplift asymmetries in the TSLRIC price" CONFIDENTIAL, February 2015, paragraph [61].

1266 WIK-Consult "Cross-submission in response to the Commerce Commission's Draft pricing review determination for Chorus' unbundled bitstream access service unbundled copper local loop services including the cost model and its reference documents - TSO/geospatial modelling related aspects" 31 March 2015, paragraph [70].

1267 WIK-Consult "Cross-submission in response to the Commerce Commission's Draft pricing review determination for Chorus' unbundled bitstream access service unbundled copper local loop services including the cost model and its reference documents - TSO/geospatial modelling related aspects" 31 March 2015, paragraph [70].

1268 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" CONFIDENTIAL, 13 August 2015, paragraph [243].

*Analysis and final decisions*

F14 We believe that Chorus' costs offer valuable, real-world information about the hypothetical efficient operator. Further, we have adjusted Chorus' costs to reflect efficiency gains the hypothetical operator could be expected to achieve, as discussed in Attachment M. Accordingly, we maintain our previous position that it is appropriate to adjust for catastrophic risk by including the cost of seismic bracing and backup generators for exchange buildings and Chorus' insurance cost.

**Asset stranding due to technological change**

*Our preliminary views and views of submitters*

F15 In the December 2014 UCLL draft determination paper, we recognised that the high level of technological change in the telecommunications sector may result in asset stranding. This would mean that the engineering asset lives would be more likely to over-estimate the economic lives of the hypothetical efficient operator's assets than to under-estimate them. So using these asset lives would create an asymmetric risk. Accordingly, we addressed this by adopting Chorus' asset lives, which we considered better reflected the likely economic lives of the hypothetical efficient operator's assets.[1269]

F16 Vodafone, WIK, Network Strategies, and Wigley and Company opposed providing compensation to the hypothetical efficient operator to compensate it for the potential for technological change to cause asset stranding. [1270,1271,1272,1273] In particular, Vodafone, WIK and Wigley and Company argued the hypothetical

[1269] Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014, paragraph [711].

[1270] Vodafone "Submission on process paper and draft pricing review determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and comments on Analysys-Mason's TSLRIC models" 20 February 2015, paragraph [K3]; WIK-Consult "Submission in response to the Commerce Commission's Draft pricing review determination for Chorus' unbundled bitstream access service and unbundled copper local loop service including the cost model and its reference documents" CONFIDENTIAL, 20 February 2015, paragraph [78].

[1271] Vodafone "Submission on process paper and draft pricing review determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and comments on Analysys-Mason's TSLRIC models" 20 February 2015, paragraph [K3]; WIK-Consult "Submission in response to the Commerce Commission's Draft pricing review determination for Chorus' unbundled bitstream access service and unbundled copper local loop service including the cost model and its reference documents" CONFIDENTIAL, 20 February 2015, paragraph [78]; Network Strategies "Final report for Spark New Zealand and Vodafone New Zealand - Commerce Commission draft determination for UCLL and UBA" CONFIDENTIAL, 20 February 2015, p. 83.

[1272] Vodafone "Submission on process paper and draft pricing review determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and comments on Analysys-Mason's TSLRIC models" 20 February 2015, paragraph [K3]; WIK-Consult "Submission in response to the Commerce Commission's Draft pricing review determination for Chorus' unbundled bitstream access service and unbundled copper local loop service including the cost model and its reference documents" CONFIDENTIAL, 20 February 2015, paragraph [78]; Network Strategies "Final report for Spark New Zealand and Vodafone New Zealand - Commerce Commission draft determination for UCLL and UBA" CONFIDENTIAL, 20 February 2015, p. 83.

[1273] Wigley and Company "Submission on draft pricing review determination for UBA and UCLL services" 20 February 2015, paragraphs [10.29]-[10.31].

operator was already compensated for this risk through the WACC asset beta. Vodafone, WIK and Network Strategies also argued that our approach was inconsistent with the approach other regulators took.

F17 Chorus and CEG disagreed that the risk of asset stranding due to technological change is captured in the asset beta. They argued that technological change does create cash flow risk that is not captured in the asset beta.[1274,1275]

F18 Chorus, CEG and L1 Capital argued that adopting Chorus' asset lives did not adequately compensate for the risk of asset stranding. This is because, in their view, the asset lives used for Chorus' financial statements did not sufficiently consider technological obsolescence and therefore an adjustment needs to be made.[1276,1277,1278,1279]

F19 Conversely, WIK felt it was fair to assume that Chorus has made a prudent choice of asset lives.[1280] WIK also noted that major parts of Chorus' assets are fully depreciated but still in use. WIK argued that to apply shorter asset lives to these assets would not promote efficiency.[1281]

F20 In our July 2015 UCLL further draft determination paper,[1282] we held that regardless of whether the asset beta of the WACC captures some of the risk, there is significant degree of firm-specific risk that is not captured by the asset beta..

F21 On balance, we continued to hold the view that Chorus' asset lives provided the best reflection of the likely economic lives of the hypothetical efficient operator's assets.

F22 We also recognised that asset lives which are developed to meet accounting standards may not perfectly reflect the risk of asset stranding. Nonetheless, based on

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1274 CEG "Issues from submissions UCLL and UBA" March 2015, paragraph [44].

1275 Chorus "Cross-submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and Process and Issues Update Paper for the UCLL and UBA Pricing Review Determinations" CONFIDENTIAL, 20 March 2015, paragraphs [301]-[303].

1276 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and Process and Issues Update Paper for the UCLL and UBA Pricing Review Determinations" CONFIDENTIAL, 20 February 2015, paragraphs [677]-[679].

1277 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and Process and Issues Update Paper for the UCLL and UBA Pricing Review Determinations" CONFIDENTIAL, 20 February 2015, paragraph [679].

1278 CEG "Uplift asymmetries in the TSLRIC price" CONFIDENTIAL, February 2015, paragraph [96].

1279 L1 Capital "Submission on draft UCLL and UBA pricing review determinations" 20 February 2015, p. 12.

1280 WIK-Consult "Cross-submission in response to the Commerce Commission's Draft pricing review determination for Chorus' unbundled bitstream access service unbundled copper local loop services including the cost model and its reference documents" CONFIDENTIAL, 19 March 2015, paragraph [71].

1281 WIK-Consult "Cross-submission in response to the Commerce Commission's Draft pricing review determination for Chorus' unbundled bitstream access service unbundled copper local loop services including the cost model and its reference documents" CONFIDENTIAL, 19 March 2015, paragraph [72].

1282 Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 2 July 2015, paragraph [1353].

evidence from Chorus' financial statements,[1283] at the conference,[1284] and in further information provided to the Commission we felt that Chorus' asset lives did make some allowance for the potential for assets to be rendered obsolete (see Attachment H: Setting asset lives for further discussion).[1285]

F23 We also undertook a comparison of Chorus' asset lives with the engineering lives of its assets.[1286] This analysis showed that the shorter asset lives Chorus applied provided significant compensation. Therefore, we elected to maintain our position that Chorus' asset lives should be used as compensation for the risk of asset stranding due to technological development.

F24 In submissions on our July 2015 UCLL further draft determination, Spark agreed that using Chorus' asset lives provided adequate compensation for the risk of asset stranding due to technological change.[1287]

F25 Chorus repeated its argument that its asset lives were developed for the purposes of financial accounts and statements and do not adequately take into account the risk of asset stranding from technological change.[1288] It also claimed that uncertainty in asset lives should be recognised by calculating an average annuity across a range of asset lives.[1289]

F26 Vodafone argued that our further draft decision to use Chorus' asset lives was "unorthodox" in light of the decision of the Supreme Court *Vodafone TSO* case.[1290] Network Strategies drew a comparison with the majority's finding in that case that we were wrong to exclude mobile technology on the basis that we would then need to allow compensation to Telecom for the consequential asset stranding.[1291]

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1283 Chorus "Financial Statements for the year ended 30 June 2014" August 2014, p. 10.

1284 Commerce Commission "UBA and UCLL pricing review determination conference transcript" 15-17 April 2015, p. 294.

1285 Chorus "Commission's follow up questions following FPP conference" Confidential, 12 May 2015, Question 3.

1286 Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 2 July 2015, paragraphs [1360-1363].

1287 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" CONFIDENTIAL, 13 August 2015, paragraph [246].

1288 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services - Public version" 2 July 2015, paragraph [279-280].

1289 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services - Public version" 2 July 2015, p. 16.

1290 Vodafone "Submission on process paper and draft pricing review determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and comments on Analysys-Mason's TSLRIC models" 20 February 2015, paragraph [D8.1(e)], citing *Vodafone New Zealand Ltd v Telecom New Zealand Ltd* [2011] NZSC 138, [2012] 3 NZLR 153.

1291 Network Strategies "Final report for Spark New Zealand and Vodafone New Zealand - Commerce Commission draft determination for UCLL and UBA" CONFIDENTIAL, 20 February 2015, p. 83.

*Analysis and final decisions*

F27 We note that in the *Vodafone TSO* case,[1292] the Court considered that the efficient service provider being modelled to determine the "net cost" of meeting the TSO obligations would not need to be compensated for assets stranded by the introduction of new technology. Elias CJ held that the costs of such assets were avoidable and irrelevant to the costs of an efficient service provider.[1293] Blanchard J considered that there was no case for compensation since those legacy assets had been overvalued by a replacement cost methodology.[1294]

F28 We have explained in Chapter 2 the different context in which the *TSO case* was decided. In particular, the Court was concerned to ensure that the objective standard of an efficient service provider provided an effective cap on Telecom's recoverable costs. Since the purpose of the net cost formula was to allow Telecom to recover the cost to it of efficiently servicing its commercially non-viable customers, new technology should be introduced where more efficient than the existing network.

F29 The issue of stranded assets arises in a different context in this determination. Here we are modelling the cost to a hypothetical efficient operator of building a new network. We consider that in assessing that cost it is appropriate to take into account the asymmetric risk that the assets being used to construct the network will become stranded in the future. Contrary to Network Strategies' submission, we consider this is consistent with the forward-looking nature of the TSLRIC exercise. We are not compensating Chorus for receiving a lower return on and of its legacy assets, but reflecting the cost to a hypothetical efficient operator of building a new network. That cost reflects the risk that the relevant assets' economic lives would ultimately be shorter than their engineering lives.

F30 We note that, as referred to above, Spark was supportive of our approach.[1295]

F31 With respect to Chorus' argument about using asset lives from their financial statements, as discussed previously based on evidence from Chorus' financial statements,[1296] what Chorus said at the conference,[1297] and in further information provided to us,[1298] we note that Chorus' asset lives do make allowance for the potential for assets to be rendered obsolete.

F32 We also note that over the two decades the asset lives of copper lines (and indeed of the NEAX exchanges) has turned out to be longer than anticipated. In particular

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[1292] *Vodafone New Zealand Limited v Telecom New Zealand Limited* [2011] NZSC 138, [2012] 3 NZLR 153.

[1293] At [13]-[14].

[1294] At [75] for himself and McGrath and Gault JJ.

[1295] Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" CONFIDENTIAL, 13 August 2015, paragraph [246].

[1296] Chorus "Financial Statements for the year ended 30 June 2014" August 2014, p. 10.

[1297] Commerce Commission "UBA and UCLL pricing review determination conference transcript" 15-17 April 2015, p. 294.

[1298] Chorus "Commission's follow up questions following FPP conference" Confidential, 12 May 2015, Question 3.

around 15 to 20 years ago, it was expected that the copper network would need to be replaced by a hybrid cable network. ADSL, ADSL2+ and VDSL have prolonged the useful life of the copper pair technology by 15 or more years. The same has turned out to be the case for the NEAX exchanges. This shows that Chorus' accounting lives can overstate as well understate economic lives.

F33 We do not dispute the mathematical analysis underlying CEG and Chorus' claim that we should use an annuity approach to calculate asset lives. However, to the extent that any downward bias did exist, it is not clear how this could be removed.

F34 CEG suggested formulating expectations of asset lives, but given the difficulties in determining a single economic lifetime for a particular asset, there is unlikely to be any robust and objective basis for determining multiple possible lifetimes (and the associated probabilities of occurrence) for a given asset.

F35 We also agree with the comments of Professor Vogelsang, who has stated that "[w]ithout concrete data it is hard to assess the size of this effect".[1299]

F36 Accordingly, our final decision is to provide compensation for the risk of asset stranding due to technological change by using Chorus' asset lives except where they are out of line with international benchmarks.

**Asset stranding due to competitive developments**

*Our preliminary views and views of submitters*

F37 In the December 2014 UCLL draft determination paper, we provisionally decided not to provide an *ex ante* allowance for asset stranding due to competitive developments.[1300] Our reasoning for this was that, while competitive developments may leave assets stranded, it is difficult to separate the risk of asset stranding through competitive developments from that of technological change. Since we had already provided for *ex ante* compensation for the latter, we considered it inappropriate to provide an additional *ex ante* allowance for the former.

F38 We received a range of views from submitters. Vodafone and WIK were supportive,[1301,1302] while CEG and Chorus opposed this approach. [1303,1304] In

[1299] Ingo Vogelsang "Reply to Comments on my November 25, 2014, paper "Current academic thinking about how best to implement TSLRIC in pricing telecommunications network services and the implications for pricing UCLL in New Zealand"" 23 June 2015, paragraph [21].

[1300] Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014, paragraph [722].

[1301] Vodafone "Submission on process paper and draft pricing review determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and comments on Analysys-Mason's TSLRIC models" 20 February 2015, paragraph [K3].

[1302] WIK-Consult "Submission in response to the Commerce Commission's Draft pricing review determination for Chorus' unbundled bitstream access service and unbundled copper local loop service including the cost model and its reference documents" CONFIDENTIAL, 20 February 2015, paragraph [79].

[1303] CEG "Uplift asymmetries in the TSLRIC price" CONFIDENTIAL, February 2015, paragraphs [101]-[102].

particular, Chorus submitted that asset stranding due to new entry and changes to the demand base will not be taken into account in consideration of the asymmetric risk arising from technological change. Chorus submitted that these are further risks which should be accounted for.[1305]

F39 In our July 2015 further draft determination, we noted that there is an inherent circularity in reflecting any *ex ante* compensation for this form of competition. Typically competition manifests itself in prices falling, rather than rising. Indeed, we would not expect a hypothetical efficient operator to raise prices *ex ante* to compensate for the risk of asset stranding that arises from this competition, as to do so would encourage entry and/or competition that leads to the stranding in the first place.

F40 Accordingly, we maintained the view that no *ex ante* compensation should be provided for the asymmetric risk of asset stranding associated with competitive developments.

F41 Spark supported our proposal not to provide an *ex ante* allowance for asymmetric risk from competitive development.[1306] We received no other submissions on this particular issue.

*Analysis and final decision*

F42 We have not received any further submissions opposing our proposed approach. We continue to feel that while competitive developments may leave assets stranded, it is difficult to separate the risk of asset stranding through competitive developments from that of technological change. Since we had already provided for *ex ante* compensation for the latter, we considered it inappropriate to provide an additional *ex ante* allowance for the former. Therefore, our final decision is to maintain our draft decisions to not include any *ex ante* allowance for the asymmetric risk from competitive developments.

**Asset stranding due to future regulatory decisions**

*Our preliminary views and views of submitters*

F43 In the December 2014 UCLL draft determination paper and our July 2015 UCLL further draft determination paper, we proposed not to provide an *ex ante* allowance for asset stranding due to future regulatory decisions (re-optimisation).[1307]

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[1304] Chorus “Submission for Chorus in response to Draft Pricing Review Determinations for Chorus’ Unbundled Copper Local Loop and Unbundled Bitstream Access Services and Process and Issues Update Paper for the UCLL and UBA Pricing Review Determinations” CONFIDENTIAL, 20 February 2015, paragraph [307].

[1305] Chorus “Submission for Chorus in response to Draft Pricing Review Determinations for Chorus’ Unbundled Copper Local Loop and Unbundled Bitstream Access Services and Process and Issues Update Paper for the UCLL and UBA Pricing Review Determinations” CONFIDENTIAL, 20 February 2015, paragraph [307].

[1306] Spark "Further draft pricing review determination for Chorus’ UBA and UCLL services" CONFIDENTIAL, 13 August 2015, paragraph [246].

[1307] Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014, paragraph [726].

F44 Chorus and CEG submitted that the TSLRIC framework has the potential to strand the assumed investment of the hypothetical efficient operator, as the TSLRIC exercise is repeated in the future.[1308,1309]

F45 WIK and Network Strategies characterised fibre-to-the-home (FTTH)/fixed wireless access (FWA) as a "future proof" technology, and suggested that this implies there is limited ability for FTTH/FWA to be re-optimised at a future regulatory determination.[1310] In contrast, Analysys Mason stated that we may not be able to foresee what technology supersedes what we build today, and that current technology built today will always be a legacy technology.[1311]

F46 In our July 2015 UCLL further draft determination paper, we recognised that future regulatory decisions could result in the choice of a new MEA due to re-optimisation. However, we were not convinced that this justified any *ex ante* compensation. We were also unsure how any such compensation would be implemented.

F47 Therefore, we remained of the view that it is not appropriate to include any *ex ante* allowance for the asymmetric risk associated with future regulatory determinations.

F48 Spark supported our proposal not to provide an *ex ante* allowance for asymmetric risk from future regulatory decisions.[1312] We did not receive any further submissions on this particular issue.

*Analysis and final decisions*

F49 We have not received any further submissions opposing our proposed approach. Further we remain unconvinced that this justifies any *ex ante* compensation. Further, we are unsure how any such compensation would be implemented. Therefore we maintain our decision to not include any *ex ante* allowance for asymmetric risk associated with future regulatory determinations.

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1308 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and Process and Issues Update Paper for the UCLL and UBA Pricing Review Determinations" CONFIDENTIAL, 20 February 2015, paragraph [684].

1309 CEG "Uplift asymmetries in the TSLRIC price" CONFIDENTIAL, February 2015, paragraph [78].

1310 Commerce Commission "UBA and UCLL pricing review determination conference transcript" 15-17 April 2015, p. 302 and 308.

1311 Commerce Commission "UBA and UCLL pricing review determination conference transcript" 15-17 April 2015, p. 303.

1312 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" CONFIDENTIAL, 13 August 2015, paragraph [246].

# Attachment G: Depreciation

### Purpose

G1 This Attachment outlines how we have treated regulatory depreciation in our model, and presents in more detail our reasons for our final decisions relating to our approach to regulatory depreciation.

### Our final decision

G2 Our final decision is to maintain the view that the tilted annuity method is the appropriate methodology for regulatory depreciation.[1313] This approach combines an allowance for depreciation with the return on capital.

### Relevance of depreciation to TSLRIC

G3 Depreciation determines the amount of its asset base that the hypothetical efficient operator can recover each year through the regulated access prices. As telecommunications networks, and in particular the UCLL and UBA services, are capital intense, depreciation is a significant component of these services' forward-looking cost-based prices. Therefore, decisions about the choice of depreciation methodology and the inputs into the depreciation formula in the TSLRIC model can directly affect these prices. In particular, these decisions can affect whether the hypothetical efficient operator's costs are recovered from current or future users of the hypothetical efficient operator's network.

G4 Due to a combination of physical deterioration, technical obsolescence, and contract terms, most of the hypothetical efficient operator's network and related assets have finite commercially-useful lives. As these assets age, their future productive capacity and market value declines.[1314] This loss of value is a cost that needs to be recovered over the life of these assets as part of the forward-looking cost-based prices charged for the service(s). Attachment H discusses how we set the asset lives used to calculate depreciation in detail.

G5 Changes in asset prices can also impact the depreciation included in forward-looking cost-based prices. This can occur due to factors such as inflation increasing the cost of comparable new assets (eg, wage inflation increasing the cost of laying cable) and technological development reducing the value of older assets. Attachment I discusses our approach to determining price trends.

G6 We considered several methodologies to determine how to best estimate an efficient allowance of the regulatory depreciation costs for the UBA and UCLL services. This included considering economic depreciation that in theory provides an efficient estimate of the cost, and other approaches, such as tilted annuities, that address the practical limitations of economic depreciation.

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[1313] For calculating the hypothetical efficient operator's notional taxation, we have used diminishing value taxation.

[1314] Charles R. Hulten and Frank C. Wykoff (1996) "Issues in the measurement of economic depreciation: introductory remarks", *Economic Inquiry* 34, p. 10–23.

**Overview of tilted annuities**

G7 An annuity combines an allowance for depreciation with the return on capital.[1315] Tilted annuities are consistent with the principles of financial capital maintenance and provide efficient incentives for build-buy decisions over time.[1316]

G8 A standard annuity calculates the charge that recovers the asset's total purchase price and financing costs in annual sums that are constant over time.

G9 If the price of the asset is expected to change over time, a tilted annuity would be more appropriate. A tilted annuity calculates an annuity charge that changes between years at the same rate as the expected change of the asset value. This results in declining annualisation charges if prices are expected to fall over time, or vice versa if prices are expected to rise. Because of this feature, the tilted annuity approach is an approximation of economic depreciation as annual charges are brought in line with the expected value of the asset at each time of its economic life. As with a standard annuity, the tilted annuity should still result in charges that, after discounting, recover the asset's purchase price and financing costs.

G10 To calculate the tilt we used price trends for the key inputs into the hypothetical efficient operator's network assets. Attachment I explains how we calculated the price trends.

**Consultation on alternative approaches to depreciation**

G11 In our December 2013 UCLL process and issues paper, our December 2014 UCLL draft determination paper and our July 2015 UCLL further draft determination, we considered two other approaches to depreciation:

G11.1 *economic-based depreciation* which captures the change in factors that determine the value of an asset from one period to the next; and

G11.2 *straight-line depreciation* which is focussed on allocating the opening value of an asset across time periods.[1317,1318]

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1315 The return on capital is calculated by multiplying the value of assets by the cost of capital (ie, the financial return investors require from an investment given its risk).

1316 Further discussion on tilted annuities and depreciation can be found in Van Dijk Management Consultations, "Evaluating Economic Depreciation Methodologies for the Telecom Sector", which can be found at *http://www.vandijkmc.com/en/expertise_3.aspx.*

1317 Commerce Commission "Process and issues paper for determining a TSLRIC price for Chorus' unbundled copper local loop service in accordance with the Final Pricing Principle" 6 December 2013, paragraph [146].

1318 Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014, paragraph [784-789].

*Economic depreciation*

G12 Economic depreciation incorporates the various factors that affect the value of assets. There are a wide range of factors that determine the economic value of an asset, including:

G12.1 expected revenue;

G12.2 its age;

G12.3 asset prices;

G12.4 technological change; and

G12.5 demand.[1319]

G13 Estimating economic depreciation is information-intensive and requires forecasts of how the various factors that affect the value of an asset are expected to change over a long time period. Due to the inherent shortcomings of forecasting over long periods, it is unclear whether economic depreciation provides a more accurate depreciation allowance than accounting-based approaches to depreciation.

G14 There is also a risk of creating a circular argument, as the calculation of economic depreciation depends on the expected development in revenue, which in turn depends on the calculated depreciation charge included in the regulated prices.

*Straight-line depreciation*

G15 Straight-line depreciation distributes an asset's acquisition cost or opening value equally across the assumed life of the asset to produce an annualised depreciation charge.[1320]

G16 Straight-line depreciation is often used in economic regulation, particularly outside the telecommunications industry, because, relative to other forms of depreciation, it is well understood, transparent and simple to calculate. Straight-line depreciation is also widely used by the accounting profession.

G17 The straight-line depreciation formula provides limited flexibility to take into account factors that are expected to affect asset values while the asset is in use. For example, the regulator can modify the assumed lifetime of the asset.

[1319] Regulators in Belgium, The Netherlands and Norway apply forms of economic depreciation. Analysys Mason "Report for BIPT: BIPT's NGN/NGA Model version v1.0 documentation for industry players" 23 December 2011; Analysys Mason "Report for the Norwegian Post and Telecommunications Authority (NPT): Fixed Long Run Incremental Cost (LRIC), Model for Market 4 Response to operator consultation" 28 September 2012; Analysys Mason "Report for OPTA: Conceptual approach for the fixed and mobile BULRIC models" 20 April 2010; Analysys Mason "Report for Ofcom: Study of approaches to fixed call origination and termination charge controls" 15 May 2012.

[1320] In practice, there may be adjustments for expected salvage values or disposal costs.

G18 However, the straight-line depreciation formula does not lend itself to modelling changes in the value of in use assets or reflecting these changes in the forward-looking cost-based prices for specific services. Therefore, it is not as well-suited to modelling the forward-looking cost of the hypothetical efficient operator in the context of a FPP as the tilted annuity approach.

*Industry responses to our proposed approach in our December 2013 paper*

G19 In the December 2013 UCLL process and issues paper, we outlined our preliminary choice of a tilted annuity approach and asked submitters whether an alternative depreciation approach should be used and if so, why it would be preferable.[1321]

G20 Submitters responded as follows.

G20.1 Frontier Economics, for Vodafone, Telecom and CallPlus, submitted that a tilted annuity methodology should be used for depreciation, and that economic depreciation should not be used due to the complexities. In doing so, Frontier recommended against using straight-line depreciation given its tendency to front-load allowed revenues.[1322]

G20.2 Spark stated that economic depreciation would generally be preferred to the tilted annuity methodology in telecommunications cost models, but given that the economic depreciation methodology is difficult, a tilted annuity methodology may well provide an acceptable proxy for economic depreciation if all relevant factors are fully considered.[1323]

G20.3 Both Chorus and Analysys Mason (for Chorus) submitted that an adjusted tilted annuity (with an additional tilt for demand changes) and economic depreciation would both be superior to a tilted annuity, given the possibility of a future migration to an alternative access technology. Chorus submitted that the adjusted tilted annuity may be an appropriate simplification to ensure the model results are delivered by December 2014.[1324]

G20.4 Vodafone argued that a standard or straight-line annuity should apply to re-used assets, while a tilted annuity methodology (using CPI adjustments) should apply to assets valued at ORC.[1325]

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[1321] Commerce Commission “Process and issues paper for determining a TSLRIC price for Chorus' unbundled copper local loop service in accordance with the Final Pricing Principle” 6 December 2013, paragraph [167-168].

[1322] Frontier Economics "Determining a TSLRIC price for Chorus’ UCLL service - A report prepared for Vodafone New Zealand, Telecom New Zealand and CallPlus" February 2014, p. 41.

[1323] Telecom "Submission on Process and issues paper for determining a TSLRIC UCLL price" 14 February 2014, paragraphs [166-168].

[1324] Chorus "Submission in response to the Commerce Commission’s Process and issues paper for determining a TSLRIC price for Chorus’ unbundled copper local loop service in accordance with the Final Pricing Principle" 14 February 2014, paragraphs [79] and [279]; and Analysys Mason "Report for Chorus - Response to Commission" 12 February 2014, p. 34.

[1325] Vodafone New Zealand Limited "Comments on process and issues paper for the unbundled copper local loop (UCLL) final pricing principle" 14 February 2014, recommendations 24 and 25, p. 28.

G21 None of the submissions we received changed our view, and in our July 2014 regulatory framework and modelling approach paper we stated that our view was still that a tilted annuity methodology is the most appropriate for our TSLRIC modelling exercise for two reasons.

G21.1 A tilted annuity methodology is the orthodox depreciation methodology used in electronic communications regulation, and we have previously adopted a tilted annuity methodology in the TSLRIC context.

G21.2 Over the lifetime of the assets, a tilted annuity will result in a relatively constant rate of change in prices in a situation where a stable demand profile is modelled. This is expected to avoid windfall gains and losses being caused by changing network costs.

G22 We also noted the following.

G22.1 While an economic depreciation methodology is considered to be the most robust methodology, it is the most complex to implement and the availability of the necessary information is limited.

G22.2 The tilted annuity methodology is a good proxy for economic depreciation where the demand profile is stable. Given that we have adopted a stable demand profile, a tilted annuity methodology is likely to produce a similar result to an economic depreciation methodology.

G22.3 Similarly, an adjusted tilted annuity methodology, as recommended by Chorus and Analysys Mason, is only superior to tilted annuity where demand is not stable.

*Industry responses to our proposed approach in our July 2014 paper*

G23 In response to our July 2014 regulatory framework and modelling approach paper, we received a number of submissions.

G23.1 Vodafone, Spark, and WIK all supported a tilted annuity approach, but submitted that we should include an adjustment factor for both expected price and demand changes.[1326]

[1326] Vodafone NZ "Submission to the New Zealand Commerce Commission - Comments on Consultation paper outlining Commission's proposed view on regulatory framework and modelling approach for UBA and UCLL services" 6 August 2014, paragraph [G8.1]; Telecom "UCLL and UBA FPP: consultation on regulatory framework and modelling approach - Submission Commerce Commission" 6 August 2014, paragraph [142]; WIK-Consult "Report for Telecom New Zealand and Vodafone New Zealand - Submission - In response to the Commerce Commission's 'Consultation paper outlining our proposed view on regulatory framework and modelling approach for UBA and UCLL services (9 July 2014)'" 5 August 2014, paragraph [59].

G23.2 Chorus maintained its position that an adjusted tilted annuity is superior to a tilted annuity. Chorus submitted that we:

> […] should be very careful when setting the depreciation profile so that it does not backload recovery of cost in a way that will make it practically impossible to recover the efficient cost of the network.[1327]

G23.3 Chorus also submitted that:

> In order to achieve expected NPV neutrality over the regulatory period, the input price trends must, in total, reflect the expected change in the replacement cost of the assets over the regulatory period. There are two factors that need to be taken into account to ensure this outcome is achieved – the expected escalation in costs of the MEA being modelled and any effects of a change in the MEA.[1328]

G23.4 Vodafone also commented that static demand is not required for proper application of the tilted annuity approach.[1329]

G23.5 Analysys Mason submitted that we “should adopt a depreciation method which allows for the declining demand for UCLL as a result of fixed-mobile substitution and (as a minimum) loss of customers to non-Chorus LFC’s.”[1330] We have responded to this in our draft decisions on demand, outlined in Attachment A and note that our TSLRIC model assumes constant demand.

G24 In our December 2014 UCLL draft determination paper we restated our preliminary view that a tilted annuity methodology is the most appropriate for our TSLRIC modelling exercise. In response to submissions on our July 2014 regulatory framework and modelling approach paper we noted the following.

G24.1 The adjusted tilted annuity is only superior to the tilted annuity when demand is not considered to be constant. However as our preliminary view is that as a constant demand should be modelled, there is consequently unlikely to be a difference between using a tilted annuity or an adjusted tilted annuity.

G24.2 The proposed price trends and asset lifetimes used in the model have been chosen to achieve cost recovery and NPV neutrality over the regulatory period and, as a consequence, the adjusted tilted annuity results in charges

[1327] Chorus "Submission in response to the Commerce Commission’s Consultation paper outlining its proposed view on the regulatory framework and modelling approach for UBA and UCLL services (9 July 2014)" 6 August 2014, paragraphs [126, 129]. We note that the model does not significantly backload cost recovery because the UBA price increment is stable.

[1328] Chorus "Submission in response to the Commerce Commission’s Consultation paper outlining its proposed view on the regulatory framework and modelling approach for UBA and UCLL services (9 July 2014)" 6 August 2014, paragraph [128].

[1329] Vodafone NZ "Submission to the New Zealand Commerce Commission - Comments on Consultation paper outlining Commission's proposed view on regulatory framework and modelling approach for UBA and UCLL services" 6 August 2014, paragraph [G8.2].

[1330] Analysys Mason "Report for Chorus - Response to Commission consultation on regulatory framework and modelling approach for UCLL and UBA" 6 August 2014, paragraph [1.18].

that, after discounting, recover the asset's purchase price and financing costs.

G24.3 We consider the risk of technical obsolescence does not provide a reason for selecting one depreciation method over another.

*Industry responses to our proposed approach in our December 2014 UCLL draft determination*

G25 In response to our December 2014 UCLL draft determination paper, CEG, for Chorus, submitted on specific aspects of our approach to depreciation.

G26 CEG's submission noted the attributes of the tilted annuity and assumed the use of the tilted annuity in its submissions on price trends and asset lives. CEG did not propose an alternative approach to depreciation.[1331] We agree with CEG's statement that the tilted annuity approach:

G26.1 recovers the cost of the asset in present value terms over its expected life;

G26.2 changes in line with expected changes in an asset's replacement cost; and

G26.3 predicts a smooth path of revenue over time and therefore avoids price shocks when demand is stable.[1332]

G27 CEG submitted that a shortcoming of straight-line depreciation is that, when it is used in conjunction with a return on capital factor, it can result in compensation that is "front loaded" and experiences an "upward jump" when the asset is replaced. CEG stated that the tilted annuity approach tends to result in smoother compensation (subject to a constant price trends).[1333]

G28 We agree with CEG that that the relatively smoother compensation profile offered by the tilted annuity approach is a reason to use it rather than straight-line depreciation, when calculating forward-looking costs.

G29 Several parties submitted on the choice of asset lives and how the price trends used in the tilted annuity were calculated, but did not propose an alternative approach to depreciation.[1334] We considered these issues in Attachments H and I of our July 2015 UCLL further draft determination.

*Industry responses to our proposed approach in our July 2015 UCLL further draft determination*

G30 The submissions and cross submissions on our July 2015 UCLL further draft determination did not comment on the specifics of our depreciation methodology. This supported our maintaining our view as presented in our July 2015 UCLL further

[1331] For example, CEG "Evidence on price trends" 23 February 2015, paragraphs 30 and 36 which discuss price trends are written in the context of applying the tilted annuity approach.

[1332] CEG "Evidence on price trends" 23 February 2015, paragraph [14].

[1333] Ibid, at paragraph [18].

[1334] For example, CEG "Evidence on price trends" 23 February 2015, paragraphs [10], [19], [29-35].

draft determination that the tilted annuity method is the appropriate methodology for regulatory depreciation. This approach combines an allowance for depreciation with the return on capital.

G31 Several parties submitted on the choice of asset lives and price trends used in the tilted annuity and these points are considered in Attachments H and I respectively.

# Attachment H: Setting asset lives

## Purpose

H1 This Attachment sets out in more detail our reasons for our final decisions regarding the asset lives used in our TSLRIC model.

## What asset lives are and why they are relevant to TSLRIC

H2 Asset lives are the economic lives of the hypothetical efficient operator's assets. We use these asset lives to depreciate the hypothetical efficient operator's assets which determines how much of the cost of these assets is recognised each year. In effect, the economic asset life is the amount of time an asset can be used until it is replaced.

H3 In order to set a TSLRIC price that promotes efficiency, it is important that we set asset lives that are our best estimate of the economic lifetime of assets. If asset lives understate the economic lives of assets, the TSLRIC price will be set too high. This would mean that consumers would pay more than they need to. Similarly, if asset lives overstate the economic lives of assets, the TSLRIC price would be too low. This would mean that there would not be sufficient incentives for the hypothetical efficient operator to invest.

## Our final decision

H4 Our final decision is to set the hypothetical efficient operator's assets lives equal to Chorus' except where:

H4.1 Chorus' asset lives are out of line with international benchmarks; or

H4.2 no Chorus data is available. In these cases we use international benchmarks to adjust/set asset lives or domestic settings (ie, the period management rights are auctioned for).

H5 The main reasons for our final decision are as follows.

H5.1 We consider that the accounting asset lives supplied by Chorus provide a reasonable estimate of the economic lives of the hypothetical efficient operator's assets.[1335]

H5.2 We believe that international benchmarks provide the most appropriate check for Chorus' asset lives except in the case of FWA spectrum, where we believe that domestic settings are most appropriate.

[1335] Chorus provided a list of asset categories and its estimation of the corresponding lives, as required by our section 98 Notice. TERA has allocated all of the assets in the model into one of these categories.

H6 Based on the reasoning above, we have decided to set asset lives to the following:

**Table H1: Asset lives in our TSLRIC model**

| Asset class | Asset lives in years |
|---|---|
| Copper cables overhead | 14 |
| Copper cables underground | 20 |
| Fibre cables | 20 |
| Copper joints overhead | 14 |
| Copper joints underground | 20 |
| Fibre joints | 20 |
| Ducts | 50 |
| Trenches | 50 |
| Poles | 20 |
| Urban/Rural Manholes | 50 |
| Street cabinets (passive) | 14 |
| MDF | 20 |
| ODF | 20 |
| Submarine cable | 20 |
| DWDM sites | 10 |
| FWA spectrum | 17 |
| FWA sites (masts) | 14 |
| FWA sites (antennas) | 7 |

**Our initial views on the use of Chorus data as a starting point for assessing asset lives**

H7 Our framework allows for real-world information and reflections of the incumbent's legacy decisions to be used to inform our assessment of what constraints a hypothetical efficient operator would be likely to face and decisions it would be likely to make.[1336]

H8 In our December 2014 UCLL draft determination paper and our July 2015 UCLL further draft determination paper, we used asset lives provided by Chorus as a starting point. Where the asset lives seemed out of line with what has been observed in other jurisdictions, we used international benchmarks derived from TSLRIC models overseas.[1337,1338]

[1336] Refer to Chapter 2 of this determination.

[1337] Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014, paragraphs [306]–[ 309] and Attachment F and Attachment G.

*Submitters' views*

H9 WIK submitted that we should not adopt Chorus' assets lives as this involves consideration of the incumbent, and not the hypothetical efficient operator.[1339]

H10 Chorus argued that WIK's argument is overly simplistic.

> It would be prudent (and efficient) for any HEO to consider the incumbent's experience. In addition, Chorus' asset lives are developed following thorough analysis by subject matter experts, which take account of the experience of New Zealand conditions. Asset life review occurs annually, including a detailed review by subject matters experts, in conjunction with audit advice on accounting standards. There is no reason that an efficient HEO would not undertake an equivalent analysis, and reach equivalent conclusions.[1340]

H11 Chorus also argued that the requirements for setting asset lives in financial accounts are different from the considerations that should be applied in determining the asset lives of the hypothetical efficient operator. In particular, Chorus claimed that we should give further consideration to the risk of asset stranding.[1341,1342]

*Analysis and final decision*

H12 Our final decision is that Chorus' asset lives offer valuable, real-world information about the hypothetical efficient operator. Chorus' asset lifetime data provides us with the best objective assessment of the lifetime of assets used in a fixed telecommunications network in New Zealand. We also believe that international benchmarks provide a strong check on the appropriateness of Chorus' asset lives.

H13 We discuss our analysis in respect of whether the asset lives appropriately address the asymmetric risk of asset stranding in Attachment F – Asymmetric risk.

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[1338] Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 2 July 2015, Attachment H.

[1339] WIK-Consult "Submission in response to the Commerce Commission's Draft pricing review determination for Chorus' unbundled bitstream access and unbundled copper local loop services including the cost model and its reference documents" CONFIDENTIAL, 20 February 2015, paragraphs [78], [100], [101], and [356].

[1340] Chorus "Cross-submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and Process and Issues Update Paper for the UCLL and UBA Pricing Review Determinations" CONFIDENTIAL, 20 March 2015, paragraph [335].

[1341] Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and Process and Issues Update Paper for the UCLL and UBA Pricing Review Determinations" CONFIDENTIAL, 20 February 2015, paragraph [282].

[1342] Chorus "Submission in response to the Commerce Commission's Further Draft Pricing Review Determination for Chorus' Unbundled Bitstream Access and Unbundled Copper Local Loop Services" CONFIDENTIAL, 13 August 2015, paragraphs [279]–[280].

## Setting asset lives

*Our initial views and views of submitters*

H14 In our December 2014 UCLL draft determination paper, we considered it appropriate to use, as a starting point, information provided by Chorus to determine reasonable values for asset lives. Chorus explained that it calculates its asset lives as follows:

> Chorus reviews the useful life of assets annually, assessing the expected period of service, and the likelihood of the asset becoming obsolete as a result of technology advances.[1343]

H15 In response to our December 2014 UCLL draft determination paper, WIK submitted that Chorus' asset lives were less than international asset lives.[1344] WIK provided a range of international data to support its position. However, Analysys Mason provided data which shows that Chorus' asset lives are either in line with or longer than international benchmarks.[1345]

H16 Network Strategies submitted that we should set asset lives to 18 years rather than 17, as the 700 MHz spectrum on which we derive FWA spectrum costs is licensed for 18 years.[1346]

H17 In preparing our July further draft determination, we asked TERA to cross-check these asset lives against TSLRIC models overseas. TERA used Denmark and Ireland to compare Chorus' asset lives. They also confirmed that that these asset lives were consistent with asset lives in other jurisdictions. TERA selected these countries for pragmatic reasons since the information is well-documented and transparent. We note that the countries TERA selected are consistent with our international benchmark analysis in Attachment P – International comparators.

H18 With respect to MDF/ODF, Chorus provided lifetimes of [ ]**CNZCI**. However, this is significantly lower than benchmark data collected by TERA which were:

H18.1 from Denmark: 20 years; and

H18.2 from Ireland: 40 years.[1347]

H19 We reviewed TERA's analysis and agreed with it. We could not see a strong reason for having asset lives for MDF/ODF in New Zealand that are less than half of those in

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[1343] Chorus "Commission's follow up questions following FPP conference" Confidential, 12 May 2015, Question 3.

[1344] WIK Consult "Submission in response to the Commerce Commission's Draft pricing review determination for Chorus' unbundled bitstream access and unbundled copper local loop services including the cost model and its reference documents" CONFIDENTIAL, 20 February 2015, paragraph [78].

[1345] Analysys Mason "Report for Chorus UCLLL and UBA FPP draft determination cross submission" CONFIDENTIAL, 20 March 2015, Section [2.9.1].

[1346] Network Strategies "Final report for Spark New Zealand and Vodafone New Zealand - Modelling Fixed Wireless Access" CONFIDENTIAL, 20 February 2015, p. 30.

[1347] ComReg Response to Consultation Document No. 09/11: Review of the regulatory asset lives of Eircom Limited, 11 August 2009.

other countries. Accordingly, our July 2015 UCLL further draft decision was to select a value of 20 years for the asset lives for MDF/ODF.

H20 To determine whether the other asset lives were appropriate, we also obtained some evidence on:

H20.1 the likely physical/engineering lifetimes of the asset classes submitters raised as a concern;[1348]

H20.2 the asset lives used in the TSO model;[1349] and

H20.3 the asset lives used to set tax depreciation rates determined by the Inland Revenue Department (IRD) as a national benchmark.[1350]

H21 Table H2 below shows the economic lifetimes used in our TSLRIC model and the additional information we obtained on asset lives in New Zealand.

**Table H2: Summary of asset lives in our TSLRIC model and asset lives raised in submissions to our December 2014 draft determination [years]**

| | Economic lives used in our TSLRIC model | Engineering lives | TSO model | IRD (used for tax depreciation rates) |
|---|---|---|---|---|
| Overhead copper | 14 | 100 | [ ] **CCNZRI** | 15.50 |
| Copper cable | 20 | 100 | [ ] **CCNZRI** | |
| Fibre cable | 20 | 100 | [ ] **CCNZRI** | 15.50 |
| Duct | 50 | 100 | [ ] **CCNZRI** | 50 |
| Poles | 20 | 50 | [ ] **CCNZRI** | 25 |
| Urban/Rural manhole | 50 | 50 | [ ] **CCNZRI** | 50 |
| Street cabinet | 14 | 20-50 | | |
| MDF/ODF | 20 | 30-50 | | 12.50 |

1348 We could not obtain data on all engineering lifetimes for all asset classes, and for some asset classes we only obtained a likely range of the engineering lifetime.

1349 Commerce Commission "Final Determination for TSO Instrument for Local Residential Telephone Service for period between 1 July 2004 and 30 June 2005", Table 10, p. 99.

1350 Inland Revenue Department "General Depreciation Rates", February 2015. Available at http://www.ird.govt.nz/resources/6/5/6576ff004ba3cf748844bd9ef8e4b077/ir265.pdf, pp. 40-41.

H22 The comparison in the table suggests the following.

H22.1 The economic lifetimes are in the same range as those used in the TSO model and by the IRD. The only material differences are the TSO model asset lives for manholes and the IRD asset lives for MDF/ODF. In both cases the economic lifetimes used in our model are longer than those used in other cases.

H22.2 The economic lifetimes for many asset classes are substantially lower than the engineering lifetimes, suggesting that the risk of asset stranding has been taken into account. This is further considered in Attachment F – Asymmetric risk.

H22.3 Based on the analysis in this Attachment, there was nothing to suggest that the proposed asset lives are overly long or overly short. As such, we considered that they are within a reasonable range for economic lifetimes of the relevant assets for the UCLL service.

H23 Asset lives for submarine cables were not provided by Chorus. Therefore, international benchmarks have been used to set the asset lifetime for submarine cables.

H23.1 In Ireland, ComReg uses lifetimes for submarine cables of 15 years.[1351]

H23.2 In Denmark, DBA uses lifetimes for submarine cables of 40 years.

H24 Based on this analysis and considering New Zealand conditions, in our July 2015 UCLL further draft determination paper we decided to set an asset life of 20 years.

*Our final decision*

H25 We have reviewed the asset lives for the FWA spectrum. We have confirmed the following with Radio Spectrum Management.

H25.1 Spark only took management of the spectrum that it purchased in August 2014.

H25.2 Vodafone and Trilogy took management of the spectrum that they purchased at a similar time (within a few months of Spark).

H25.3 All of these contracts effectively give these parties rights to use the FWA until 28 November 2031.

H26 Therefore, the actual length of management rights of the FWA spectrum that was auctioned was closer to 17 years than 18 years. On this basis we do not accept Network Strategy's proposal to change the asset life of FWA spectrum to 18 years.

[1351] ComReg Response to Consultation Document No. 09/11: Review of the regulatory asset lives of Eircom Limited, 11 August 2009.

H27 In light of the fact that we have not received any evidence to change our view, we find that there are no grounds for changes to be made to asset lives.

H28 Accordingly, our final decision is to set the hypothetical efficient operator's assets lives equal to Chorus' except where:

H28.1 Chorus' asset lives are out of line with international benchmarks; or

H28.2 no Chorus data is available. In these cases we used international benchmarks to set or adjust asset lives.

H29 The main reasons for our final decision are as follows:

H29.1 we consider that the accounting asset lives supplied by Chorus provide a

H29.2 reasonable estimate of the economic lives of the hypothetical efficient operator's assets;[1352] and

H29.3 we believe that international benchmarks provide the most appropriate check for Chorus' asset lives.

[1352] Chorus provided a list of asset categories and its estimation of the corresponding lives, as required by our section 98 Notice. TERA has allocated all of the assets in the model into one of these categories.

# Attachment I: Price trends

### Purpose

I1 The purpose of this Attachment is to set out our final decision on the appropriate price trends with respect to the UCLL service. These price trends are used in our TSLRIC model to forecasts costs and are applied as part of the tilted annuity depreciation formula.

I2 We commissioned NZIER to provide advice on long-term price trends for this FPP pricing review.[1353] The NZIER report is published with our final price determination.

### Our final decisions summary

I3 The assessment of price trends is largely an evidential matter, where we determine the best objective measure of the long-term trend in prices for the relevant cost drivers of our TSLRIC model. Our final decisions are to use the following price indices and approaches to determine the long-term price trend for the following cost drivers. The price trends are then used by TERA to formulate specific price trends for each asset and opex category in the TSLRIC model where not already specified below.[1354] These are the best available price trends and methodologies taking into account our own analysis, expert advice and evidence provided in submissions and cross submissions.

[1353] NZIER "Price trends for UCLL and UBA final pricing principle – advice on response to submissions" (report to the Commerce Commission) November 2015.

[1354] TERA "TSLRIC price review determination for the unbundled copper local loop and unbundled bitstream access services – model specification" December 2015, p. 85.

**Table I1: Price indices and approaches to determine long-term price trends**

| Cost driver | Appropriate price index | Basis of price trend | Price Trend (annual percentage change) |
|---|---|---|---|
| Non-recurring charges (NRC) | Labour Cost Index (LCI) -all industries | Due to the predominant use of a wide variety of labour used in non-recurring activities | Annual change in index[1355] |
| Trenching costs | Statistics New Zealand Producers' Price Index (PPI) for the Heavy and Engineering Civil Construction sector | Relationship to construction sector labour costs and general all sector producer input price inflation | 3.3% |
| Wages/labour | Labour Cost Index (LCI) -all industries | Relationship to general inflation | 2.0% |
| Non-labour opex | Consumer Price Index (CPI) | The expectation that the gains and losses across all activities in this category will lead to a stable price trend of 0% | 0.0% |
| CPI | Consumer Price Index (CPI) | Current requirements of the RBNZ's policy target agreement with the Minister of Finance | 2.0% |
| Building costs | Capital Goods Price Index (CGPI) for non-residential buildings | Relationship to general inflation | 1.9% |
| Fabricated steel | Producer Price Index for Outputs of the metal fabrication industry (PPI-O) | Relationship to international steel prices, aluminium prices and domestic labour costs | 2.9% |
| Copper | London Metals Exchange (LME) prices for Copper | Average of historical growth and forecast based on LME futures plus Consensus Economics consensus forecasts | 5.0% |
| Fibre optic cabling | A US Bureau of Labour Statistics Producer Price Index (US PPI) for wholesale prices of fibre optic cable | Historical trend including currency effects | -1.3% |

1355 The percentage change observed in the LCI (all industries) during the preceding calendar year will be applied to non-recurring charges in November each year.

**What it is and why it is relevant to TSLRIC**

I4 Price trends are estimates of expected price changes during and beyond the regulatory period. The price trends are used in the TSLRIC model to forecast costs, and are applied with tilted annuity depreciation to spread capital costs over the lifetime of the assets.

I5 The price trends we have chosen would apply to a hypothetical efficient operator in New Zealand. They are the most accurate estimate of long-term price trends over the lifetime of the modelled assets and for expenses. These have been chosen to reflect international costs where we think they will apply and New Zealand-specific costs where relevant.

**Our final decision**

*Non-recurring charges*

I6 The STD includes a price adjustment for sundry non-recurring charges based on LCI (communications services) and is applied each year by Chorus. To ensure consistency between core and sundry non-recurring charges and the main set of recurring charges we have decided that core and sundry charges should be adjusted each year according to the LCI (all industries) index.

I7 In response to our July 2015 further draft determination, submitters suggested that either a price trend or efficiency adjustment should be applied to NRC.

I7.1 WIK suggested that NRC should have an efficiency adjustment applied over the five-year regulatory period on the basis of foreseeable efficiency improvements in contracted services. In effect this would mean a price trend of between -3.0 and -5.0%.[1356]

I7.2 Conversely, Analysys Mason proposed that the LCI index should be used as the price trend for core charges (a positive price trend) given the high labour component of NRC service provision.[1357] In its cross submission, Analysys Mason suggested that WIK's choice of a negative price trend is not supported by international experience and a zero or positive price trend is commonly chosen. Analysys Mason also pointed out that if an efficiency adjustment is applied, it is done so in the context of driving efficiencies on the part of the incumbent, which is not the role of price trends in the TSLRIC

[1356] WIK-Consult "Submission In response to the Commerce Commission's "Further draft pricing review determination for Chorus' unbundled bitstream access service" and "Further draft pricing review determination for Chorus' unbundled copper local loop service" including the revised cost model and its reference documents" 12 August 2015, p. 4.

[1357] Analysys Mason "Report for Chorus - UCLL and UBA FPP further draft determination submission", 11 August 2015, p. 14.

model.[1358] We agree with Analysys Mason on this point and have chosen to apply a price trend based on LCI (all industries).

I8 We do not consider WIK's proposed -3.0 to -5.0% price trend to be suitable for NRC. The trend WIK proposes is based on efficiency adjustments that have been applied in international models. While these are useful as a guide, we are not seeking to incentivise efficiency gains via price trends specifically but rather we are doing so via the TSLRIC methodology more generally.

I9 The STD specifies that sundry NRC will be adjusted each year based on the LCI (communication services). However, it does not detail an approach for core charges.[1359]

I10 As explained below, we do not see any reason for there to continue to be a difference between core and sundry NRC in terms of price trends. Therefore, to ensure consistency, our final decision is that sundry and core charges will both be adjusted by the same index, using the same adjustment method.

I11 Core and sundry NRC have a very high labour component and use a wide variety of labour such as IT specialists, back office staff, tradesmen and electricians. It is therefore appropriate to use the LCI (all industries) as opposed to an industry specific index such as LCI (communication services), which includes irrelevant professions such as couriers and postal workers and leaves out other professions relevant to NRC.

I12 We consider it is appropriate to apply the price trend at the end of each year (eg, in November), as these NRC are not part of the broader price determination for recurring charges based on tilted annuity depreciation.

I13 In considering all submissions, cross submissions and expert advice, our final decision is to apply a price trend to core and sundry NRC based on the LCI (all industries) index. Our final decision ensures a consistent approach for core and sundry NRC and is in keeping with the application of price trends for recurring charges.

*Trenching*

I14 The Beca and TERA reports which accompanied the December 2014 draft determination specified a trenching price trend of 3.0%.[1360,1361] This was based on the CGPI all groups index. CEG and Network Strategies provided submissions outlining that Beca had taken too narrow a snapshot of the CGPI growth trend and

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[1358] Analysys Mason "Report for Chorus - UCLL and UBA FPP further draft determination submission", 22 September 2015, paragraph [7.1.13].

[1359] Commerce Commission "Standard Terms Determination for the designated service Telecom's unbundled copper local loop network" 7 November 2007, Schedule 2, paragraph [3.1.1].

[1360] Beca "FPP Corridor Cost Analysis of Trenching and Ducting Rates in NZ - Final Issue Nov14" 25 November 2014, p. 8.

[1361] TERA Consultants "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services: - Model Specification" November 2014, p. 62.

that the price trend for trenching should be lower.[1362,1363] In the case of CEG, it recommended 1.88% instead of 3.0%.

I15 TERA changed its price trend in its modelling specification accompanying the July 2015 further draft determination to 3.3% based on advice from NZIER. NZIER advised that the price trend should be based on the Producers' Price Index for the Heavy and Civil Engineering Construction sector index (PPI Civil Construction).[1364,1365]

I16 In submissions and cross submissions on the July 2015 further draft determination:

I16.1 CEG recommended a lower trenching price trend of between 1.99% and 2.77%.[1366] CEG claimed that civil engineering is not representative of the telecommunications industry and that a composite index, that calculates the weighted average of general and specific indices (eg, Capital Good Price Index and Labour Cost Index ), would be more appropriate.

I16.2 Network Strategies commented that a price trend based on PPI Civil Construction was not representative of trenching for telecommunications.[1367] However, it criticised CEG's price trends on the basis that it incorrectly combined historical and forecast data.[1368]

I16.3 Network Strategies also proposed applying an additional efficiency adjustment to trenching price trends to account for improving trenching technologies.[1369] In cross submissions CEG agreed in principle with Network Strategies' recommendation.[1370]

I17 In terms of expert advice:

I17.1 Beca agreed that a broad engineering index, like the one recommended by NZIER, is suitable because materials and labour used for trenching are generally substitutable with other civil engineering projects such as road maintenance.[1371]

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1362 CEG "Evidence on price trends" Public Version, February 2015, p. 23-24.

1363 Network Strategies "Final report for Spark New Zealand and Vodafone New Zealand - Commerce Commission draft determination for UCLL and UBA", 20 February 2015, p. 60-62.

1364 TERA Consultants "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services: - Model Specification for recurring charges" June 2015, p. 75.

1365 NZIER "Price trends for UCLL and UBA final pricing principle – advice on response to submissions", May 2015, p. 24.

1366 CEG "Response to the further draft determination" August 2015, paragraphs [274-295].

1367 Network Strategies "Response to submissions on revised draft determination – pricing review UCLL and UBA Final Pricing Principle", 24 September 2015, sections 6.1–6.3.

1368 Network Strategies "Response to submissions on revised draft determination – pricing review UCLL and UBA Final Pricing Principle", 24 September 2015, p. 58.

1369 Network Strategies "Response to submissions on revised draft determination – pricing review UCLL and UBA Final Pricing Principle", 24 September 2015, sections 6.1–6.3.

1370 CEG "Price trends and asset beta cross submission" September 2015, paragraph [20].

1371 BECA "FPP Corridor Cost Analysis – Report 4, Response to Submissions", December 2015, p. 16-17.

I17.2 In the report that accompanied the July 2015 further draft determination, NZIER cautioned against using bespoke composite price trends, as broader trends that are based on official indices are more likely to safeguard against basket bias. Basket bias occurs when the market moves away from higher price products and services in favour of substitutes but price indices are delayed in taking this into account. This issue is well researched and addressed to the extent possible in official price indices. Conversely, bespoke indices may not capture these broader shifts and substitutions in the economy.[1372]

I17.3 Beca's advice is consistent with NZIER's estimate. While Beca has not changed its recommendation to use the CGPI with a value of 2.63%, it agrees in principle with NZIER's approach and notes that it is not an expert on statistical analysis, as NZIER is. [1373]

I17.4 After considering submissions and cross submissions, NZIER and Beca do not support a productivity adjustment being applied to the trenching price trend. NZIER believes it could be considered but that there is insufficient evidence to support an adjustment or to quantify its size. Beca also notes that recent changes in prices have been related to materials rather than technology changes and agrees with Downer New Zealand Limited that these are unlikely to continue.[1374] Beca and NZIER both reason that there is unlikely to be a step change in trenching technology that would justify an additional change. Network Strategies' example of micro-trenching is unconvincing because micro-trenching is not a new trenching technology and therefore does not signal a step change that our index would not account for.[1375]

I18 After considering the submissions, cross submissions and expert advice responding to the December 2014 and July 2015 draft determinations, we have decided to use the PPI Civil Construction for trenching costs, which provides a price trend of 3.3%. This is because we are of the view that materials and labour used for trenching are generally substitutable with other civil engineering projects, especially at the sub-contractor level and that no specific productivity gains are expected to be made in the UCLL trenching sector. Therefore the PPI Civil Construction was deemed to be suitable.

*Labour costs*

I19 In the December 2014 draft determination we set the labour cost price trend in accordance with the LCI, from which TERA estimated a price trend of 2.58% based on data from 1994 to 2014.

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[1372] NZIER "Price trends for UCLL and UBA final pricing principle – advice on response to submissions", November 2015, p. 28.

[1373] ibid

[1374] Downer "Submission to July further draft determination" 12 August 2015, paragraph [11].

[1375] Network Strategies "Final report for Spark New Zealand and Vodafone New Zealand - Revised draft determination for the UCLL and UBA price review" 13 August 2015, p. 65.

I20 In response to the December 2014 draft determination we received a number of submissions:

I20.1 Chorus and CEG submitted that we should use the Labour Cost Index for technicians and associates because this index better reflects labour for the purposes of our pricing review determinations, and this is the index used by Chorus in its contract terms. CEG estimated the price trend from December 1992 to March 2019 at 2.22%.[1376]

I20.2 Vodafone and Network Strategies submitted that it is questionable whether CEG's data is of sufficient quality. They claim that the LCI for technicians and associates has a break in the price series and CEG's projection for this industry specific LCI is based on projections for the LCI (all industries).[1377,1378] Network Strategies submitted that we should use the LCI (all industries), and estimated the price trend from 2014 to 2019 at 2.2%.

I21 In July, NZIER concluded there was insufficient evidence to justify an efficiency adjustment to labour used for UCLL and UBA. This advice has not changed and is restated in NZIER's updated report.[1379]

I22 In the July 2015 further draft determination we decided to use the LCI (all industries) as the types of labour considered in our TSLRIC model for the hypothetical efficient operator extend beyond the labour included in the labour index for technicians and associates. We also agreed with NZIER to set the price trend at 2.0% because we would not expect that LCI would grow more slowly than the CPI.

I23 In response to the July 2015 further draft determination WIK stated that the LCI price trend of 2.0% should be reduced to either account for efficiency gains based on productivity or to reflect efficiency gains used in international models.[1380]

I24 After considering the submissions, cross submissions and expert advice, our final decision is to maintain the LCI price trend at 2.0% as we do not have evidence that there will be labour productivity efficiency gains in the UCLL/UBA sector that will not be captured by broader labour productivity gains in the LCI (all industries) index.

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1376 CEG "Evidence on price trends" February 2015, at paragraphs [51-54].

1377 Network Strategies "Final report for Spark New Zealand and Vodafone New Zealand - Review of issues from UCLL and UBA submissions" 20 March 2015, p. 43.

1378 Vodafone "Cross submission to the New Zealand Commerce Commission on submissions to the Process Paper and Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access services (excluding TSO Boundary considerations)" 20 March 2015, section E.2.6.

1379 NZIER "Price trends for UCLL and UBA final pricing principle – advice on response to submissions", November 2015, p. 8-12.

1380 WIK-Consult "Submission In response to the Commerce Commission's "Further draft pricing review determination for Chorus' unbundled bitstream access service" and "Further draft pricing review determination for Chorus' unbundled copper local loop service" including the revised cost model and its reference documents" 12 August 2015, p. 110.

*Non-labour opex*

I25 In the December 2014 draft determination and the July 2015 further draft determination we set the non-labour opex price trend to 0.0%, as we expected efficiency gains and losses across the activities in this group which would lead to a 0% price trend.

I26 In response to the December 2014 draft determination, WIK submitted that the efficiency gain should be greater than 2.0%. WIK submitted that other overseas regulators often apply a higher productivity gain to telecommunications opex and that the introduction of technology such as smart phones has led to recent productivity improvements. WIK submitted that this should be captured in the price trend.[1381]

I27 We maintained a price trend of 0.0% in our July 2015 further draft determination as other regulators' application of productivity gains are often in a non-TSLRIC context. We were also of the view that a 2.0% efficiency gain was enough to capture productivity gains across what is a wide variety of activities, each potentially offsetting each other in terms of productivity gains.

I28 In response to the July 2015 further draft determination, Analysys Mason submitted that we should apply a positive price trend to non-labour opex, as opposed to the 0.0% trend we applied in the July 2015 further draft determination.[1382] WIK emphasised that 0.0% is inappropriate to use for building costs and power opex, which were likely to experience cost growth. WIK disagreed with Analysys Mason's submission and agreed with the July 2015 further draft determination that the cost trend should balance efficiency and productivity with any price increase, and that 0.0% is appropriate.[1383]

I29 We disagree with Analysys Mason—buildings and power only make up a small percentage of overall non-labour opex so any price growth in these areas would very likely be countered by efficiencies in others.[1384]

I30 We have not received any submissions, cross submissions or expert evidence that leads us to change our position that the non-labour-related opex price trend should be 0.0%. Therefore, that is our final decision.

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1381 WIK-Consult "Submission In response to the Commerce Commission's "Draft pricing review determination for Chorus' unbundled bitstream access service" and "Draft pricing review determination for Chorus' unbundled copper local loop service" including the revised cost model and its reference documents" 20 February 2015, p. 44.

1382 Analysys Mason "Report for Chorus - UCLL and UBA FPP further draft determination submission", 11 August 2015, paragraph [5.3].

1383 WIK-Consult "Cross-Submission In response to the Commerce Commission's "Further draft pricing review determination for Chorus' unbundled bitstream access service" and "Further draft pricing review determination for Chorus' unbundled copper local loop service" including the revised cost model and its reference documents" 22 September 2015, p. 163.

1384 It is noted that a positive price trend is applied to buildings and power in their capex categories.

*Converting foreign currency to New Zealand dollars*

I31 In the December 2014 draft determination we converted foreign currency to New Zealand dollars using Purchasing Power Parity (PPP) rates, with 2013 being held constant for the regulatory period.[1385]

I32 Network Strategies agreed with the use of PPP rates instead of the "blended" rates that incorporate both the PPP and the market exchange rates that have previously been used by us.[1386]

I33 CEG submitted we should not use PPP but only market exchange rates, as steel and copper is an international market.[1387] Network Strategies, in its cross submission, stated that the use of market exchange rates is preferable rather than blended exchange rates.[1388]

I34 We usually apply a blended currency conversion approach to convert prices for the purpose of setting prices in telecommunications. This approach converts benchmark prices based on an appropriate weighting of PPP rates and a ten-year average for market exchange rates. We applied this approach for all the determinations for SLU, UCLL, and UBA.[1389]

I35 The blended approach in previous determinations reflected the fact that these services comprised of approximately 50% of non-tradable components (such as labour) with the other 50% relating to tradable capital goods inputs. We used the exchange rates as a reference point for tradable goods and services, and PPP rates as a reference point for non-tradable components.

I36 In the July 2015 further draft determination we proposed to use the same approach to convert foreign exchange rates to New Zealand dollars for this pricing review. That is:

I36.1 for price series relating to tradable capital inputs only, we will use market exchange rates;

I36.2 for price series with non-tradable components only, such as labour, we will use PPP rates only; and

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1385 Commerce Commission "Draft pricing review determination for Chorus' unbundled bitstream access service – draft determination" and "Draft pricing review determination for Chorus' unbundled copper local loop service – draft determination", 2 December 2014.

1386 Network Strategies "Final report for Spark New Zealand and Vodafone New Zealand - Commerce Commission draft determination for UCLL and UBA", 20 February 2015, section 6.3.

1387 CEG "Evidence on price trends", February 2015, paragraphs [55-62].

1388 Network Strategies "Final report for Spark New Zealand and Vodafone New Zealand - Review of issues from UCLL and UBA submissions", 20 March 2015, p. 44-45. Network Strategies submitted that it is important to use a consistent series. Network Strategies explained that CEG used historical information from the Reserve Bank and then Bloomberg for the future. This introduces additional error and different trends in different data sources.

1389 See, for example, Commerce Commission "Unbundled Bitstream Access Service Price Review, Decision [2013] NZCC 20" 5 November 2013, Attachment E.

I36.3 for price series relating to both tradable capital inputs and non-tradable components, we will use the blended approach.

I37 For example, for copper and fabricated steel we will only use market exchange rates to convert foreign currencies to New Zealand dollars. In the case of Main Distribution Frame (MDF) and Optical Distribution Frame (ODF) unit costs we will use a blended approach because these products include both tradable capital inputs and non-tradable components, such as installation costs.

I38 We have not had further submissions or evidence on this topic following the July 2015 further draft determination and see no reason to change our decision. Therefore, we have chosen the same approach to foreign exchange rates in our final decision.

*Long-term price trends for passive equipment*

I39 In the December 2014 draft determination we used a cost escalation approach to determine the price trend for passive equipment. The cost escalation approach can be summarised as follows.

I39.1 We selected the most relevant raw indexes and derived the long-term trend for each raw index.

I39.2 The long-term price trend is then determined for each asset category based on a combination of the raw indexes and the composition of that asset category. For example, fibre optic cost consists of 70% of fibre cable cost and 30% labour costs. Given this, the price trend for fibre optic is equal to 30% x the trend for the Labour Cost Index, plus 70% x the trend for the fibre optic cable index.

I40 In response to the December 2014 draft determination:

I40.1 CEG submitted that TERA used averages rather than long-term price trends.[1390] CEG also submitted that TERA has not used forecasts, and only historic information;[1391]

I40.2 Network Strategies submitted that TERA does not use price indices but the compound average growth rate (CAGR) for 2013 and 2014, and as a result this is based on historic cost. Network Strategies indicated that our preferred approach provided in the draft determinations was to use forecasts.[1392] Network Strategies proposed that forecasts should be used to assess price trends instead of historic trends.[1393]

[1390] CEG "Evidence on price trends", February 2015, paragraph [4].

[1391] Ibid.

[1392] Network Strategies "Final report for Spark New Zealand and Vodafone New Zealand - Commerce Commission draft determination for UCLL and UBA", 20 February 2015, section 6.2.

[1393] Ibid.

I41 We agreed with submissions that the long-term price trends should include forecasts, where appropriate. We also agreed with submissions that it is not appropriate to calculate long-term price trends based on CAGR, in particular if price series have stochastic trends. In this regard, NZIER also recommended that we should avoid using compound growth rates because it leads to large amounts of variability and imprecision.[1394]

I42 As an alternative, CEG proposed using a regression model where the log of the price is assumed to be linear.[1395] CEG also submitted that estimating the price trend using a linear regression (based on all years) rather than a geometric mean based on the first and last point is likely to be more precise.[1396] In cross submissions, Vodafone and Network Strategies commented that CEG's proposed approach would have a reasonable fit for well-behaved data series that exhibit a relatively consistent trend. However, for more volatile data series – such as that for copper prices – even if the overall fit is good, the model may be a poor predictor of forward-looking prices over the medium term.[1397]

I43 In response to CEG's proposed linear regression approach, we found that none of the data series we are considering can be reliably considered to have a linear deterministic trend. It is for this reason that we did not use the trend calculation method proposed by CEG. Despite not adopting the precise method, we agreed with CEG's general point that trend calculations should use multiple data points.[1398]

I44 NZIER's report following the December 2014 draft determination recommended that the most robust approach is one of the following approaches, depending on the data and information available. [1399]

I44.1 Qualitative judgement based on policy targets.

I44.1.1 In this context NZIER noted that price stability is mandated by government policy. For example, the Reserve Bank is asked to hit a target of the rate of price growth. Given this, we formed a reasonable well-informed view of general inflation as measure by CPI.

I44.2 Trends modelled using benchmark prices, to deal with stochastic trends. Most of the series considered have stochastic trends.

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1394 NZIER "Price trends for UCLL and UBA final pricing principle – advice on response to submissions" May 2015, p. 7.

1395 CEG "Evidence on price trends", February 2015, paragraphs [42-43].

1396 Ibid, at paragraph [43].

1397 Network Strategies "Final report for Spark New Zealand and Vodafone New Zealand - Review of issues from UCLL and UBA submissions" , 20 March 2015, p. 42.

1398 CEG "Evidence on price trends", February 2015, paragraph [41].

1399 NZIER "Price trends for UCLL and UBA final pricing principle – advice on response to submissions", May 2015, p. 5-7.

I44.2.1 So, if a stochastic trend is present, NZIER test whether relationships with other series produce a stable relationship through time. We then use that stable relationship, if any, to infer the underlying long-term trend.

I44.2.2 For example, if a series has a stable relationship to CPI, we can then overcome the problem of understanding stochastic trends by focussing on the relationship between the changes in CPI and the series under consideration.

I44.3 Arithmetic averages of annual average percentage growth rates.

I44.3.1 Trends are calculated based on annual average growth rates. This ensures that the growth rates are less affected by volatility.

I44.3.2 Arithmetic averages of annual average percentage growth rates are also an *unbiased* estimate of the trend in a random walk.[1400]

I45 In the July 2015 further draft determination we considered that the approaches recommended by NZIER were appropriate and robust because the series under consideration have stochastic trends in most instances. We noted that the choice in the approach to use is based on our judgement about which approach will have the least error and potential for statistical bias for the series under consideration.

I46 We have not had further submissions or evidence following the July 2015 further draft determination and see no reason to change our decision. As such, our final decision is to use the approaches outlined in paragraph I44 depending on which approach will have the least error and potential for statistical bias.

*Long-term price trend based on CPI*

I47 In the December 2014 draft determination, TERA calculated a price trend of 2.18% using the CPI for the period 1994 to 2014.

I48 CEG submitted that the CPI should be decreased to be consistent with the Reserve Bank inflation target.[1401] Vodafone and Network Strategies submitted that they agree with CEG that a reduction in the CPI is warranted because more recent data supports a reduction rather than a reason based on the mid-point for target inflation. In their view, a 2.0% inflation rate would be appropriate.[1402,1403]

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1400 A random walk is a mathematical formalisation of a path that consists of a succession of random steps.

1401 CEG "Evidence on price trends", February 2015, paragraphs [47-50]. We noted that CEG provided two contradictory views in its submissions, 2% noted in the Executive summary and 2.22% at Section 3 of its submission. We take it that CEG submitted that CPI should be 2%, and is based on the mid-point of target inflation set by the Reserve Bank.

1402 Network Strategies "Final report for Spark New Zealand and Vodafone New Zealand - Review of issues from UCLL and UBA submissions" 20 March 2015, p. 48-50.

1403 Vodafone "Cross submission to the New Zealand Commerce Commission on submissions to the Process Paper and Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access services (excluding TSO Boundary considerations)" 20 March 2015, section E.2.10.

I49 NZIER agreed that a 2.0% trend for CPI is appropriate because it is consistent with the Reserve Bank's inflation target. In particular the Reserve Bank's current Policy Targets Agreement between the Minister of Finance and the Reserve Bank of New Zealand Governor:[1404]

> b) For the purpose of this agreement, the policy target shall be to keep future CPI inflation outcomes between 1 per cent and 3 per cent on average over the medium term, **with a focus on keeping future average inflation near the 2 per cent target midpoint**.
> [Emphasis added]

I50 In our July 2015 further draft determination, we proposed to use a price trend of 2.0%. The reason was based on the inflation target set by the Reserve Bank, given that future average inflation is targeted near the mid-point and any forward-looking view on the CPI would need to consider potential policy changes in the future.

I51 We have not had further submissions or evidence following the July 2015 further draft determination and see no reason to change our decision. As such, our final decision is to use a price trend for the CPI of 2.0%, as this is the mid-point of the inflation target set for the Reserve Bank.

*Long-term price trend for building costs*

I52 In the December 2014 draft determination, TERA estimated the trend for building costs based on the number of dwellings in New Zealand at 1.90% for the period 2006 to 2014. Buildings house the UCLL exchanges, so are included as a price trend.

I53 CEG submitted that the price trends model wrongly uses the trend in the number of buildings as a proxy for buildings price trends.[1405] CEG submitted that the price trend for building costs should be based on Statistic New Zealand's CGPI for non-residential buildings, from 1989 to March 2020, resulting in a price trend of 2.33%.[1406]

I54 Following the December 2014 draft determination, NZIER recommended that the most appropriate price index for building costs is the series proposed by CEG, ie, the Statistics New Zealand CGPI for non-residential buildings because it includes the costs of acquiring building assets such as exchange equipment.[1407]

I55 In the July 2015 further draft determination we agreed with NZIER's recommendation to use the CGPI for non-residential buildings because it includes the appropriate construction costs and excludes maintenance costs. This series is also based on the price of buildings rather than the number of dwellings, previously used in our determination.

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1404 The current agreement, signed in 2012, is available at: http://www.rbnz.govt.nz/monetary_policy/policy_targets_agreement/.

1405 CEG "Evidence on price trends" February 2015, paragraph [46].

1406 Ibid, at paragraphs [46] and [92].

1407 NZIER "Price trends for UCLL and UBA final pricing principle – advice on response to submissions" May 2015, p. 18-19.

I56 NZIER also recommended that the most robust long-term price trend is estimated based on the stable relationship with CPI. The CGPI for non-residential buildings has a stochastic trend and has a stable relationship with CPI. Given this relationship, NZIER estimated that the implied underlying trend for building costs at 1.9%.[1408]

I57 In the July 2015 further draft determination we agreed with NZIER's recommendation in the accompanying report. We considered that the historic growth rate from 1992 to 2014 was 1.9%, and there is no evidence to suggest that this growth rate is not a reasonable proxy for a long-term price trend for building costs.

I58 We have not had further submissions or evidence following the July 2015 further draft determination and see no reason to change our draft decision. Therefore, our final decision to set the long-term price trend for building costs at 1.9%.

*Long-term price trend for fabricated steel*

I59 In the December 2014 draft determination, we used international steel prices to estimate the price trend for fabricated steel to be 1.43% from 1995 to 2014. Fabricated steel is relevant to UCLL as it is used to build frames for exchange equipment and cabinets.

I60 In response to the December 2014 draft determination:

I60.1 Chorus submitted that we should use forecasts for steel rather than historic information.[1409] CEG proposed that we use the MEPS[1410] Asian steel series, and estimated the price trend from 1997 to 2022 at 1.76%.[1411]

I60.2 Network Strategies submitted that we should use forecasts and historic information as a cross-check. Network Strategies submitted that the price trend for steel should be 1.44%.[1412] In its cross submission, Network Strategies indicated that the projections of steel used by CEG are not fully compatible with the historical data, and the two parts of the conjoined series may have differing (although probably related) trends.[1413]

I61 In preparing the July 2015 further draft determination our view was that it was unclear why CEG's proposed index is better than the current index used in the model. We asked NZIER to consider this and provide a recommendation on the most

[1408] ibid, p. 18-19.

[1409] Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and Process and Issues Update Paper for the UCLL and UBA Pricing Review Determinations", 20 February 2015, paragraph [308].

[1410] MEPS International Ltd - independent steel industry analysts.

[1411] CEG "Evidence on price trends", February 2015, paragraphs [55-58].

[1412] Network Strategies "Final report for Spark New Zealand and Vodafone New Zealand - Commerce Commission draft determination for UCLL and UBA", 20 February 2015, Section 6.2.

[1413] Network Strategies "Final report for Spark New Zealand and Vodafone New Zealand - Review of issues from UCLL and UBA submissions", 20 March 2015, p. 44.

appropriate index to use for steel in the context of the New Zealand market and our TSLRIC modelling exercise.

I62 We agreed with the NZIER recommended price trend of 2.9%. NZIER based the price trend on the co-integrating relationship between the Producers Price Index for the Outputs of fabricated Metal Product Manufacturing industry (PPI-O) and a combination of LCI, international steel prices in New Zealand dollars and aluminium prices in New Zealand dollars.[1414,1415] This trend includes both historical relationships and expected future prices for international metal prices.

I63 We did not receive submissions or evidence in response to the July 2015 further draft determination and see no reason to change our decision. Therefore, a price trend of 2.9% based on the PPI-O is our final decision.

*Long-term price trend for copper*

I64 In our December 2014 draft determination, TERA relied on a copper price (converted from US dollars to New Zealand dollars, using the PPP rate) from NZIER to estimate a price trend of 4.56% based on data from 1995 to 2014. Copper is used as cable to transmit data across the network, so is an important price trend for the UCLL TSLRIC model.

I65 In response to the December 2014 draft determination:

I65.1 CEG proposed that we use a combination of London Metal Exchange (LME) history, futures and economic forecasts, and estimate the price trend based on the complete series, from 1990 to 2022.[1416] CEG proposed that we use 4.46% as the price trend for copper.

I65.2 Network Strategies proposed that we use forecasts only, and estimated the price trend for copper at 0.53%.[1417] Network Strategies submitted that beyond 2014, CEG only has four data points projected over a seven-year period so CEG's selection of the forecast data governs the slope of the last five years of the dataset, and this has an impact on the estimated long-term trend.[1418]

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1414 Asia hot-rolled coil price, and consensus economic surveys for short term forecasting because there is no public futures market for steel in Asia.

1415 Based on LME market futures to December 2018 and an extrapolation of Consensus Economic long-term forecasts to 2020 and beyond.

1416 CEG "Evidence on price trends", February 2015, paragraphs [59-62].

1417 Network Strategies "Final report for Spark New Zealand and Vodafone New Zealand - Commerce Commission draft determination for UCLL and UBA" 20 February 2015, section 6.2.

1418 Network Strategies "Final report for Spark New Zealand and Vodafone New Zealand - Review of issues from UCLL and UBA submissions" 20 March 2015, p. 45-46.

I65.3 Vodafone submitted that CEG's copper prices are a combination of various data sources and missing data points, and this introduces additional error in the analysis.[1419]

I66 In a report accompanying the July 2015 further draft determination, NZIER estimated the price trend at 5.0%. NZIER used the LME price as the benchmark price for copper, and projected prices as a combination of futures prices and Consensus Economic forecasts, in New Zealand dollars. The price trend is based on both historic and forecast data.

I67 We noted that a growth rate only based on forecasts would have been 2.6%. Accordingly, we asked NZIER to consider whether this estimated price trend is sustainable over the long-term. In the report that accompanied the July 2015 further draft determination NZIER indicated that a price trend of 5.0% is sustainable because the estimated trend is lower than the historic growth rate of 6.4% between 1960 and 2005. In the July 2015 further draft determination we agreed with NZIER that 5.0% is a suitable price trend for copper.

I68 We have not had further submissions or evidence following the July 2015 further draft determination and see no reason to change our decision. Therefore, a copper price trend of 5.0% is our final decision.

*Long-term price trend for fibre optic cables*

I69 In the December 2014 draft determination, we used the CGPI for insulated wire, cable and optical fibre cables to set the price trend for fibre optic cables at 4.88%. Fibre optic cables are an important component of UCLL network as they transport data.

I70 Following criticisms in submissions and cross submissions, NZIER's report which accompanied the July 2015 further draft determination recommended that we use the US Producer Price Index for fibre optic cable manufacturing in the United States (US PPI), excluding currency effects. This index is specific to fibre optic cables produced by the fibre optic cable manufacturing industry. This trend excludes currency effects, as NZIER indicated that there is no expectation that the price of fibre optics be correlated with the value of the New Zealand dollar over the long term.

I71 On this basis, NZIER estimated the price trend to be -1.3% based on the historic average rate between 2006 and 2014 and this was our decision in the July 2015 further draft determination.

I72 Network Strategies, in its submission on the July 2015 further draft determination, queried why NZIER excluded data between 2003 and 2006 from the US Producer Price Index for fibre optic cable. However, NZIER explained in its most recent report that the average annual growth rate from 2006 includes data points from 2004, as

[1419] Vodafone "Cross submission to the New Zealand Commerce Commission on submissions to the Process Paper and Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access services (excluding TSO Boundary considerations)" 20 March 2015, sections E.2.6, E2.7.

average annual growth calculations require 48 months of data prior to the first observation. NZIER also explain that 2003 data was not used as the data was still adjusting to a long-term trend following the dot com bubble.[1420]

I73 We have not had further submissions or evidence following the July 2015 further draft determination and see no reason to change our decision. As such, our final decision is to set a price trend of -1.3% for fibre optic cables.

[1420] NZIER "Price trends for UCLL and UBA final pricing principle – advice on response to submissions" November 2015, p. 23, footnote 34.

# Attachment J: Trenching costs

### Purpose

J1 The purpose of this Attachment is to set out our decisions on calculating the total cost of trenching.

J2 Trenching involves the techniques used to deploy telecommunications infrastructure underground: specifically, the ducts and cables which are deployed along roadways and into homes and workplaces to deliver telecommunications services, such as UCLL.

J3 Various types of trenching methodologies can be used; the choice of method depends on cost and circumstances that are encountered. These include the type of soil, the dimensions of the required trench (ie, length, depth, and width), and its location.

J4 Trenching is a critical input when establishing the TSLRIC of UCLL. Chorus' UCLL service is provided over a fixed line access network. Cabling of a fixed line access network tends to be a mix of aerial (on poles above the ground) and underground (in trenches).

J5 As discussed in Attachment D, we have decided that we will deploy the network aerially where electricity distribution businesses (EDBs) have existing poles. The remainder of the modelled network will be deployed underground, specifically:

J5.1 53% of the distribution cable routes (shared communal trench); and

J5.2 54% of the lead-in cables (dedicated trench to building).

J6 As stated in Chapter 2, the objective of the TSLRIC exercise is not to recreate the incumbent's actual costs but to calculate the forward-looking, efficiently incurred costs of providing the regulated services, unconstrained by the incumbent's legacy decisions.

J7 This TSLRIC exercise is to determine a forward-looking and efficient price for the UCLL service. We have done this by modelling a hypothetical efficient operator's costs from the bottom up, based on reliable objective information and good industry practices. We have also been guided by subjective (ie, top-down) data where definitive objective data is not available to us.

J8 We received submissions based on our July 2015 further draft determination suggesting refinements and additions to the model. A number of these submissions addressed very specific and technical details. We have discussed these submissions with Beca and TERA, our expert consultants. Where these technical issues are not addressed in this Attachment, they are addressed by either Beca in its report or by

TERA in its review of submissions document.[1421,1422] We have reviewed both the Beca report and the TERA document and agree with the advice contained therein.

**Final decisions**

J9 As part of our TSLRIC exercise, for trenching, we carried out three phases of work:

J9.1 soil type analysis;

J9.2 trenching methodologies; and

J9.3 representative trenching costs.

J10 Under each phase we have made a series of decisions to determine the representative costs for trenching. We set out our decisions under each phase below.

*Soil type analysis*

J11 Based on advice from Beca we have identified five rural soil types and a single soil type for urban areas.

*Trenching methodologies*

J12 Based on advice from Beca we have identified several accepted trenching methodologies that are used in New Zealand for consideration in our model.

J13 We have decided to deploy a fully ducted network as this approach is consistent with New Zealand and international best practice.

J14 In our view the hypothetical efficient operator would not deploy ducts larger than necessary, therefore the size of ducts being deployed would be 50 mm for the FTTH network and 110 mm for the FTTN network.

J15 In our view the hypothetical efficient operator would not use sub-ducts in its network. As set out in Attachment A, we have assumed constant demand, therefore the benefits of sub-ducting will not be realised for our hypothetical efficient operator. As such, the hypothetical efficient operator would not incur the additional expense of sub-ducting its network.

J16 Based on current New Zealand practice and advice from TERA, we have provided for network resilience of critical trenches ( ]**CNZCI** or more lines) by double trenching rather than trench reinforcement.

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[1421] TERA consultants "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services Analysis of the responses to the second consultation following the further draft determination" December 2015.

[1422] Beca "FPP Corridor Cost Analysis - Response to Submissions, Report 4 (Final)" 11 December 2015.

*Representative trenching costs*

J17 We have relied on Beca for the setting of trenching costs. We consider that the Beca costs are based on objective and independent data that used:

J17.1 historical data held by Beca from previous tenders;

J17.2 limited supplier pricing;

J17.3 indicative “cover-all” rates; and

J17.4 pricing methodologies received from contractors from throughout New Zealand.

J18 We asked Beca to review trenching costs supplied by Chorus and the local fibre companies (LFCs). Beca noted there were challenges on comparing its data with the Chorus data as the Chorus data was not as granular as the Beca data and was therefore difficult to rely on for the purpose of modelling trenching costs.

J19 However, Beca has used the data received from Chorus’ UFB roll-out and data from LFCs, as a cross-check of its trenching cost data.

J20 Beca concluded that its costs were not dissimilar to the Chorus’ UFB data and the LFCs data with its trenching costs. We are therefore satisfied that Beca has provided us with an independent, robust, and representative estimate of trenching costs the hypothetical efficient operator would incur.

J21 We have used a weighted set of trenching methodologies, provided by Beca. We consider that this ensures the trenching methodologies used in our approach are representative of what the hypothetical efficient operator would likely encounter.

J22 We are not applying any discount over and above Beca’s cost estimates. We do not consider the hypothetical efficient operator would be able to achieve any discount further to the trenching costs set by Beca.

**Approach to determining trenching costs**

J23 Trenching techniques and costs vary across international jurisdictions. To undertake this modelling exercise we needed to understand New Zealand-specific conditions relating to soil types, trenching methodologies, and representative trenching costs.

J24 Our approach was to undertake three phases of work to determine trenching costs for our model. These were:

J24.1 Soil type analysis – to identify the distribution of New Zealand’s rural and urban soil types. This was required to allow us to understand the characteristics of the soils for the segments of the roads to be trenched.

J24.2 Trenching methodologies – to identify “in use” New Zealand trenching methodologies and the soil types and conditions they are best suited to. This information is required to allow us to assign the appropriate trenching methods to each soil type.

J24.3 Representative trenching costs – to estimate national "cover-all" rates for each of the trenching methods, inclusive of telecommunication ducting.

J25 Beca Consultants (Beca), a professional consulting firm based in Australia, Asia and New Zealand, is our selected expert for providing advice on these phases. We have based our decisions on their analysis and expertise.

J26 Beca has extensive experience in providing a range of consultancy services in the industrial, infrastructure, and building markets. Specific to this project, Beca has experience in cost estimation, management of civil and transport (rail, road, and transport management) projects, and in geospatial and geotechnical analysis.[1423]

J27 The rest of this Attachment sets out the development of these phases.

**Soil type analysis**

*Initial views*

J28 For our December 2014 draft determination, we engaged Beca to assist us with the modelling of trenching costs. We asked Beca to supply us with a range of "average" estimating rates within New Zealand for various trenching technologies and telecommunication ducting sizes, along with an indication of regional variances and likely future pricing trends.

J29 In order to do this, Beca had to initially undertake an engineering geology assessment to identify the appropriate soil and rock material categories for the purpose of modelling urban and rural trenching costs across New Zealand. [1424]

J30 In this regard, Beca reviewed terrain data from:

J30.1 Landcare Research New Zealand (LRNZ); [1425]and

J30.2 the Bell-Ducat system (method) for assessing the difficulty of trenching telecommunications services in New Zealand.[1426]

J31 Beca concluded: [1427]

J31.1 The "Lithology" dataset (New Zealand Land Resource Inventory) provided a suitable categorising of New Zealand's rural, but not urban, soils (ie, rock/soil types); [1428]and

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[1423] Beca "FPP Corridor Cost Analysis of Trenching and Ducting Rates in NZ - Final Issue Nov14" 25 November 2014, p. 15.

[1424] Beca "FPP Corridor Cost Analysis of Trenching and Ducting Rates in NZ - Final Issue Nov14" 25 November 2014, p. 2.

[1425] Beca "FPP Corridor Cost Analysis of Trenching and Ducting Rates in NZ - Final Issue Nov14" 25 November 2014, Appendix 1: Rock and Soil Classification Method and Data, p. 2.

[1426] Beca "FPP Corridor Cost Analysis of Trenching and Ducting Rates in NZ - Final Issue Nov14" 25 November 2014, Appendix 1: Rock and Soil Classification Method and Data, p. 2.

[1427] The full detail of Beca's analysis is contained in its November 2014 report. See Beca "FPP Corridor Cost Analysis of Trenching and Ducting Rates in NZ - Final Issue Nov14" 25 November 2014.

J31.2 it was appropriate to apply the Bell-Ducat classification system to the soil types defined in the Lithology dataset.[1429]

J32 Using the Bell-Ducat system, Beca cross-matched the soil types defined in the Lithology dataset to one of five Bell-Ducat equivalent classifications.[1430]

J33 Beca added a sixth classification “urban” category covering city and major suburban areas, assuming those areas to be predominately comprised of a compact fill, imported or redistributed, of a type generally used in developed areas.[1431]

J34 We then used GIS tools to associate road segments being trenched to one of the underlying soil types classified by Beca. Where a road segment transited more than one soil type, the majority soil type was assigned to the segment. The output from this process was supplied to TERA to associate the appropriate trenching methods and thereby the cost.

*Submissions*

J35 Network Strategies, WIK, and Vodafone supported Beca’s approach to the classification of rural soils. [1432,1433] Further, Network Strategies and Vodafone agreed with Beca’s assessment that the Bell-Ducat system of soil classification was a suitable classification for us to use. [1434,1435] Additionally, Network Strategies said it was not aware of a relevant superior classification scheme.[1436]

J36 However, parties noted the potential limitations of only having a single urban soil type based on an assumption of compacted fill. [1437,1438,1439] Network Strategies stated

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[1428] Beca "FPP Corridor Cost Analysis of Trenching and Ducting Rates in NZ - Final Issue Nov14" 25 November 2014, Appendix 1: Rock and Soil Classification Method and Data, p. 2.

[1429] Beca "FPP Corridor Cost Analysis of Trenching and Ducting Rates in NZ - Final Issue Nov14" 25 November 2014, pp. 4,7.

[1430] Ibid, Appendix A, Table 2 – Application of Bell-Ducat (B-D) lithology CLASS to NZLRIS lithology rock/rock2.

[1431] Ibid, p.4.

[1432] WIK noted our classifications had been determined from an aggregate form of the most detailed and advanced geo-information available in New Zealand.

[1433] WIK-Consult "Report for Telecom New Zealand and Vodafone New Zealand - Submission - In response to the Commerce Commission’s “Draft pricing review determination for Chorus' unbundled bitstream access service" and "Draft pricing review determination for Chorus' unbundled copper local loop service" including the cost model and its reference documents- Non-Confidential version" 20 February 2015, paragraph [118].

[1434] Network Strategies "Final report for Spark New Zealand and Vodafone New Zealand - Commerce Commission draft determination for UCLL and UBA" PUBLIC, 20 February 2015, p. 37.

[1435] Vodafone "Submission on process paper and draft pricing review determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and comments on Analysys Mason's TSLRIC models" 20 February 2015, paragraph I1.2.

[1436] Network Strategies "Final report for Spark New Zealand and Vodafone New Zealand - Commerce Commission draft determination for UCLL and UBA" PUBLIC, 20 February 2015, p. 37.

[1437] Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and Process and Issues Update Paper for the UCLL and UBA Pricing Review Determinations" Public version, 20 February 2015, paragraphs 28 and 423.

[1438] Analysys Mason "Report for Chorus - UCLL and UBA FPP draft determination submission- PUBLIC, 20 February 2015", p. 30.

that, although Beca's approach to the classification of urban soils was pragmatic, it was a sweeping assumption that [would] increase the margin of error in our analysis.[1440]

J37 Analysys Mason referred to the Beca report and noted Beca's statement that further analysis was required to accurately cost urban areas.[1441]

J38 Most parties acknowledged that the cost of trenching in urban areas would not be driven by soil conditions alone: other factors such as different surface conditions, traffic management, complex road crossings, and reinstatement costs would also contribute toward the total cost of trenching in urban areas.

J39 However, in cross submissions, WIK argued those additional costs would be reflected in contractors' average urban trenching rates, which it understood to be the basis of Beca's trenching rates.[1442]

J40 WIK and Vodafone challenged the applicability of our soil classifications when modelling the cost of trenches alongside rural roadways, as soil conditions alongside rural roads may differ from those of the surrounding area we had modelled.[1443,1444]

*Analysis*

J41 We asked Beca to review and analyse submissions that related to the advice it had given us.

J42 Beca noted that there was little or no argument from submitters that the Bell-Ducat model was an appropriate system of soil classification for rural areas.[1445]

J43 Beca also acknowledged that the complex nature of urban soils often requires a variety of trenching methods to be used within any specific urban street or berm.

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1439 Vodafone "Submission on process paper and draft pricing review determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and comments on Analysys Mason's TSLRIC models" 20 February 2015, paragraph [I1.3].

1440 Network Strategies "Final report for Spark New Zealand and Vodafone New Zealand - Commerce Commission draft determination for UCLL and UBA" PUBLIC, 20 February 2015, p. 38.

1441 Analysys Mason "Report for Chorus - UCLL and UBA FPP draft determination submission- PUBLIC, 20 February 2015", p. 31

1442 WIK-Consult "Report for Telecom New Zealand and Vodafone New Zealand - Cross-Submission - In response to the Commerce Commission's "Draft pricing review determination for Chorus' unbundled bitstream access service" and "Draft pricing review determination for Chorus' unbundled copper local loop service" including the cost model and its reference documents- Non-Confidential version" 19 March 2015, paragraph [108].

1443 WIK-Consult "Report for Telecom New Zealand and Vodafone New Zealand - Submission - In response to the Commerce Commission's "Draft pricing review determination for Chorus' unbundled bitstream access service" and "Draft pricing review determination for Chorus' unbundled copper local loop service" including the cost model and its reference documents- Non-Confidential version" 20 February 2015, paragraphs [119 and 352].

1444 Vodafone "Submission on process paper and draft pricing review determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and comments on Analysys Mason's TSLRIC models" 20 February 2015, paragraph [I2.1.c].

1445 Ibid, p. 4.

However, Beca stated that the vast majority of soil types encountered within most urban areas would not present any problems to a skilled trenching contractor.[1446]

J44 Beca emphasised that the application of a single urban soil type was pragmatic given the considerable human effort required to extend the Bell-Ducat classification system to cover more urban areas.

J45 We have decided that Beca's classification of rural and urban soils is appropriate for the modelling of the hypothetical efficient operator's trenching costs. We note that parties have agreed with the classification of rural soil types. While submitters and Beca acknowledge the issue with the identification of a single urban soil type, we consider our approach, detailed under the weightings section below in this Attachment, deals with this issue.

J46 Regarding WIK and Vodafone's submission on the applicability of soil classifications when trenching alongside rural roadways, Beca has acknowledged there will be areas alongside roads, such as engineered filled embankments, where a different soil type will be encountered. Further, Beca also noted the identification of such areas is beyond the resolution (capability) of the LRIS data set.[1447]

J47 However, due to our decisions regarding laterals,[1448] in rural areas we are now modelling trenches alongside the property boundary, rather than the road, so this condition no longer arises. Accordingly, we consider the rural soil types identified by Beca appropriate.

**Trenching methodologies**

*Initial views*

J48 For our December 2014 draft determination Beca identified and matched the appropriate trenching methodologies for the New Zealand soil types it had classified.[1449]

J49 In reliance on its expertise and consultation with local contractors, Beca identified accepted in use trenching methods in New Zealand.[1450]

J50 Beca's analysis of available methodologies allowed TERA to model the appropriate methodology for each classified soil type.[1451,1452]

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1446 Ibid.

1447 Beca "FPP Corridor Cost Analysis of Trenching and Ducting Rates in NZ - Final Issue Nov14" 25 November 2014, p. 6

1448 Set out later in this Attachment.

1449 Beca "FPP Corridor Cost Analysis of Trenching and Ducting Rates in NZ - Final Issue Nov14" 25 November 2014, p. 5.

1450 Ibid.

1451 Ibid, Table 2, p. 5.

1452 Beca "Report FPP Corridor Cost Analysis - Report 3, New Rates and General Recommendations" 5 June 2015, p. 1-12.

J51 For our December 2014 draft determination and in our July 2015 further draft determination we assigned the appropriate trenching methods to each soil type identified in our previous phase.

J52 In response to our July 2015 draft determination we received further submissions on our approach to the following trenching techniques:

J52.1 hydro and micro-trenching;

J52.2 ducting; and

J52.3 reinforcement.

*Submissions*

<u>Hydro and micro-trenching</u>

J53 Vodafone noted WIK and Network Strategies' comments that Beca had not taken account of the efficiency of modern trenching techniques, specifically hydro, mini, [1453] and micro-trenching. [1454,1455,1456]

J54 Additionally, Downer noted that Beca's choice of trenching methodologies was largely complete, with the exception of hydro-trenching.[1457]

<u>Ducting</u>

J55 Network Strategies argued that an efficient operator would deploy direct buried cables if there was a financial advantage in doing so. [1458] Network Strategies concluded the model did not reflect the cost of an efficient operator, based on the absence of explicit assumptions on the share of ducted and direct buried cable used in the model. [1459]

J56 However, Network Strategies also acknowledged that the financial incentive to deploy buried cables needs to be assessed in terms of the total cost of ownership,

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[1453] Mini and micro trenching methodologies were considered in tandem as they are effectively the same method of trenching.

[1454] Vodafone "Submission to the New Zealand Commerce Commission on further draft pricing review determination for Chorus' unbundled copper local loop service and further draft pricing review determination for Chorus' unbundled bitstream access service" CONFIDENTIAL, 13 August 2015, paragraphs H7.b. and J1.3.

[1455] WIK-Consult "Submission In response to the Commerce Commission's "Further draft pricing review determination for Chorus' unbundled bitstream access service" and "Further draft pricing review determination for Chorus' unbundled copper local loop service" including the revised cost model and its reference documents" 12 August 2015, p. 110.

[1456] Network Strategies "Final report for Spark New Zealand and Vodafone New Zealand - Revised draft determination for the UCLL and UBA price review" 13 August 2015, p. 64.

[1457] Downer New Zealand Limited "Submission on the further draft pricing determination for Chorus' unbundled copper local loop and unbundled bitstream access services" CONFIDENTIAL, 12 August 2015, paragraph [2].

[1458] Network Strategies "Final report for Spark New Zealand and Vodafone New Zealand - Revised draft determination for the UCLL and UBA price review" 13 August 2015, p. 104.

[1459] Ibid.

noting that the lower capital cost of direct burying may be offset to some degree by higher operating costs.[1460]

J57 WIK submitted that we had inflated duct and trench costs because we had over-dimensioned the size of sub-ducts in the model.[1461] Downer also challenged us on the dimensioning of ducts, specifically on the use of traditional 100 mm ducts when LFCs are installing 50 mm polyethylene micro-ducts for the UFB roll-out.[1462]

Reinforcement

J58 Downer stated that the practice of trench reinforcement is rarely used in New Zealand, with network resilience generally being addressed by means of route diversity.[1463]

J59 WIK, supported by Vodafone, stressed the option of distributing lines down both sides of the road to address network resilience issues; an option it had raised in its submission on the December 2014 draft determination.[1464] [1465] Vodafone, though supportive of the model accounting for network resilience, stressed that there are more efficient deployment techniques available.[1466] Vodafone referred to WIK's recommendation of distributing feeder lines down both sides of the road to reduce the proportion of feeder trenches requiring expensive reinforcement.

*Analysis*

Hydro and micro-trenching

J60 We asked Beca to consider the use of hydro-trenching and reconsider the use of mini and micro-trenching techniques in New Zealand.

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1460 Ibid.

1461 WIK-Consult "Submission In response to the Commerce Commission's "Further draft pricing review determination for Chorus' unbundled bitstream access service" and "Further draft pricing review determination for Chorus' unbundled copper local loop service" including the revised cost model and its reference documents" Non Confidential version, 12 August 2015, p. 78.

1462 Downer New Zealand Limited "Submission on the further draft pricing determination for Chorus' unbundled copper local loop and unbundled bitstream access services" Public Version, 12 August 2015, paragraphs 1.g.

1463 Downer New Zealand Limited "Submission on the further draft pricing determination for Chorus' unbundled copper local loop and unbundled bitstream access services" CONFIDENTIAL, 12 August 2015, paragraphs 1.f and 13.a.

1464 WIK-Consult "Submission In response to the Commerce Commission's "Further draft pricing review determination for Chorus' unbundled bitstream access service" and "Further draft pricing review determination for Chorus' unbundled copper local loop service" including the revised cost model and its reference documents" 12 August 2015, p. 84.

1465 Vodafone "Submission to the New Zealand Commerce Commission on further draft pricing review determination for Chorus' unbundled copper local loop service and further draft pricing review determination for Chorus' unbundled bitstream access service" CONFIDENTIAL, 13 August 2015, paragraph G4.

1466 Vodafone "Submission to the New Zealand Commerce Commission on further draft pricing review determination for Chorus' unbundled copper local loop service and further draft pricing review determination for Chorus' unbundled bitstream access service - Public version" 13 August 2015, paragraph G4.

J61 Beca has advised hydro-trenching is a trenching methodology that is in use in New Zealand and has provided us with trenching rates for this method. While hydro-trenching can be a more expensive trenching method, Beca has advised that hydro-trenching would be used for reasons other than just cost, for instance for reasons of safety. [1467]

J62 On Beca's advice, we have decided to include the hydro-trenching method in our modelling of the hypothetical efficient operator's trenching costs.[1468]

J63 Regarding micro-trenching, Beca advised that micro-trenching is not a preferred trenching method in New Zealand and should not be used in the model.[1469]

J64 Based on Beca's advice, we have continued to not include micro-trenching in our model. [1470]

Ducting

J65 We sought Beca and TERA's advice on the use of direct buried cables.

J66 In TERA's view, the use of direct buried cables is not international best practice. TERA noted that: [1471]

J66.1 the cost model of the Danish regulator is fully ducted for the fibre network;[1472]

J66.2 direct buried cables had been widely used in some countries in the past for copper networks, including Denmark and New Zealand. In many countries (eg, Ireland, France, Italy, UK), the use of ducts had been used for at least 20 years, and in the case of France for 40 years;

J66.3 research undertaken by Analysys Mason on behalf of Ofcom, on the cost of different construction methods for next generation fibre access network (FTTH), reported "direct burying in soft ground offered savings of around 24% versus traditional trenching. The lower construction costs however must be balanced against higher maintenance costs and a shorter life expectancy." [1473]

J67 TERA advised the fundamental difference between ducted and direct buried networks is the need with direct buried cables to re-dig trenches every time the operator needs to replace or augment its cables. As a consequence, the effective

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1467 Beca "FPP Corridor Cost Analysis - Response to Submissions, Report 4 (Final)" 11 December 2015, p. 5.

1468 Beca "FPP Corridor Cost Analysis - Response to Submissions, Report 4 (Final)" 11 December 2015, p. 5.

1469 Beca "FPP Corridor Cost Analysis - Response to Submissions, Report 4 (Final)" 11 December 2015, p. 7.

1470 Beca "FPP Corridor Cost Analysis - Response to Submissions, Report 4 (Final)" 11 December 2015, p. 7

1471 TERA Consultants "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services, Model Specification" CONFIDENTIAL VERSION, December 2015, p. 60.

1472 However, for the modelling of the copper network, it is assumed that the cables are direct buried.

1473 http://stakeholders.ofcom.org.uk/binaries/consultations/wla/annexes/csmg.pdf.

"economic" life of a trench associated with direct buried cables equates to the life of the cable,[1474] whereas for ducted cables the life of the trench equates to the longer asset life of the ducts.[1475]

J68 In this regard, Network Strategies also noted that the lower capital cost of direct buried cables needs to be offset against the higher operating costs due to the greater cost of fault repairs.[1476]

J69 The advice from TERA and the submission from Network Strategies is consistent with Beca's advice. In its report Beca asserted it did not believe contractors or service providers would opt for direct burying fibre cable.[1477]

J70 Further, Downer confirmed that the majority of the UFB build, being undertaken by the LFCs, is ducted.[1478]

J71 Having considered submissions, and the advice of Beca and TERA, we have concluded that, on balance, the hypothetical efficient operator, when undergrounding services, would deploy a fully ducted network. This is in line with observed New Zealand and international best practice.

J72 As part of a ducted network, sub-ducts (ducts within a duct) can be used to aid with the administration, organisation, and protection of the cable (eg, fibre) assets. We asked TERA to comment on WIK and Downer's submissions on sub-ducting and to provide advice on the efficient dimensioning of ducts and sub-ducts.

J73 TERA noted from Ofcom's report, that: [1479,1480]

> While sub-ducts reduce the absolute capacity of the main duct, it is a useful device for allowing cables to be installed and removed without risking damage to existing cables. The use of sub-ducts may become essential if more than one operator plans to share the same duct.

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1474 In our model and as set out in Attachment H - Setting Asset Lives, we have assumed the asset life for cables is 20 years and for ducts is 50 years.

1475 TERA Consultants "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services, Model Specification" CONFIDENTIAL VERSION, December 2015, p. 60.

1476 Network Strategies "Final report for Spark New Zealand and Vodafone New Zealand - Revised draft determination for the UCLL and UBA price review" 13 August 2015, p. 104.

1477 Beca "FPP Corridor Cost Analysis - Response to Submissions, Report 4 (Final)" 11 December 2015, p. 6.

1478 Downer New Zealand Limited "Submission on the further draft pricing determination for Chorus' unbundled copper local loop and unbundled bitstream access services" CONFIDENTIAL, 12 August 2015, paragraph [1. g].

1479 TERA Consultants "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services, Model Specification" CONFIDENTIAL VERSION, December 2015, p. 28.

1480 Ofcom "Operational models for shared duct access, 1 April 2010" p. 13.
Report is available from
http://stakeholders.ofcom.org.uk/binaries/consultations/wla/annexes/operational_models.pdf

J74 To illustrate this point, the report illustrated the following:[1481]

**Figure J1**

*Sub-ducts*

A more efficient way to use space in a duct is to physically sub-divide the space using sub-ducts. Sub-ducts are usually rigid tubes; Figure 4.3 provides an example of how three cables from three separate CPs can be physically separated using rigid sub-ducts.

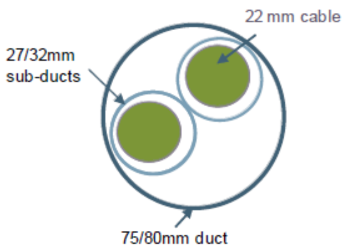


*Figure 4.3: Sub-ducting of an 80mm duct for a 22mm cable [Source: Analysys Mason]*

It can be seen in Figure 4.3 that rigid sub-ducts do not use the space available in ducts very efficiently as they create many stranded pockets of unusable space.

J75 There are benefits to sub-ducting, including: it facilitates duct sharing, it aids asset administration, and it provides the operator with greater flexibility to address maintenance issues and movements in demand for services.

J76 However, these benefits are not a necessary priority for the hypothetical efficient operator, as:

J76.1 there is not a significant market for duct sharing in New Zealand, so the hypothetical efficient operator would not require sub-ducts for this purpose; [1482] and

J76.2 a benefit of sub-ducting is demand management, whereby an operator can over-provision its ducting infrastructure to facilitate future, planned and unplanned, demand for services. In our modelling, demand is assumed to be both known and constant over time,[1483] so such planning is not required.

J77 In our view, a hypothetical efficient operator would therefore not incur the additional cost of sub-ducting for a network that does not have changing future demand.

J78 In addition, we consider that the hypothetical efficient operator would not deploy ducts larger than necessary. To do so would inflate ducting and trenching costs for no obvious benefit, as argued by WIK.[1484]

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1481 Ibid, p. 30.

1482 See Attachment D – underground infrastructure sharing.

1483 As explained in Attachment A.

1484 WIK-Consult "Submission In response to the Commerce Commission's "Further draft pricing review determination for Chorus' unbundled bitstream access service" and "Further draft pricing review

J79 TERA agreed with Downer’s submission that for FTTH deployments the traditional 110 mm ducts have been superseded by smaller volume polyethylene (PE) ducts of approximately 40-50 mm in diameter. [1485] However, TERA disagreed that these ducts would necessarily contain micro-ducts in an environment where the hypothetical efficient operator faces known and constant demand.[1486]

J80 On the advice of TERA, and the reported practices of LFCs, we have concluded that the hypothetical efficient operator would, for a fibre local access network, deploy a 50 mm ducted network, but not a micro-ducted one. However, for a point-to-point copper local access network, the operators would continue to use traditional 110 mm ducting.

Reinforcement

J81 In light of Downer’s submission regarding trench reinforcement, we asked TERA to review its recommendation on trench reinforcement.[1487]

J82 TERA agreed with Downer that the practice of trench reinforcement is rarely used in New Zealand. Therefore TERA advised that we should use double trenching (route diversity) instead of trench reinforcement. [1488]

J83 Following an assessment of submissions and TERA’s advice, we have adopted TERA’s recommendation that for critical trenches (those carrying [ ]**CNZCI** or more lines) double trenching is the accepted approach for providing network resilience.

**Representative trenching costs**

J84 To apply trenching costs in our model we need to understand how much it would cost per metre for each of the trenching methods that are available to the hypothetical efficient operator.

J85 The trenching costs need to be representative of those the hypothetical efficient operator would achieve in practice, given the scale of the network and the required compliance with New Zealand legislation and accepted codes of practice. [1489]

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determination for Chorus’ unbundled copper local loop service” including the revised cost model and its reference documents" 12 August 2015, p. 78.

1485 Downer New Zealand Limited "Submission on the further draft pricing determination for Chorus’ unbundled copper local loop and unbundled bitstream access services" CONFIDENTIAL, 12 August 2015, p. 2.

1486 TERA Consultants “TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services, Model Specification” CONFIDENTIAL VERSION, December 2015, p. 65.

1487 Following a submission received from Analysys Mason on the December 2014 draft determination, Tera recommended trench reinforcement on critical routes and the model was adjusted for the July 2015 further draft determination.

1488 TERA Consultants “TSLRIC price review determination for the Unbundled copper Local Loop and Unbundled bitstream Access services. Analysis of the responses to the second consultation following the further draft determination” Confidential Version, December 2015. p.31.

1489 As set out in Chapter 2, the hypothetical efficient operator must comply with all relevant New Zealand legislation and relevant codes of practice.

*Initial views*

J86 In our December 2014 UCLL draft determination paper, we relied on advice from Beca for trenching and duct costs.

J87 We explained that benchmarking trenching and duct costs is complex since trenching costs are likely to be specific to each country.

J88 In the July 2015 further draft determination we again said we would rely on the trenching and duct cost information sourced from Beca.

J89 Beca's rates were based on a variety of sources:[1490]

J89.1 historical data held by Beca from previous tenders;

J89.2 limited supplier pricing;

J89.3 indicative "cover-all" rates; and

J89.4 pricing methodologies received from contractors from throughout New Zealand.

J90 These rates were verified by Beca's experienced in-house quantity surveyors.[1491]

J91 For our December 2014 draft determination and our July 2015 further draft determination we selected the lowest cost trenching rate according to soil type and the number and size of ducts to be installed.

J92 For our July 2015 further draft determination, we asked Beca to investigate whether there were discounts available from civil contractors when competitively tendering for large packages of work in New Zealand. Beca interviewed quantity surveyors and civil estimators from within its four largest New Zealand offices, and looked at recent tenders received both locally and regionally.[1492]

J93 Beca's research on discounting proved inconclusive. Beca was unable to verify that, when tendering in a localised market, larger packages of civil work will necessarily result in greater discounts than small to mid-size packages. There was also no evidence of the consistent application of discounts by contractors within a given area. [1493]

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[1490] Beca "FPP Corridor Cost Analysis of Trenching and Ducting Rates in NZ - Final Issue Nov14" 25 November 2014, p. 2.

[1491] Beca "FPP Corridor Cost Analysis of Trenching and Ducting Rates in NZ - Final Issue Nov14" 25 November 2014, p. 2.

[1492] Beca "FPP Corridor Cost Analysis – Report 3, New Rates and General Recommendations" 5 June 2015, p. 12.

[1493] Beca "FPP Corridor Cost Analysis – Report 3, New Rates and General Recommendations" 5 June 2015, p. 13.

J94 Beca concluded that its national average rates were sufficiently competitive and would not likely be any lower when tendered to the market in large packages of work.[1494] Accordingly, based on the advice from Beca, we did not apply a discount to our trenching costs.

*Submissions*

J95 In response to our July 2015 draft determination we received further submissions on the following, regarding our approach to representative trenching costs:

J95.1 Chorus data;

J95.2 verification of traffic management costs

J95.3 weightings; and

J95.4 discount.

Chorus data

J96 Chorus submitted that the data it provided in respect of its RBI and UFB build programme is the best evidence of the current costs of a nationwide build and we should consider using that as the basis of our trenching costs.[1495]

J97 Chorus further emphasised that its trenching cost data, with reference to Analysys Mason's estimation of trenching cost, captures the cost of different geography and network features found in New Zealand.[1496]

J98 However, Spark and Network Strategies argued it would be inappropriate for us to rely upon Chorus' RBI and UFB costs or on Analysys Mason's statistical estimation of trenching costs based on Chorus' RBI and UFB data.[1497,1498]

J99 Spark stated that, as a matter of principle, TSLRIC modelling should capture all reasonable efficiencies, including learning efficiencies, to provide the best estimate of the representative long run competitive market price for the regulated service.[1499]

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1494 Beca "FPP Corridor Cost Analysis – Report 3, New Rates and General Recommendations" 5 June 2015, p. 13.

1495 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services (2 July 2015) - Public version" 13 August 2015, paragraph [80].

1496 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services (2 July 2015) - Public version" 13 August 2015, paragraph [102.1].

1497 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services - Public version" 24 September 2015, p. 22.

1498 Network Strategies "Final report for Spark New Zealand and Vodafone New Zealand - Response to submissions on revised draft determination - Pricing review - UCLL and UBA Final Pricing Principle - Public version" 24 September 2015, p. 45.

1499 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" CONFIDENTIAL, 24 September 2015, p. 18.

J100 Spark argued the costs incurred by Chorus in the early years (stages) of its RBI and UFB builds were not efficiently incurred, citing Chorus' own reports which forecast its UFB deployment costs to decline significantly between 2012 and 2020 as a consequence of:

J100.1 lower direct and indirect cost;

J100.2 savings achieved through learning; and

J100.3 greater flexibility in the phasing of its UFB build from CFH.[1500]

J101 Network Strategies expressed a similar view to that of Spark, that Chorus' project data from years 3 and 4 of its UFB build and years 1 to 5 of the RBI build do not reflect efficiencies that would likely be realised in later years of the build. [1501]

J102 Network Strategies, on behalf of Spark and Vodafone, assessed Analysys Mason's statistical estimation of trenching costs to be unsound. Network Strategies noted "The nature of the flaws that we identified with Analysys Mason's input data used to estimate parameter values is such that any results from the statistical analysis should be ignored." [1502] Spark and Vodafone agreed. [1503,1504]

J103 Amongst the issues identified by Network Strategies were: [1505]

J103.1 the erroneous application of the model to exchange service areas (ESAs) for which input parameters are not available; and

J103.2 for many ESAs the proportions do not sum to one, thereby violating a key assumption of the model and rendering it invalid;

J103.3 RBI costs including a contractor mark-up even when there appears to be no involvement of third party contractors.

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1500 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" CONFIDENTIAL, 24 September 2015, p. 21.

1501 Network Strategies "Final report for Spark New Zealand and Vodafone New Zealand - Response to submissions on revised draft determination - Pricing review - UCLL and UBA Final Pricing Principle - Public version" 24 September 2015, p. 45.

1502 Network Strategies "Final report for Spark New Zealand and Vodafone New Zealand - Response to submissions on revised draft determination - Pricing review - UCLL and UBA Final Pricing Principle - Public version" 24 September 2015, p. 93.

1503 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services - Public version" 24 September 2015, p. 22.

1504 Vodafone "Cross submission to the New Zealand Commerce Commission on further draft pricing review determination for Chorus' unbundled copper local loop service and further draft pricing review determination for Chorus' unbundled bitstream access service - Public version" 24 September 2015, p. 39.

1505 Network Strategies "Final report for Spark New Zealand and Vodafone New Zealand - Response to submissions on revised draft determination - Pricing review - UCLL and UBA Final Pricing Principle - Public version" 24 September 2015, p. 45.

Verification of traffic management costs

J104 WIK stated it could not verify Beca's trenching costs as it could not determine the height (magnitude) of traffic management costs.[1506]

Weightings

J105 Analysys Mason said that it cannot be assumed that the cheapest method can always be used. Analysys Mason submitted that our model's choice of the cheapest trenching method for a given combination of soil type and duct size does not reflect real-world deployments. [1507]

J106 Analysys Mason argued that the model needs to reflect a mix of trenching methodologies as observed in Chorus' UFB data.[1508]

J107 Based on its observation, Analysys Mason proposed a weighting for trenching costs, in both rural and urban areas of [ ]**CNZCI** of the cheapest trenching method and [ ]**CNZCI** of open trenching.[1509]

J108 In its cross submission, WIK, on behalf of Spark and Vodafone, disagreed and argued that the lowest trenching costs should be applied based on soil type. WIK stated that average trenching rates would include allowances for overcoming obstacles and open trenching is not the preferred methodology to overcome all trenching barriers.[1510]

J109 WIK concluded that [ ]**CNZCI** of open trenching would not be required in all rural areas to deal with obstacles that may arise, unless it was the appropriate trenching methodology for that area.[1511]

Discount

J110 We again received submissions on a discount to Beca's costs on the basis that a hypothetical efficient operator would be able to negotiate a discount on a nationwide roll-out.

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1506 WIK-Consult "Submission In response to the Commerce Commission's "Further draft pricing review determination for Chorus' unbundled bitstream access service" and "Further draft pricing review determination for Chorus' unbundled copper local loop service" including the revised cost model and its reference documents" 12 August 2015, p. 110.

1507 Analysys Mason "Report for Chorus - UCLL and UBA FPP further draft determination submission" Public, 11 August 2015, p. 16.

1508 Analysys Mason "Report for Chorus - UCLL and UBA FPP further draft determination submission" CONFIDENTIAL, 11 August 2015, p. 17.

1509 Ibid.

1510 WIK-Consult "Cross-Submission in response to the Commerce Commission's Further draft pricing review determination for Chorus' unbundled bitstream access and Further draft pricing review determination for Chorus' unbundled copper local loop service including the revised cost model and its reference documents" Non confidential version, 22 September 2015, paragraph [77].

1511 Ibid.

J111 In its submissions on the July 2015 further draft determination, Spark suggested a discount of 20% should apply. Spark repeated its position that a cost-minimising hypothetical efficient operator would commission contractors to carry out the most efficient possible build programme and those contractors, faced with the economy of scale benefits of a build of this magnitude, would provide a discount to the hypothetical efficient operator. Spark based this on Beca's December 2014 advice.[1512]

J112 WIK further argued that the hypothetical efficient operator's larger national roll-out compared with Chorus' regionally limited FTTH (UFB) roll-out would realise further economies of scale through larger purchase volumes.[1513]

J113 However, Downer disagreed, arguing that no discount should be applied to Beca rates. In its submission, Downer stated that the ability of subcontractors to discount was limited. Downer said this was due to subcontractors having insufficient resources to take advantage of large scale projects and not having the appetite for the risks that come with such projects.[1514]

*Analysis*

<u>Chorus data</u>

J114 In our view, Beca's data is suitable for our TSLRIC model. As part of this modelling exercise, our preference, where possible, has been to use objective data that is independent. The data provided by Beca is independent, forward-looking, and consistent with the hypothetical efficient operator's environment.[1515]

J115 Beca is a reputable consultancy firm with a substantial team of professional quantity surveyors and cost managers located throughout New Zealand and Australia. Beca's cost management team has provided specialist services to the industrial, infrastructure, and building market for over 40 years. Accordingly, we consider that Beca is in a position to provide us a robust estimate of trenching costs in New Zealand.

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[1512] Spark "Further draft pricing review determination for Chorus' UBA and UCLL services - Public version" 13 August 2015, paragraphs [188-192].

[1513] WIK-Consult "Submission In response to the Commerce Commission's "Further draft pricing review determination for Chorus' unbundled bitstream access service" and "Further draft pricing review determination for Chorus' unbundled copper local loop service" including the revised cost model and its reference documents" 12 August 2015, p. 100-101.

[1514] Downer New Zealand Limited "Submission on the further draft pricing determination for Chorus' unbundled copper local loop and unbundled bitstream access services" CONFIDENTIAL, 12 August 2015, paragraph [10].

[1515] This is set out in detail in Chapter 2 –Framework.

J116 We asked Beca to review data supplied by Chorus and the LFCs.[1516] In its report Beca noted the challenges of using these datasets. In general, Chorus' data is not as granular as that which Beca sourced directly from the market, making the data difficult to rely on for the purpose of setting trenching costs within our model.[1517]

J117 However, in respect of Chorus' RBI and UFB trenching data, Beca noted that:

> Although no direct comparison with Chorus/Analysys Mason is possible, and in spite of the large number of variables (trench excavation methodology, number and size of ducts, soil types etc.), Beca considers that the unit rates it has derived from Contractor's and its own in-house sources are not dissimilar (on average) to the available Chorus/Analysys Mason data and are appropriate for the intended use.[1518]

J118 Beca concluded that there is nothing within Chorus' information that would influence a decision to change any of the national average rates provided by Beca, nor was there any reason for Beca to modify any advice given to us to date.

J119 In respect of the LFC data, Beca observed that the LFCs data was comparable to Beca and did not contain anything to cause to alter its views.[1519]

J120 Beca have included a detailed analysis of this and Chorus data in its report.[1520]

J121 In addition to the reviews submitted by Network Strategies and Spark, we have also reviewed Analysys Mason's estimation of national trenching rates. We have concluded that Analysys Mason's model is not statistically robust for the following reasons.

J121.1 It excludes certain proportional variables (due to collinearity problems), yet at the same time also excludes the intercept (constant) term. The effect of this is that the model generates illogical predictions. For example, for certain road and rock conditions it predicts trenching costs to be zero ($0.00).

J121.2 We have verified Network Strategies' observation that the underlying data violates a key assumption of Analysys Mason's models, being that the proportional variables sum to 1. The data records have some proportions summing to more than 1, and others summing to (substantially) less than 1.

J122 We have concluded that there is no reason for us to think the trenching cost data provided by Chorus (including Analysys Mason estimations given on behalf of Chorus) or the LFCs give a better estimate of the hypothetical efficient operator's national trenching costs than those supplied by Beca.

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[1516] Crown Fibre Holdings Limited local fibre companies are; Northpower limited, WaikatoNetworks Limited Enable Services Limited, and Chorus Limited.

[1517] Beca "FPP Corridor Cost Analysis - Response to Submissions, Report 4 (Final)" 11 December 2015, p. 9.

[1518] Beca "FPP Corridor Cost Analysis - Response to Submissions, Report 4 (Final)" 11 December 2015, p. 10.

[1519] Beca "FPP Corridor Cost Analysis - Response to Submissions, Report 4 (Final)" 11 December 2015, p. 12.

[1520] Beca "FPP Corridor Cost Analysis - Response to Submissions, Report 4 (Final)" 11 December 2015, pp. 9-12.

J123 Our view is based upon Beca's expert advice, Beca's cross-check of Chorus' UFB and the LFCs data, our assessment of LFC trenching rates and Analysys Mason's estimation model, and submissions.

J124 We consider Beca's cost analysis to be a well-documented, thorough, representative estimate of the trenching costs a hypothetical efficient operator, would encounter. Accordingly, we have used Beca trenching rates in our model.

Verification of traffic management costs

J125 We asked Beca to comment on WIK's submission that it could not verify traffic management costs and therefore total costs. [1521]

J126 Beca responded, noting the sources of its costs are contractors who had responded to Beca, following requests from it for information or rates specified in tender documents. Further, its ongoing research had confirmed $1,000 as a suitable average daily rate for traffic management cost around New Zealand. [1522]

J127 Based upon Beca's advice, we are satisfied that a sufficient allowance has been made for traffic management costs.

Weightings

J128 We asked Beca to review Analysys Mason's submission.

J129 Beca agreed with Analysys Mason that a mix of trenching technologies would be used in most circumstances. In Beca's opinion, the nature of New Zealand's soils is such that within any given length of road it is likely contractors would encounter a variety of conditions requiring a mix of methodologies to be used. [1523]

J130 Beca reviewed the outputs of our model in terms of proportions in which it used the various trenching methodologies. Beca expected to see a higher percentage of directional drilling in rural areas and a broader range of trenching methodologies used in urban areas than the model was producing. [1524]

[1521] WIK-Consult "Cross-Submission in response to the Commerce Commission's Further draft pricing review determination for Chorus' unbundled bitstream access and Further draft pricing review determination for Chorus' unbundled copper local loop service including the revised cost model and its reference documents" Non confidential version, 22 September 2015, paragraph [110].

[1522] Beca "FPP Corridor Cost Analysis - Response to Submissions, Report 4 (Final)" 11 December 2015, p. 2.

[1523] Beca "FPP Corridor Cost Analysis - Response to Submissions, Report 4 (Final)" 11 December 2015, p. 14.

[1524] Beca "FPP Corridor Cost Analysis - Response to Submissions, Report 4 (Final)" 11 December 2015, p. 15.

J131 In the July 2015 further draft determination the model produced the following results:

**Table J2: Model result prior to application of Beca's trenching weightings**

| Methodology | Rural | Urban |
|---|---|---|
| Mole plough | 81% | - |
| Chain digger | - | - |
| Open trench | 12% | 4% |
| Directional drill | 3% | 94% |
| Rock saw | 4% | 2% |
| Thrusting | - | - |
| Hydro excavation | - | - |
| TOTAL | 100% | 100% |

J132 Beca concluded that the proportional mix of methodologies selected in our model was not reflective of those occurring in New Zealand. Beca further concluded "this could possibly lead to an under-estimation of the work on a national scale." [1525]

J133 Beca recommended we use a weighted mix of trenching methodologies to derive national average rates by soil type, rather than to continue using our least cost method. In its report, Beca suggested the following weightings by rural and urban soil type:[1526]

**Table J3: Beca recommended trenching weightings**

| Trenching method | Soil type | | | | | |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | Urban |
| Mole plough | 70% | 70% | - | - | - | - |
| Chain digger | - | - | - | - | - | - |
| Open trench | 5% | 5% | 35% | 100% | - | 10% |
| Directional drill | 25% | 25% | 65% | - | - | 70% |
| Rock saw | - | - | - | - | 100% | 10% |
| Thrusting | - | - | - | - | - | - |
| Hydro excavation | - | - | - | - | - | 10% |
| Total | 100% | 100% | 100% | 100% | 100% | 100% |

J134 Further to Beca's recommendation we also reviewed the LFC and Chorus data in light of Analysys Mason's observations.

[1525] Beca "FPP Corridor Cost Analysis - Response to Submissions, Report 4 (Final)" 11 December 2015, p. 15.
[1526] Beca "FPP Corridor Cost Analysis - Response to Submissions, Report 4 (Final)" 11 December 2015, p. 16.

J135 Chorus' data categorises trenching costs as either "trenching" or "drilling and thrusting" (trenchless) costs. The classification of costs by "trenching" and "trenchless" methods prevented us from determining the proportions in which specific trenching technologies, such as hydro-trenching, directional drilling and rock sawing, were deployed. This information is fundamental to the bottom-up modelling of trenching costs. However, we could only determine the proportion in which the two broad categorisations of trenching methods were deployed.

J136 In its submission Analysys Mason reported:

1086.1 [ ]**CNZCI** was trenched; and by deduction

1086.2 [ ]**CNZCI** was completed using either directional drilling or thrusting (ie, trenchless methods).[1527]

J137 This appears consistent with the LFC data that was supplied to us in response to section 98 notices. From that information, we noted research undertaken by Enable Services Limited and its subcontractors. That research indicated that Enable could expect [ ]**ECI** of its UFB work in Christchurch to be completed by way of directional drilling.[1528]

J138 In urban areas, our model is almost exclusively selecting directional drilling as the preferred trenching method. This differs from Analysys Mason's observation and Enable's expectation of the proportional use of trenching and trenchless technologies in urban areas.

J139 We believe this is a consequence of the model not having enough detailed information on the range of urban soil types to guide its selection of trenching methodologies.

J140 In light of the above findings, we have concluded the model is not selecting trenching methodologies in proportions representative of those the hypothetical efficient operator would likely encounter in urban areas.

J141 We also reviewed the proportions in which the model selected trenching methodologies in rural areas based on the least cost method for the soil type, number, and size of ducts being deployed.

J142 The results were not consistent with Beca's expectations based on its experience and contractor sources. Beca expected to see a greater proportion of directional drilling being used in rural areas compared with the 3% the model was producing (see Table J2 above).

J143 In light of the above findings, Beca advice, and submissions, we have concluded that the lowest cost approach results in the model not calculating an appropriate

[1527] Analysys Mason "Report for Chorus - UCLL and UBA FPP further draft determination submission" CONFIDENTIAL, 11 August 2015, p. 17.

[1528] Enable Services' response to 5 May 2014 s98 notice, Paragraph [6.11] - ESL.pdf, paragraph [6.11.1. (k)] and [6.11.1 (k)] Appendix One.pdf.

representation of trenching methodologies that a hypothetical efficient operator would likely encounter in rural areas.

J144 We have decided, based on Beca's advice and our analysis, to use Beca's suggested weighting of trenching methods to determine the cost of trenching in rural and urban areas in our model.[1529] Having included Beca's weightings for both urban and rural soil types the model now produces the following results:

**Table J4: Model result after the application of Beca's trenching weightings**

| With weightings | Rural | Urban | National |
|---|---|---|---|
| Mole plough | 56.6% | - | 38.2% |
| Chain digger | - | - | - |
| Open trench | 14.0% | 14.6% | 14.2% |
| Directional drill | 24.8% | 71.8% | 40.0% |
| Rock saw | 4.0% | 1.6% | 3.2% |
| Thrusting | 0.3% | 6.0% | 2.2% |
| Hydro excavation | 0.3% | 6.0% | 2.2% |
| Total | 100.0% | 100.0% | 100.0% |

J145 This ensures a proportional set of trenching methodologies is used that is representative of those the hypothetically efficient operator would encounter in New Zealand.

J146 Notwithstanding the shortcomings noted by Beca in its report regarding the availability of definitive data to enable it to produce a series of weightings, we are satisfied that the weightings result in a mix of trenching methodologies that are closely aligned to Analysys Mason's observation and Enable's expectations.[1530,1531]

> It is Beca's opinion that the outcomes in table 8 above [Table J4] are closer to reality and to actual contractor experience than the un-weighted percentages. We therefore support TERA's use of the Beca weightings for both rural and urban areas.[1532]

J147 This gives us comfort that we are modelling trenching methodologies and resulting costs that are representative of those the hypothetical efficient operator would likely incur.

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[1529] Beca "FPP Corridor Cost Analysis - Response to Submissions, Report 4 (Final)" 11 December 2015, p. 15.

[1530] Analysys Mason "Report for Chorus - UCLL and UBA FPP further draft determination submission" CONFIDENTIAL, 11 August 2015, p. 17.

[1531] Enable Services' response to 5 May 2014 s98 notice, Paragraph [6.11] - ESL.pdf, Paragraph [6.11.1. (k)] and [6.11.1 (k)] Appendix One.pdf.

[1532] Beca "FPP Corridor Cost Analysis - Response to Submissions, Report 4 (Final)" 11 December 2015, p. 17.

Discount

J148 We have considered whether the hypothetical efficient operator would negotiate a further discount on Beca's rate for a nationwide roll-out.

J149 Beca investigated the possibility of the application of a discount for the July 2015 draft determination. Beca concluded that larger packages of civil work would not necessarily result in greater discounts than small to mid-size packages. Based on this advice, we concluded Beca's national average rates were competitive and a further discount was not justified.

J150 As no further evidence was provided in submissions to justify a discount, and given that Downer supports Beca's expert advice, we have decided to maintain our position that a discount should not be applied to Beca's trenching rates. [1533]

**Modelling correction - laterals**

J151 The term "lateral" is used to describe, depending on the context, a trench, duct or cable that connects the buried communal telecommunication network running along a road to the customer's underground lead-in at the property boundary.[1534]

J152 Laterals are an essential component of the communal local access network. Therefore, the cost of providing lateral trenches, ducts, and cables to the private property boundary must be accounted for in our modelling of the hypothetical efficient operator's total trenching costs.

*Initial view*

J153 In our December 2014 draft determination the costs of lead-ins and laterals were included in our assessment of total trenching costs. In our July 2015 further draft determination these costs were omitted following implementation of the capital contributions draft decision (Attachment K).

*Submissions*

J154 Submissions from Analysys Mason, Chorus, and Downer identified that the cost of laterals had been incorrectly omitted from the July 2015 further draft determination. [1535, 1536, 1537]

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[1533] Downer New Zealand Limited "Submission on the further draft pricing determination for Chorus' unbundled copper local loop and unbundled bitstream access services" CONFIDENTIAL, 12 August 2015, paragraph [10].

[1534] A "lead-in" is a general term used to describe the trench, duct and cable infrastructure (ie, buried or underground assets) between the private property boundary and the dwelling. The aerial equivalent is commonly referred to as the "drop-lead".

[1535] Analysys Mason "Report for Chorus - UCLL and UBA FPP further draft determination submission" CONFIDENTIAL, 11 August 2015, pp. 5-6.

[1536] Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services (2 July 2015) - Public version" 13 August 2015, paragraph [86.1].

J155 Spark, however, signalled we were at risk of overstating lateral costs if capital contributions made toward the cost of installing the lead-in to the end-user's premises were not properly accounted for.[1538]

J156 Referencing Chorus' guideline on lead-ins, Spark argued the point of demarcation between the lead-in and the lateral was not at the property boundary but beyond it at the network terminal located within the road reserve (the road corridor), wherever that may be.[1539]

J157 In Spark's opinion, the costs of laterals form part of the lead-in installation and are provided or paid for by end-users.[1540]

J158 We also received submissions that informed us as to how laterals should be modelled. Downer and WIK submitted on the sharing of lateral trenches and the optimal location of assets within the road corridor.

J158.1 WIK re-emphasised a point raised in an earlier submission that "it would be more efficient to share the (road) crossing trench between two neighbouring buildings instead of crossing the street per building". [1541]

J158.2 Downer, in commenting on lead-ins, recognised the practice of network connections (laterals) being shared between properties, stating "... including breakout at each second boundary taking the connection point [lateral] to the boundary". [1542]

J158.3 Again, in commenting on directional drilling, Downer noted "… the newly installed plant [cable] normally needs to be accessed at every second boundary to allow the installation of the connection to the premises being passed."[1543]

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1537 Downer New Zealand Limited "Submission on the further draft pricing determination for Chorus' unbundled copper local loop and unbundled bitstream access services" CONFIDENTIAL, 12 August 2015, p. 2.

1538 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" CONFIDENTIAL, 24 September 2015, paragraphs [81-84].

1539 Ibid.

1540 Ibid.

1541 WIK-Consult "Submission In response to the Commerce Commission's "Further draft pricing review determination for Chorus' unbundled bitstream access service" and "Further draft pricing review determination for Chorus' unbundled copper local loop service" including the revised cost model and its reference documents" 12 August 2015, p. 90.

1542 Downer New Zealand Limited "Submission on the further draft pricing determination for Chorus' unbundled copper local loop and unbundled bitstream access services" CONFIDENTIAL, 12 August 2015, paragraph [16.b].

1543 Downer New Zealand Limited "Submission on the further draft pricing determination for Chorus' unbundled copper local loop and unbundled bitstream access services" CONFIDENTIAL, 12 August 2015, paragraph [7.g].

J158.4 Further, Downer emphasised new trenching technologies, specifically hydro-trenching, which allowed for trenches to be positioned closer to existing services and property boundaries to reduce lateral requirements.[1544]

J159 Industry practices in respect of laterals and trenching placement were further emphasised in cross submissions. Specifically, Vodafone and WIK cited the New Zealand Standard for subdivisions (NZS4404) which states "…it is most efficient to locate the trenches at the border of the private property and not at the edge of the metalled surface of the road" as such a practice. [1545,1546]

*Analysis*

J160 We asked TERA to investigate submissions that the cost of laterals was missing from the July 2015 further draft determination. TERA subsequently confirmed lateral costs were inadvertently omitted.[1547] This occurred following the implementation of the capital contributions draft decision, which excludes the cost of lead-in trenches from total modelled costs (Attachment K). However, cable costs were still included, as were aerial costs.

J161 On the advice from our experts we have concluded the following.

1086.3 We should include the cost of laterals in the determination of the hypothetical efficient operator's trenching costs.

1086.4 An adjustment is not required to account for the over-recovery of lateral trenching costs, as claimed by Spark, as:

J161.1.1 lead-in trenching is the responsibility and cost of the property owner; and

J161.1.2 lead-in trenching starts at the location of the ETP and ends at, or just before, the property boundary.[1548]

J162 To determine the efficient cost of laterals, we were guided by industry codes of practice and the advice of Beca.[1549]

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1544 Downer New Zealand Limited "Submission on the further draft pricing determination for Chorus' unbundled copper local loop and unbundled bitstream access services" CONFIDENTIAL, 12 August 2015, paragraph [2.c.iv].

1545 Vodafone "Cross submission to the New Zealand Commerce Commission on further draft pricing review determination for Chorus' unbundled copper local loop service and further draft pricing review determination for Chorus' unbundled bitstream access service - Public version" 24 September 2015, p. 36.

1546 WIK-Consult "Cross-Submission in response to the Commerce Commission's Further draft pricing review determination for Chorus' unbundled bitstream access and Further draft pricing review determination for Chorus' unbundled copper local loop service including the revised cost model and its reference documents - Public version" 22 September 2015, paragraph [37].

1547 TERA Consultants "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services Analysis of the responses to the second consultation following the further draft determination." Confidential Version, December 2015, p. 27.

1548 As observed in appendix 5 of the TCF's Premises wiring code of practice 2011 available from http://www.tcf.org.nz/content/dc07abcd-21f8-4288-b55b-6f861bdd4d02.html .

1086.5 Based on industry codes of practice and the advice of Beca, we have concluded that the hypothetical efficient operator would position its trenches in the road corridor such that:

J162.1.1 its communal network trenches are as close as operationally practical to private property boundary. Beca has advised the national average length of a lateral, being the distance between the communal network trench that runs along a road and the private property boundary, would be approximately 1.75 m;[1550,1551]

J162.1.2 its lateral trenching or road crossings can be shared between two or more properties, wherever possible.[1552]

J163 In response to Spark's submission, a lead-in would not extend beyond the property boundary and this is consistent with our modelling

J164 Additionally, we asked TERA to advise on whether double recovery of lateral cost may be occurring via the non-recurring UCLL new connection charge.

J165 The UCLL MPF new connection charge, as defined in the UCLL STD, establishes a new UCLL connection from spares or intact circuits with "an existing service lead into the building".[1553]

J166 TERA confirmed the UCLL new connection charge excludes the cost of any labour and materials incurred by Chorus in the provision of service between the network distribution point and the ETP.

J167 In conclusion, we have decided the cost of laterals will be included in the total modelled costs without any adjustment. We do not consider that there is any double recovery of costs via the UCLL new connection charge or any capital contribution the end-user makes towards the cost of their lead-in. In the context of this decision it means laterals may be shared between two or more properties and trenches positioned in the road corridor in accordance with industry best practice (ie, NZS4404, referenced in paragraph J159).

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1549 Beca "FPP Corridor Cost Analysis - Response to Submissions, Report 4 (Final)" 11 December 2015, p. 13

1550 Ibid.

1551 In addition to NZS4404 we have observed similar recommends in other industry codes of practices also inform us on the placement of telecommunication services within the road corridor, namely:
The NZUAG code of practice (http://www.nzuag.org.nz/national-code/)
(a) As close as possible to the property boundary; and
(b) In an area designated for, or already used by, utility structures
The Telecommunications Carriers Forum: Premises Wiring Code of Practice indicates the placement of the network access point close to the shared boundary of two or more properties.

1552 TERA Consultants "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services, Model Specification" CONFIDENTIAL VERSION, December 2015, p. 40.

1553 Commerce Commissions "Standard Terms Determination for Chorus' unbundled copper local loop Network Service Schedule 2 UCLL price list public Version 7 November 2007" p. 3.

# Attachment K: Capital contributions

## Purpose

K1 This Attachment sets out the framework for our consideration of capital contributions, and explains our final decisions on the treatment of the different kinds of capital contributions.

K2 Capital contributions arise because network providers can require end-users or third parties to provide elements of their network (such as lead-in trenches) or to pay a cash contribution towards the cost of an asset. Where this occurs, we need to determine how to treat capital contributions as part of this pricing review determination.

K3 Where we consider that a particular cost would not be met by the hypothetical efficient operator we have excluded it from the TSLRIC price. We consider that this is appropriate to avoid double recovery of that cost through the capital contribution and again through the regulated charges that we are setting in this pricing review determination. In our view, avoiding such double recovery will result in a price which promotes competition for the long-term benefit of end-users in accordance with section 18.

K4 In considering how to treat capital contributions in this pricing review determination, we have been guided by several factors: real-world practice; the Act's general intention that Chorus should not over-recover its costs; and our view that it would not promote competition for the long-term benefit of end-users to permit Chorus to recover a cost that would be borne by end-users or third parties.[1554]

K5 While our approach to implementing TSLRIC is not concerned with the under- or over-recovery of historic investments, the Act also contains a requirement that we take into account the provision of other services and avoid double recovery between services which is relevant by analogy.

## Our final decisions

K6 Our final decisions in respect of capital contributions are set out below.

K6.1 In relation to the network which lies inside the TSO-derived boundary (that is, the notional boundary drawn around all end-users in situ and being provided service by Telecom as of December 2001):

K6.1.1 Except as described below, we have included the cost of all lines within the TSO-derived boundary (that is, both TSO lines and lines within the boundary that were built since December 2001).

K6.1.2 We have excluded the cost of lead-in trenches, on the basis that Chorus/Telecom required the trench to be provided by the end-

[1554] The Commerce Commission, "Further draft pricing review determination for Chorus' unbundled copper local loop service", 2 July 2015, paragraphs [1590], [387], [1620].

user, and that the hypothetical efficient operator would receive a similar contribution.[1555]

K6.1.3 We have made no deductions in respect of the costs of aerial lead-ins.

K6.1.4 We have excluded the cost of trenching and reinstatement for subdivisions built after December 2001 (ie, groups of lines that are within the TSO-derived boundary but were not connected at December 2001)[1556].

K6.1.5 We have made no deductions in respect of the cost of capacity from the exchange to the TSO-derived boundary required to provide service to end-users outside the TSO-derived boundary.

K6.2 In relation to the network which lies outside the TSO-derived boundary, we have excluded the capital costs of this part of the network. We have done this on the basis that the hypothetical efficient operator would be likely to receive a capital contribution from more remote end-users in order to extend its network. This decision is informed by Chorus' general practice.

K6.3 We have made no deductions to UCLL in respect of the government's contribution to UFB or RBI funding.

K7 The extent to which potential capital contributions should be taken into account is a question of judgement. Some submitters said we should not take capital contributions into account at all, whereas others said we have not gone far enough. In a number of instances, we have decided that an adjustment would not be appropriate. Some of these instances could be expected to have had the effect of reducing the regulated TSLRIC price (such as any allowance for Chorus' aerial lead-in policy), while others are likely to have had the effect of increasing the regulated TSLRIC price (such as implementing the capital expenditure adjustment for lines beyond the TSO-derived boundary as a one-off contribution with replacement costs being included in the model).

K8 Overall, we consider that we have taken a pragmatic approach which provides a reasonable measure of the likely capital contribution, and one that also fits well with our concern to avoid Chorus recovering the same cost through both a capital contribution and the regulated price.

K9 RBI funding is discussed in Attachment K of the UBA FPP final determination.

[1555] A lead-in trench is the trench between the end-user's boundary and the External Termination Point (ETP) on the building. Lead-in trenches are the subset of trenches that lie on private property.

[1556] The cost of connecting infill lines is however included. Paragraph K57 provides more detail.

**Relevance of the TSO and explanation of our terms**

K10 We have considered whether the hypothetical efficient operator would incur all of the capital costs of building its hypothetical UCLL network, or whether it would likely receive some capital costs from another party. In our view, the hypothetical efficient operator would be unlikely to deploy its network to the most remote (and therefore the most expensive) end-users without receiving a contribution from those end-users. In reaching this view, we have been guided by real-world practices, such as Chorus' subdivision policy, which contains specific provisions for "high cost" subdivisions. For "high cost" subdivisions Chorus charges an amount to "fully recover our incremental CAPEX costs + a margin".[1557]

K11 We have chosen the area within the TSO-derived boundary as a proxy for the area over which the hypothetical efficient operator would generally deploy its network without a contribution to cover its full capital costs.

K12 TSO lines are those lines in existence as at December 2001. TSO lines are, by definition, inside the TSO-derived boundary, but we note that not all lines in the TSO area are TSO lines (lines inside the TSO-derived boundary but built after 2001 are not TSO lines).

**What we said on the treatment of capital contributions in the July 2015 further draft determination**

K13 In our July 2015 UCLL further draft determination, we maintained our view from the December 2014 UCLL draft determination that in thinking about possible capital contributions it was helpful to consider what regulatory obligations the hypothetical efficient operator would be subject to. We found it appropriate to assume that the hypothetical efficient operator would be subject to a universal service obligation in the form of the TSO obligations (that is, it would be required to provide the TSO lines, being those inside the TSO-derived boundary and built before 2001).

K14 We then looked to Chorus' treatment of capital costs as a way of arriving at appropriate assumptions regarding capital contributions.

K15 In the July 2015 UCLL further draft determination we also removed the cost of lead-in trenches within the TSO-derived boundary from the TSLRIC cost.[1558] This was on the basis that Chorus/Telecom had required the trench to be provided by the end-user, and that the hypothetical efficient operator would also be able to require a similar contribution.[1559]

K16 We also raised the issue of how to treat the current Chorus charge ($195) for the installation of new aerial lead-ins. According to Chorus, this charge for new copper

[1557] Chorus Infrastructure Group, "Chorus Standard Subdivision Policy" 23 April 2014, paragraph [2.1].

[1558] The Commerce Commission, ""Further draft pricing review determination for Chorus' unbundled copper local loop service", 2 July 2015, paragraph [1594.1.1].

[1559] Ibid, paragraphs [1613] and [1614].

connections was introduced in response to the 2013 UBA IPP determination.[1560] We said that we had not deducted from the TSLRIC cost the amount of money Chorus receives for the installation of aerial lead-ins (and for reticulating subdivisions), for two reasons:

K16.1 the link between the dollar amount collected by Chorus and the TSLRIC cost is not clear; and

K16.2 we had no historical information regarding what Chorus (or Telecom) had charged for aerial lead-ins in the past.[1561]

K17 We also said that, in our view, the hypothetical efficient operator would not incur the cost of trenching and reinstatement for post-December 2001 subdivisions (ie, lines that are within the TSO-derived boundary but were not connected at December 2001), and that these costs should be excluded from the TSLRIC cost.

K18 We invited submissions on how these charges should be taken into account.

**Key issues discussed in submissions and cross submissions**

K19 There have been several key issues that have been raised throughout the consultation process by submitters. They are set out and briefly introduced here, and further discussed below.

K19.1 **TSLRIC and "double recovery"**: Chorus submitted that a TSLRIC approach must take account of the replacement costs of all assets that the hypothetical efficient operator would deploy to provide the service Chorus is required to provide, and accordingly we are not permitted to deduct capital costs in calculating TSLRIC.[1562]

K19.2 **The TSO:** There was general agreement at the conference that the TSO-derived boundary was an acceptable proxy for the boundary beyond which a hypothetical efficient operator would not be required to extend its network without contribution.[1563] Chorus disagreed with the deduction of capital contributions, but said that in the event that they are to be deducted, the use of the TSO-derived boundary may be better than other

[1560] Chorus, "Submission for Chorus in response to Draft pricing review determination for Chorus' unbundled copper local loop and unbundled bitstream access services (2 July 2015)", 13 August 2015, paragraph [57].

[1561] The Commerce Commission, "Further draft pricing review determination for Chorus' unbundled copper local loop service", 2 July 2015, paragraphs [1625] and [1626].

[1562] Chorus, "Submission for Chorus in response to Draft pricing review determination for Chorus' unbundled copper local loop and unbundled bitstream access services (2 July 2015)", 3 August 2015 paragraph [55].

[1563] Although there was general agreement at the conference that this was a pragmatic approach – "UBA and UCLL pricing review determination conference transcript 15 – 17 April 2015", p. 448.

proxies.[1564] As noted below however, Chorus did raise an issue with the way in which network costs beyond the TSO-derived boundary were deducted.

K19.3 **One-off payment**: Chorus submitted that any deduction for capital contributions for network lying outside the TSO-derived boundary should be implemented as a one-off payment rather than assuming that further contributions would be received in the future and that these future replacement costs needed to be accounted for.

K19.4 **Underground lead-ins**: Chorus requires, and previously Telecom required, end-users to supply the trench and the pipe for underground lead-ins. This appears to have been the case since before 2001, and access seekers submitted that this should be excluded from the TSLRIC model.

K19.5 **Aerial lead-ins**: Chorus has recently introduced a charge ($195) for the provision of new aerial lead-ins and Access Seekers submitted that this should also be excluded from the TSLRIC model.

K19.6 **Subdivisions**: Chorus requires developers to provide the trench for reticulation in "low cost" subdivisions, and also to pay a cash contribution "per lot" to cover other costs. Access Seekers have submitted that this amount should also be excluded from the TSLRIC model of the network.

K19.7 **Subsidies – UFB, RBI and TSO**: Chorus has received subsidies for UFB deployment, RBI and historically Telecom received TSO payments. Access Seekers submitted that these should be taken into account.[1565]

**Analysis and final decisions**

K20 Capital contributions arise because network providers can require end-users or third parties to provide elements of their network (such as lead-in trenches) or to pay a cash contribution towards the cost of an asset.

K21 Where this occurs, we need to determine how to treat these capital contributions as part of our TSLRIC process. In considering the key issues raised in submissions and cross submissions throughout the FPP process, it is helpful to set out the relevant framework that we have used to review the treatment of capital contributions.

K22 As discussed in Chapter 2, we are required to determine the price according to the TSLRIC-based FPP.

K23 TSLRIC represents the efficient "forward-looking" costs incurred over the long run of supplying the service, taking into account the supply of other services.

[1564] Chorus, "Submission for Chorus in response to Draft pricing review determination for Chorus' unbundled copper local loop and unbundled bitstream access services (2 July 2015)", 3 August 2015 paragraph [56.1].

[1565] We note that RBI subsidies are discussed in the UBA final determination.

K24 We note that a network provider may consider imposing combinations of the following charges.

K24.1 Recurring charges (monthly rental) paid by wholesale customers (Access Seekers);

K24.2 Non-recurring service transaction charges (“NRC”, for example wholesale connection fees, or service transfer fees) paid by wholesale customers; and

K24.3 Non-recurring up-front contributions from end-users and third parties. In some instances, the end-user or third party contributes to an asset (eg, provides a trench to bury cable) rather than a making a cash payment.

K25 As discussed in the July 2015 UCLL further draft determination, there are a number of relevant TSLRIC objectives/outcomes to consider when looking at the treatment of capital contributions.

K25.1 Efficient cost recovery: TSLRIC-based prices are set so as to allow the service provider to recover only costs efficiently incurred. This implies no “forward-looking” double recovery by the hypothetical efficient operator.

K25.2 Efficient investment: TSLRIC-based prices providing incentives for the service provider to efficiently invest in the maintenance and expansion of its network, as well as efficient “build/buy” incentives for potential market entrants.

K26 We have also applied the section 18 purpose statement.

*Should we take capital contributions into account?*

K27 Chorus submitted that the TSLRIC must take account of the cost of all assets that would be used by the hypothetical efficient operator in supplying the regulated service. According to Chorus, “[c]apital contributions should therefore not be deducted from the modelled TSLRIC.”[1566]

K28 It is appropriate to assume that where the hypothetical efficient operator receives capital contributions, the hypothetical efficient operator should not be able to recover the same costs again as part of the monthly recurring charge.

K29 Putting it another way, we do not consider that a cost that is likely to be recovered by the hypothetical efficient operator separately from the regulated monthly recurring charge would normally be a relevant cost for the purpose of the TSLRIC exercise.

K30 This approach is consistent with the TSLRIC objectives of efficient cost recovery and efficient investment. Furthermore, in our view it would not promote competition for

[1566] Chorus “Submission for Chorus in response to Draft Pricing Review Determinations for Chorus’ Unbundled Copper Local Loop and Unbundled Bitstream Access Services (2 July 2015)”13 August 2015, paragraph [55].

the long-term benefit of end-users to permit Chorus to recover a cost that would be borne by end-users or third parties, distorting build/buy incentives.

K31 While TSLRIC is concerned with setting an objectively efficient price, and not directly concerned with the under- or over-recovery of historic investments, our approach also broadly fits with the Act's requirement that we take into account the provision of other services and avoid double recovery between services (clause 4B of Schedule 1).

K32 Consequently, our final view is that it is appropriate to take capital contributions into account when determining a TSLRIC price for the UCLL service as part of this pricing review determination.

*The TSO-derived boundary and capital contributions*

K33 As discussed in Chapter 2, we have been guided by the concept of a hypothetical efficient operator in order to implement the TSLRIC pricing principle.

K34 To ensure the hypothetical efficient operator is grounded in the real world, we consider that it is reasonable to assume that the hypothetical efficient operator would be subject to a form of service obligation.

K35 As noted above, it is appropriate to assume that the hypothetical efficient operator would be subject to the TSO obligations. That is, we consider the hypothetical efficient operator would be under a regulatory obligation to provide the TSO lines (lines connected to Telecom's network as of 2001). Our approach is consistent with the reference to TSO costs in the definition of "forward-looking common costs" in Schedule 1 of the Act.

K36 Chorus submitted that section 30S of the Act obliges it to supply any end-user with a metallic path facility (MPF), meaning that the entire network (including lines built since 2001) must be modelled without contributions being taken into account. However, we do not accept Chorus' argument that we must, as a matter of law, require that the hypothetical efficient operator build a network that encompasses the present STD footprint without being able to seek capital contributions. Taking into account the regulatory constraints just identified, we consider it a discretionary matter as to the scope of the network the hypothetical efficient operator builds. We also note that Chorus does seek contributions which we consider are a relevant factor in our assessment.

K37 Submissions from access seekers have broadly supported our approach.[1567]

K38 Chorus also stated that in the event that capital costs are to be deducted, the use of the TSO-derived boundary may be better than other proxies.[1568]

[1567] For example, Spark New Zealand in their submission "Further draft pricing review determination for Chorus' UBA and UCLL services", 13 August 2015 paragraph [255] and WIK-Consult "Submission in response to the Commerce Commission's "Further draft pricing review determination for Chorus' unbundled copper local loop service" including the revised cost model and its reference documents", 12 August 2015, paragraph [202].

K39 Having considered these submissions we continue to believe that it is appropriate to assume the TSO obligations would apply to the hypothetical efficient operator such that it would be required to provide the TSO lines.

K40 In order to inform our decisions in respect of where the hypothetical efficient operator would be likely to require a capital contribution we also considered Chorus practice, as this is an area where we found it appropriate to be guided by real-world practice.

K41 Based on this, in our July 2015 UCLL further draft determination, we said that the hypothetical efficient operator would be required to build, without end-user contributions, the network as it was in December 2001, except for certain lead-ins (discussed below).

K42 For "high cost" areas (by proxy, those outside the TSO-derived boundary), we noted that Chorus requires end-users to cover the costs of network extensions. We consider that it is appropriate to assume that the hypothetical efficient operator would take the same approach. Accordingly, we have excluded the capital costs of lines outside the TSO-derived boundary from our model.

K43 In deciding this we have considered that the cost of the capacity from the exchange to any end-user inside the TSO area is included in the monthly rental.[1569]

*Other contributions - underground lead-ins*

K44 Within the TSO-derived boundary, we have also considered whether there are certain capital costs for which the hypothetical efficient operator would require a capital contribution, and for which the cost should be excluded from our model.

K45 Chorus requires end-users to provide the lead-in trench and pipe. Chorus' August 2015 submission confirmed that this has been its (and previously Telecom's) practice since at least 2002, but said that evidence of the policy before that is sparse.

K46 This policy towards underground lead-ins raises the question as to whether this cost (for the trenching and pipe) should also be treated as a capital contribution that should be deducted from the TSLRIC model.[1570] Here we note the factual context is quite different to the context of aerial lead-ins (discussed below).

K47 Spark submitted that there is evidence that Chorus required a free trench before 2001, and we had previously found some evidence that indicated this had been the

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[1568] Chorus, "Submission for Chorus in response to Draft pricing review determination for Chorus' unbundled copper local loop and unbundled bitstream access services (2 July 2015)", 13 August 2015, paragraph [56.1].

[1569] The averaged monthly rental covers the cost of capacity for any connection inside the TSO-derived boundary. Capacity inside the TSO-derived boundary is therefore included in the rental paid by an end-user outside the TSO-derived boundary.

[1570] For example Vodafone NZ Ltd "Submission to the New Zealand Commerce Commission on Further Draft Pricing Review Determination for Chorus' Unbundled Local Loop Service and Further Pricing Review Determination for Chorus' Unbundled Bitstream Access Service", 13 August 2015, paragraph [K2.1].

case.[1571] Spark said that Chorus is incorrect to say that the historic record on lead-in trenches is sparse. Telecom/Chorus has had a clear policy going back to at least 1999 (according to the Telecom List of Charges or TLoC) that the end-user is responsible for providing the lead-in trench.[1572]

K48 According to Chorus:

K48.1 taking account of historic policies is not consistent with a “forward-looking” exercise;[1573]

K48.2 excluding capital costs outside the TSO-derived boundary as well as underground lead-ins will remove materially more cost than Chorus/Telecom has received in the past;[1574] and

K48.3 Chorus’ UFB policy is the best proxy for the hypothetical efficient operator seeking to shift existing demand onto its new network.[1575]

K49 In terms of Chorus’ argument that historic policies should not be considered in a “forward-looking” exercise, we have set out our views above for why we consider that the hypothetical efficient operator should not recover in the TSLRIC price a cost that would be borne by other parties. To ensure this, we have been guided by real-world practice, such as Chorus/Telecom’s long-standing policy relating to lead-in trenches.

K50 In terms of Chorus’ argument that we would be removing materially more cost than Chorus/Telecom has received in the past, we note that Chorus has not received cash contributions for underground lead-ins in the past (since at least 2002, and probably longer) because the end-user has had to provide the trench. In other words, Chorus has not received cash contributions for underground lead-ins in the past because Chorus has not incurred the cost of underground lead-ins (the end-user has). We have removed the TSLRIC cost of the parts of lead-in provision that were provided to Chorus (and Telecom previously) by third parties.

K51 Regarding Chorus’ UFB policy being the best proxy for the hypothetical efficient operator, Spark cross submitted that Crown Fibre Holdings’ website points out that the funding of drop-leads is required as part of the UFB initiative and that Chorus has signalled in its investor briefing that the funding policy will change at the end of the UFB contract.[1576] In addition, as Chorus has previously submitted, the UFB funding

[1571] Commerce Commission, “”Further draft pricing review determination for Chorus’ unbundled copper local loop service”, 2 July 2015, paragraph [1614], footnote 910.

[1572] Spark NZ’s cross-submission “Further draft pricing review determination for Chorus’ UBA and UCLL services” paragraphs [73]–[77].

[1573] Chorus, “Submission for Chorus in response to Draft pricing review determination for Chorus’ unbundled copper local loop and unbundled bitstream access services (2 July 2015)”, 13 August 2015, paragraph [57].

[1574] Ibid, paragraph [57], [58].

[1575] Ibid. paragraphs [56.2], [77].

[1576] Spark NZ’s cross-submission “Further draft pricing review determination for Chorus’ UBA and UCLL services” paragraphs [69]–[72].

arrangement is designed to accelerate fibre deployment "in a context where demand was served from an existing copper network".[1577] By contrast, as discussed below, the hypothetical efficient operator is not faced with the need to shift existing demand from copper to fibre. As a result, we do not consider that Chorus' UFB connection policy is informative in the current context.

K52 Spark submitted that the end-user contribution goes beyond trenching (specifically including conduit, trench, and external termination point (ETP)).[1578] In implementing our decision we have excluded the costs of the trench, conduit and ETP from the model.

K53 We conclude that it is likely that the hypothetical efficient operator would require that the trench and pipe for underground lead-ins to be supplied by the end-user, and therefore our final decision is to exclude the cost of all lead-in trenches (including trench, conduit, and ETP) from our TSLRIC model.

*Other contributions - aerial lead-ins*

K54 Premises can be connected to the local telecommunications network via underground or aerial lead-ins. Chorus recently began charging $195 for the installation of a new aerial lead-in.[1579] This raises the question as to whether this charge should also be treated as a capital contribution that should be deducted from the TSLRIC model.[1580]

K55 We have decided not to make any deduction to account for Chorus' charge ($195) for new aerial lead-ins inside the TSO-derived boundary for the following reasons:

K55.1 Chorus is currently deploying very little new aerial copper network, so very few new aerial lead-ins will have been deployed.[1581] The aerial policy is a relatively recent development, and is unlikely to have been applied extensively.[1582] This limits the evidentiary value of the $195 charge as a payment which would be received by the hypothetical efficient operator on a national basis.

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1577 Chorus "Cross-submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and Process and Issues Update Paper for the UCLL and UBA Pricing Review Determinations", 20 March 2015, paragraph [115].

1578 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services", 13 August 2015, paragraph [264].

1579 This was stated in Chorus' most recent submission, "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services (2 July 2015)"13 August 2015, paragraph [76.2]

1580 Spark New Zealand in their submission "Further draft pricing review determination for Chorus' UBA and UCLL services", 13 August 2015 paragraph [265]-[268], and Chorus' "Cross-submission for Chorus in response to Draft Pricing Review Determination for Chorus' Unbundled Copper Local Loop Service and Unbundled Bitstream Access Services (2 July 2015)", 24 September 2015, [50].

1581 Chorus, "Submission on Commission's framework and modelling approach", 6 August 2014, paragraph [60].

1582 This is in contrast to the situation regarding underground lead-ins, where, as discussed above, there has been a long-standing policy which has been widely applied.

K55.2 Since Chorus is likely deploying very little new aerial copper network, new aerial lead-ins will be low cost, since they will use elements of the network that are already in place (for example poles). It is therefore difficult to link Chorus' costs for a new aerial lead-in with elements of our TSLRIC model. This also limits the evidentiary value of the $195 charge.

K56 In reaching this view we have noted that Chorus' policy towards this is relatively recent. We have not assessed the appropriateness or legality of this charge, but note that we have other powers with which we can respond to this policy if this became appropriate.[1583]

*Other contributions - subdivisions*

K57 For modelling purposes we define a subdivision created after December 2001 as a road segment where at least 75% of the buildings were built after December 2001.[1584] We do not need to define pre-2001 subdivisions for modelling purposes. Buildings built after 2001, and therefore outside this criterion are regarded as "infill". Thus, all post-2001 connections are either parts of subdivisions or are "infill".

K58 Chorus requires developers of new subdivisions to provide a free trench for its network deployment (including any reinstatement) and a cash payment per subdivided section to cover "other costs".[1585]

K59 In our July 2015 further draft determination, we proposed to exclude from the TSLRIC cost the cost of trenching in subdivisions post-December 2001.

K60 For the treatment of subdivisions, we are guided by the Chorus (and previously Telecom) subdivision policy as an indication of what a hypothetical efficient operator would do. As with our other decisions on capital contributions, we consider this to be a pragmatic approach and consistent with our concerns regarding over-recovery. This approach is also consistent with our decision to assume, as set out in paragraph K35, that the hypothetical efficient operator is subject to the TSO obligations, which apply to pre-2001 lines.[1586]

K61 Accordingly, for new subdivisions (since 2001) inside the TSO-derived boundary we deduct from the modelled costs the capital cost of the trench (and any reinstatement) to deploy the distribution network (ie, the shared distribution down the street).[1587] As we explained in paragraph K35, we believe it is appropriate to

[1583] For instance, we could act under section 66 of the Act and its Schedule 3 powers.

[1584] TERA, "TSLRIC price review determination for the Unbundled Local Loop and the Unbundled Bitstream Access services, Model Specification" December 2015, paragraph [4.3.4.6].

[1585] Chorus Infrastructure Group, "Chorus Standard Subdivision Policy" (confidential).

[1586] We recognize that subdivisions have developed over a period of time, and that the application of the hypothetical is therefore not as simple as in other instances.

[1587] We make no deduction in respect of the cash contribution that Chorus requires developers pay, consistent with our view in our December 2014 draft determination and our July 2015 further draft determination.

assume that the hypothetical efficient operator is subject to the TSO, which applies to pre-2001 lines.[1588]

K62 For subdivisions before 2001 inside the TSO-derived boundary we make no deduction from the modelled costs of the distribution network. We have assumed that the hypothetical efficient operator would be obliged to supply these lines, and would not demand a capital contribution.

*Other contributions - subsidies*

K63 Spark, in its August 2015 submission, argued that we should also take into account the contributions made by the government to Chorus' deployment of an FTTH network under the UFB. According to these submissions, the subsidy received by Chorus should be taken into account in the TSLRIC model, as Spark said it is relevant to the network footprint and deployment.[1589] Spark argued that the hypothetical efficient operator would not build a FTTH network to more than 65% of the country without the UFB subsidy, nor would it build FTTN to remote rural areas without RBI subsidies. If we model the cost of the additional lines, we should also take account of the subsidies.

K64 However, in our view the UFB funding is not relevant to the current TSLRIC exercise, for the reasons below.

K64.1 UFB funding by the government has the objective of accelerating the deployment of FTTH to at least 75% of New Zealanders. The government UFB assistance partially funds the construction cost of the UFB network for the period from its construction until end-users migrate to it. In other words the government assistance reduces the actual interest cost that the actual time for migration entails for the UFB providers. Our TSLRIC modelling in contrast assumes instantaneous acquisition of all end-users and thus assumes that there is no such cost. Thus the government assistance is directed at covering a real-world cost that is not taken into account in our modelling. Since the real-world cost is not incorporated in our modelling there is no case for inclusion in the modelling of the government assistance that reduces this real-world cost.

K64.2 UFB funding is intended by the government as a mechanism to speed up the replacement of the existing copper network, so it is not relevant to our hypothetical efficient operator.

[1588] Where a subdivision occurs inside an area covered by FWA, the hypothetical efficient operator requires the usual free trench plus the cost of capacity to the existing fixed network.

[1589] Spark New Zealand in their submission "Further draft pricing review determination for Chorus' UBA and UCLL services", 13 August 2015 paragraph [277].

K64.3 Deducting the full amount of the government contribution to the UFB programme from the TSLRIC through the monthly rental, could be seen as negating or undermining the intention of the subsidy.[1590]

K65 As a result, we do not consider that the government funding contribution to the UFB programme is relevant to the determination of a TSLRIC-based price for the UCLL service.

K66 In addition, Vodafone submitted that TSO payments should be deducted from the capital cost of the network.[1591]

K67 TSO payments were made annually to (the vertically-integrated) Telecom from 2001 until 2010 to compensate it for the net cost of providing service to commercially non-viable customers who were connected as of December 2001. These payments are not currently being made, and the hypothetical efficient operator would not be able to receive them.

K68 We therefore do not consider that the TSO payments received by Telecom are relevant in the determination of a TSLRIC-based price for the UCLL service.

K69 RBI has provided a subsidy to Chorus (and also to Vodafone) to fund the upgrading of cabinets in rural areas where it would otherwise be uneconomic to do this. The RBI programme is a government initiative to improve the quality of broadband available in rural areas, and RBI funds were allocated on the basis of a tender. The RBI subsidy was not applied to improving the performance of the local access network (the copper between the cabinets and end-users), and is therefore not relevant to the provision of UCLL, however it is relevant to the provision of UBA, and is discussed in more detail within the UBA final determination.[1592]

*One-off payments*

K70 In relation to the use of the TSO-derived boundary as a proxy beyond which capital contributions would be received, Chorus submitted that we should implement the capital contributions as a one-off payment (rather than excluding them from our model entirely). Chorus submitted that we should not assume that the hypothetical

[1590] A subsidy has been provided by government through a competitive tender to Chorus for the provision of services, in the case of UFB, these are non-regulated services. Where we subsequently to reduce regulated revenues on other services by the size of the subsidy, it would mean the receiver of the subsidy would be financially no different to the situation in which no subsidy was granted. This situation is complicated where the subsidy was linked to building assets which affected the size of the regulatory asset valuation (and consequently regulated prices), this situation has not arisen in relation to UCLL but has in relation to UBA and we discuss this in more detail under the RBI subsidy in the UBA determination.

[1591] "Vodafone New Zealand Ltd cross-submission to the Commerce Commission on submissions to the process paper and draft price reviews for Chorus' unbundled copper local loop and unbundles bitstream access services (excluding TSO-derived boundary considerations)", 20 March 2015, Recommendation 20.

[1592] The Rural Broadband Initiative, as applied to Chorus, provided funding primarily targeted at improving broadband in rural areas, by upgrading the feeders to cabinets to optical fibre, thus enabling the cabinets and the DSLAMs to be upgraded.

efficient operator would receive further contributions to fund the future replacement of the network.[1593]

K71 We considered whether any further adjustment to account for future replacement of the network was justified.

K72 We consider that there is some merit in Chorus' argument; however we note that the network assets have a relatively long life and there is considerable uncertainty over the circumstances that would apply when the network beyond the TSO-derived boundary would need to be replaced. On balance, we do not consider it appropriate to account for future replacement costs and have made no further adjustment to reflect this approach.

[1593] Chorus, "Submission for Chorus in response to Draft pricing review determination for Chorus' unbundled copper local loop and unbundled bitstream access services (2 July 2015)", 13 August 2015, para [69.2].

# Attachment L: Modelling basis for taxation

### Purpose

L1 This Attachment sets out in more detail our reasons for our final decision relating to our modelling basis for taxation.[1594] The modelling basis for taxation describes how we treat corporate income tax in our TSLRIC model.

### Our final decision

L2 Our final decision is that the TSLRIC-based price will be a pre-tax amount. Given that the price we derive is a pre-tax amount, our final decision is that our TSLRIC model will adjust the tilted annuity capital charges for each type of asset by taking into account an appropriate tax depreciation rate. This is the same approach as presented in our July 2015 UCLL further draft determination paper, December 2014 UCLL draft determination paper and July 2014 regulatory framework and modelling approach paper.[1595]

L3 The reason for our final decision is to ensure that the result is not an inaccurate TSLRIC-based price due to an over-estimation of the tax position of the hypothetical efficient operator, which would occur if the tax model adopted a simple pre-tax calculation that assumed the corporate tax rate.[1596] This is consistent with our framework for carrying out the pricing review.

### Relevance of the modelling basis for taxation to TSLRIC

L4 As the hypothetical efficient operator would be subject to corporate income tax on its earnings, how we estimate and treat its tax obligations in our TSLRIC model will impact the TSLRIC price. It is important that we adopt a realistic approach to taxation to avoid setting a TSLRIC price which is too high or too low.

L5 As the hypothetical efficient operator's network is capital intense, it will be able to significantly reduce its tax obligations by deducting depreciation expenses. Hence we have considered how our TSLRIC model should account for the tax benefits of depreciation deductions.

### Overview of the modelling basis for taxation to TSLRIC

L6 In order to derive a price that is a pre-tax amount, our TSLRIC model adjusts the tilted annuity capital charges for each type of asset by taking into account an appropriate tax depreciation rate.

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1594 This section does not relate to industry levies, fees, licences, council rates and other such expenses that are paid to or collected by government bodies (eg, councils). These expenses are covered in Attachment M - Operating expenditure.

1595 Commerce Commission "Consultation paper outlining our proposed view on regulatory framework and modelling approach for UBA and UCLL services" 9 July 2014 paragraphs [253-258].

1596 In New Zealand, a firm can reduce its taxation payments by deducting depreciation from the taxable earnings. This depreciation tax shield is computed as the amount of allowable depreciation multiplied by the tax rate. The use of accelerated depreciation methods during the early years of an asset's life will provide for a greater tax shield during the asset's early life and hence increase the NPV of the tax shield.

L7 Our approach for the tax adjustment is the sum of the full (infinite life) stream of diminishing value depreciation allowances (ie, the sum of a power series).[1597]

L8 We sourced the diminishing value tax deprecation rates for each asset class defined in our TSLRIC model from the IRD.[1598] We matched the asset classes defined in our TSLRIC model with the asset classes defined by IRD. For those asset classes defined in our model and not explicitly defined by TERA, we considered the default tax depreciation rate provided by IRD.[1599]

L9 Our matching exercise, and the resulting diminishing value used for each asset class, is published as a separate document with this final determination.[1600]

**Our July 2014 consultation on the treatment of tax**

*Overview of our July 2014 consultation and response*

L10 We received several submissions and cross submissions on our July 2014 regulatory framework and modelling approach paper that presented our proposed pre-tax approach. We responded to these submissions in the December 2014 UCLL draft determination paper. Our December 2014 UCLL draft determination paper presented a new explanation of how we adjust the pre-tax annuity factor used to calculate the tilted annuity capital charges.

*Transparency of our model*

L11 Vodafone and Spark, as well as WIK, and Network Strategies (for Vodafone and Telecom), submitted that it was unclear how we proposed to model tax related cash flows and the use of nominal and real cost through the model.[1601]

L12 In response, in our December 2014 UCLL draft determination paper, our July 2015 UCLL further draft determination paper, and now in our final determination, we further explain our approach to provide more transparency.

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1597 Further explanation of our view on tax adjustments is in Commerce Commission “Consultation paper outlining our proposed view on regulatory framework and modelling approach for UBA and UCLL services” 9 July 2014, Attachment A.

1598 http://www.ird.govt.nz/resources/6/5/6576ff004ba3cf748844bd9ef8e4b077/ir265.pdf.

1599 We note that the model groups land and buildings together with the same depreciation rate, although in practice land is not depreciable for tax purposes.

1600 This document shows the tax depreciation rates that we used in our TSLRIC model. It is unchanged from the when we published it with our December 2014 UCLL draft determination paper.

1601 Spark New Zealand "UCLL and UBA FPP: consultation on regulatory framework and modelling approach - Cross-submission Commerce Commission" 6 August 2014, paragraphs [143]-[145]; Network Strategies "Final report for Telecom New Zealand and Vodafone New Zealand - Key issues in modelling UBA and UCLL services - Commission consultation on regulatory framework and modelling approaches for FPP process" 6 August 2014, p. 55-56; WIK-Consult "Report for Telecom New Zealand and Vodafone New Zealand - Submission - In response to the Commerce Commission’s ‘Consultation paper outlining our proposed view on regulatory framework and modelling approach for UBA and UCLL services (9 July 2014)’" 5 August 2014, paragraphs [70]-[71]; Vodafone NZ "Submission to the New Zealand Commerce Commission - Comments on Consultation paper outlining Commission's proposed view on regulatory framework and modelling approach for UBA and UCLL services" 6 August 2014, section G.

*Use of pre-tax values and WACC*

L13 WIK submitted that it is common international practice to apply adjustments for tax in the WACC, but that our tax approach is unusual, and proposed an alternative formula.[1602]

L14 Vodafone submitted that tax adjustments should be made within the WACC formula, as corporate taxes impinge on the return on equity capital.[1603] Network Strategies recommended using a pre-tax WACC approach.[1604]

L15 Our response is that our tax approach and an approach to apply tax adjustments for tax in the WACC will result in an equivalent outcome. Our approach applies another way of adjusting for tax in the WACC.

L16 In its cross submission, Chorus confirmed this view:[1605]

> The derivation of this formula is not provided by the Commission which is perhaps why WIK and Vodafone appear not to understand it. However, it is useful to note that dividing a post-tax WACC of the above form by (1-t), which the Commission formula does, gives the same formula as WIK proposes in equation 13 reproduced above.

L17 Chorus also argued in its cross submission that:[1606]

> WIK and Vodafone's responses to the Commission's proposals on modelling the cost of tax appear to be based on the incorrect belief that a simple transformation of the WACC can be used to account for the fact that tax depreciation differs from the actual rate at which capital is returned (depreciated) within the tilted annuity.
>
> ….WIK and Vodafone are incorrect in relation to the second dot point. Differences between the rate of tax depreciation and regulatory depreciation (return of capital) must be accounted for separately – which is what the Commission's formula attempts to do.

L18 We agree and note that our proposed formula accounts for the differences between regulatory depreciation and tax depreciation.

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[1602] WIK-Consult "Report for Telecom New Zealand and Vodafone New Zealand - Submission - In response to the Commerce Commission's 'Consultation paper outlining our proposed view on regulatory framework and modelling approach for UBA and UCLL services (9 July 2014)'" 5 August 2014, paragraph [71]. Also see paragraphs [59]-[69].

[1603] Vodafone NZ "Submission to the New Zealand Commerce Commission - Comments on Consultation paper outlining Commission's proposed view on regulatory framework and modelling approach for UBA and UCLL services" 6 August 2014, Section G9.

[1604] Network Strategies "Final report for Telecom New Zealand and Vodafone New Zealand - Key issues in modelling UBA and UCLL services - Commission consultation on regulatory framework and modelling approaches for FPP process" 6 August 2014, p. 53-54. Network Strategies also submitted that our proposed approach is different to the approach used in TSO determinations. We agree. In the TSO determinations, we used the post-tax nominal WACC based on corporate tax.

[1605] Chorus "Cross-submission in response to the Commerce Commission's Consultation paper outlining its proposed view on the regulatory framework and modelling approach for UBA and UCLL services (9 July 2014)" 20 August 2014, paragraphs [118] and [150].

[1606] Chorus "Cross-submission in response to the Commerce Commission's Consultation paper outlining its proposed view on the regulatory framework and modelling approach for UBA and UCLL services (9 July 2014)" 20 August 2014, paragraphs [117]-[119].

*Use of Excel PMT function*

L19 Analysys Mason, for Chorus, argued that if we adopt a software implementation using the Excel PMT function for defining the annuity calculation, we need to provide arguments for doing so to avoid the potential for later debate.[1607,1608]

L20 Our response is that the Excel PMT function is a widely used and tested function that provides for transparency. We have adopted the Excel PMT function in our annuity calculation. In implementing the Excel PMT function we set the “type” parameter at “0” to indicate that payments are due at the end of each period.

*Notional tax position of the hypothetical network operator*

L21 Chorus argued that our proposed approach assumes that 100% of interest and depreciation tax deductions will be deducted in the year they occur, and that this meant that our tax model assumed that there is a zero probability of the hypothetical efficient operator ever being in a tax loss position. Chorus argued that this may not be reasonable.[1609]

L22 In its cross submission, Network Strategies also argued that our approach implicitly assumes that the hypothetical efficient operator is not in a tax loss situation and submitted that it is a common approach in TSLRIC modelling. Network Strategies recommended that we make an explicit statement on the assumed tax situation of the hypothetical efficient operator.[1610]

L23 In the December 2014 UCLL draft determination paper, we responded that our approach provides for the notional tax position of the hypothetical efficient operator because:

L23.1 the price that we set is based on a subset of the notional tax position of the hypothetical operator. The overall tax position of the hypothetical efficient operator will include a wider group of other telecommunications services. Within this wider group of services there may be some subsets that incur tax losses, even when the hypothetical efficient operator’s overall tax position is positive. This is consistent with the definition of TSLRIC referring to “the service provider’s provision of other telecommunication services”; and

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1607 Analysys Mason "Report for Chorus - Response to Commission consultation on regulatory framework and modelling approach for UCLL and UBA" 6 August 2014, section 1.19.

1608 PMT is a Microsoft Excel function that calculates the payment for a loan based on a specified number of constant payments, and a constant interest rate.

1609 Chorus "Submission in response to the Commerce Commission’s Consultation paper outlining its proposed view on the regulatory framework and modelling approach for UBA and UCLL services (9 July 2014)" 6 August 2014, paragraphs [141]-[144].

1610 Network Strategies "Final report for Spark New Zealand and Vodafone New Zealand - Cross-submission for consultation on UCLL and UBA FPP regulatory framework - A review of selected issues in submissions on the Commission’s consultation paper of 9 July 2014" 20 August 2014, paragraph [7.2].

L23.2 from a section 18 purpose statement perspective, it is difficult to see why the competitive market price is likely to be dependent on the tax position of a particular market participant.

**Submission on our December 2014 UCLL draft determination paper**

L24 In response to our December 2014 consultation, Chorus submitted:[1611]

> We generally agree with the Commission's approach to tax, save of its position on the valuation of deductions.

L25 Chorus raised several issues about how our model treated tax losses and argued that we should adopt more realistic assumptions regarding the hypothetical efficient operator's business.[1612,1613]

*Overall tax position of the hypothetical efficient operator group*

L26 Chorus did not support our view that that the overall tax position of the hypothetical efficient operator should include a wider group of telecommunications services.

L27 We consider that our view of the hypothetical efficient operator being part of a business with a wider group of services is consistent with the definition of TSLRIC referring to *"*the service provider's provision of other telecommunication services*"*.

L28 We also consider that this view is realistic since Chorus provides multiple services.[1614] Therefore, we do not agree with Chorus that our view "stretches the hypothetical framework too far".[1615]

L29 Chorus also submitted that our view "does not recognise the reality that even multi-operations business can nevertheless make an overall tax loss at various times".[1616]

L30 We note that Chorus's financial statements show that it has paid tax for each year since it was separated from Spark/Telecom and that prior to separation the Telecom group was profitable.[1617]

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1611 Chorus "Submission in response to the Commerce Commission's Draft Pricing Review Determinations for Chorus' UBA and UCLL services (9 July 2014)" 2 December 2014, paragraph [310].

1612 Chorus "Submission in response to the Commerce Commission's Draft Pricing Review Determinations for Chorus' UBA and UCLL services (9 July 2014)" 2 December 2014, paragraph [311].

1613 Chorus also proposed an amendment to the PMT formula used in our explanation of our modelling basis for taxation (Chorus "Submission in response to the Commerce Commission's Draft Pricing Review Determinations for Chorus' UBA and UCLL services (9 July 2014)" 2 December 2014, paragraph 317). We agree with Chorus' proposal, but note that this issue does not affect the worked example of our tax model that we previously released (Tax- model-30-September-2014).

1614 For example, on https://www.chorus.co.nz/our-products#cs-166195, Chorus lists its services as including commercial access to our exchanges, poles and other infrastructure, transport services, development and testing facilities, businesses phone and broadband services over copper and fibre including dark fibre and grey fibre, and phone and broadband services over copper and fibre for residential customers (url referenced 9 June 2016).

1615 Chorus "Submission in response to the Commerce Commission's Draft Pricing Review Determinations for Chorus' UBA and UCLL services (9 July 2014)" 2 December 2014, paragraph [315].

1616 Chorus "Submission in response to the Commerce Commission's Draft Pricing Review Determinations for Chorus' UBA and UCLL services (9 July 2014)" 2 December 2014, paragraph [315.3].

L31 Our TSLRIC model is designed to provide a long-term price and, therefore, reflects long-term positions, even if there are short term variances. We note that in practice while some firms may incur a tax loss at some times, at other times these firms may experience larger than average tax profits, and/or use accounting and tax planning techniques to influence specific year's tax positions.

*Assumed tax loss during initial years*

L32 Chorus stated that the Commission's model indicates that taxable income relating to the UCLL and UBA service is negative for the first three years.

L33 Chorus' submission referred to row 22 of our Excel model "Tax- model-30-September-2014" to support this statement.[1618,1619] This model was a hypothetical example that we provided to explain our taxation methodology and to illustrate how the formula works. The example showed an initial tax loss for an individual project, and was not intended to show the overall tax position of the hypothetical efficient operator.

L34 As we explained in paragraph L23.2 of this Attachment, we consider that the notional tax position of the hypothetical efficient operator should be viewed in the context of the group's wider tax position. Therefore, any initial tax losses could generally be used to offset other tax obligations, rather than carried forward. We consider that this is realistic, as it reflects how many companies operate.

*Other new businesses making tax losses*

L35 In response to our view that the overall tax position of the hypothetical efficient operator will include a wider group of other telecommunications services, Chorus submitted "if the HEO is also simultaneously entering other business lines then these business lines will add to the tax loss problem".[1620]

L36 If this scenario was to arise, we would expect that the hypothetical efficient operator's management would have assessed the long run profitability and tax implications of the new business before investing. In doing so management should have considered matters such as taxation and made decisions to minimise the risk of taxation problems.

L37 We note that this argument relies on a hypothetical example that makes additional assumptions about the timing, scope and tax position of the hypothetical efficient operator's businesses. These new assumptions are outside of the scope typically included in TSLRIC models.

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[1617] Chorus' financial statements showed that it had income tax expenses of $36 million in 2015, $58 million in 2014, $65 million in 2013 and $40 million in 2012.

[1618] Chorus "Submission in response to the Commerce Commission's Draft Pricing Review Determinations for Chorus' UBA and UCLL services (9 July 2014)" 2 December 2014, paragraph [313].

[1619] This Excel model can be found on our website at http://www.comcom.govt.nz/regulated-industries/telecommunications/regulated-services/standard-terms-determinations/unbundled-copper-local-loop-and-unbundled-bitstream-access-services-final-pricing-principle/.

[1620] Chorus "Submission in response to the Commerce Commission's Draft Pricing Review Determinations for Chorus' UBA and UCLL services (9 July 2014)" 2 December 2014, paragraph [315.2].

L38 We consider that Chorus' example is hypothetical, and deals with an issue outside of the scope of our pricing review.

*Modelling of tax costs*

L39 Chorus submitted that we should model tax costs explicitly within our model by accumulating any early tax losses and offsetting them against later tax liabilities. Chorus also submitted that if we did not do so then we should scale up asset values for early tax losses.[1621] Both of Chorus' proposals assume that there are initial tax losses, and that these losses are carried forward into later years, rather than used to offset other tax obligations.

L40 We consider that the proposed model changes are unnecessary.

L40.1 We consider that the notional tax position of the hypothetical efficient operator should be viewed in the context of the group's wider tax position. Therefore, any initial tax losses could generally be used to offset other tax obligations, rather than carried forward. We consider that this is realistic, as it reflects how many companies operate.

L40.2 We do not consider it necessary to model the "costs" of carrying forward any tax loss, when any such tax loss (and in particular the tax depreciation shield) is notional to the hypothetical efficient operator, and not necessarily reflective of an existing network operator's tax position.[1622]

L41 Therefore, we do not consider that there is a need to separately model the hypothetical efficient operator's tax payments in the TSLRIC model or to scale up asset values for possible initial tax losses.

*Separating tax costs from other costs*

L42 In questioning our approach to tax, Chorus submitted:[1623]

> For the purposes of estimating price to be set adopting a TSLRIC methodology, it is the competition of the HEO ... which must be considered. Therefore, it is the costs of the HEO, including its tax costs, which must be considered in the same way the capex and opex of the HEO must be considered. There is no principled basis to distinguish tax costs from the HEO's other costs.

L43 Our response to the first two sentences of the above quote is that it is not clear why if Chorus submitted that we must consider the "competition of the HEO" in estimating the TSLRIC price that we should therefore consider the hypothetical efficient operator's costs, rather than the competitors' actual or potential costs. We consider that, if we were to take account of the competition's possible impact on

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[1621] Chorus "Submission in response to the Commerce Commission's Draft Pricing Review Determinations for Chorus' UBA and UCLL services (9 July 2014)" 2 December 2014, paragraph [316].

[1622] A tax depreciation shield is the reduction in income tax that arises from deducting depreciation expense when calculating taxable income.

[1623] Chorus "Submission in response to the Commerce Commission's Draft Pricing Review Determinations for Chorus' UBA and UCLL services (9 July 2014)" 2 December 2014, paragraph [315.4].

market prices, we should examine the competition's costs (eg, as would be done using the economic theory of setting price based on the cost of a potential market entrant).

L44 In regard to Chorus' last sentence, we consider that it is appropriate to use a pre-tax approach that treats the hypothetical efficient operator's income tax costs differently to opex and capex. This recognises that within the TSLRIC model the opex and capex costs are determined by different approaches such as engineering rules, efficiency adjustments and cost-volume relationships. On the other hand, income tax is accounted for using financial formulae that include factors such as the post-tax WACC. Chorus in its submissions did not object in principle to the inclusion of tax as a parameter in setting the annuity factor or the post-tax WACC.

**Submission on our July 2015 UCLL further draft determination paper**

L45 The submissions and cross submissions on our July 2015 further draft determination paper did not comment on the specifics of our approach to taxation. This supported our maintaining our position that the TSLRIC-based price we derive will be a pre-tax amount as we presented it in our July 2015 further draft determination paper.

# Attachment M: Operating expenditure

### Purpose

M1 In this Attachment we explain our final decisions regarding the treatment of operating expenditure (opex) in our TSLRIC model for the UCLL service.

M2 In particular, we:

M2.1 outline our final decisions in respect of opex in our TSLRIC model for the UCLL service;

M2.2 explain the relevance of opex to TSLRIC and the terminology we use in this Attachment;

M2.3 describe our starting point for determining opex in our TSLRIC model of the FTTH/FWA network;

M2.4 describe the adjustments we have made (where applicable) to this starting point opex; and

M2.5 explain our approach for determining opex in our modelled copper network (where the modelled copper network allows us to compare against the costs of the FTTH/FWA network and to consider whether a MEA adjustment is appropriate).

M3 We note that the discussion in this Attachment is at a relatively high level. TERA has built a separate model to calculate the opex that is used as an input into the TSLRIC model, and the opex model has a number of detailed implementation aspects. We have discussed the implementation of the opex model with TERA, and we agree with the specific details of the model. For a discussion of the detailed treatment of opex in this model see TERA's Model Specification and Model Documentation papers.[1624, 1625]

### Our final decisions

M4 Our final decisions and reasons in respect of opex for the UCLL service are set out as follows.

M4.1 On the hypothetical efficient operator's FTTH network, our starting point is Chorus data on network opex for its copper network, as we consider this provides the best objective starting point for estimating the network opex for a nationwide fixed line telecommunications network in New Zealand.

[1624] TERA Consultants "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services: – Model Specification" December 2015, section [2].

[1625] TERA Consultants "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services: – Model documentation" December 2015, section [3].

M4.2 On the hypothetical efficient operator's FWA network, our starting point is Vodafone data on network opex for its RBI network, as we consider this provides the best objective starting point for network opex on a fixed wireless network in New Zealand.

M4.3 For the non-network opex associated with operating the telecommunications business of the hypothetical efficient operator itself, our starting point is Chorus data on its non-network opex, as we consider this provides the best objective starting point for estimating the non-network opex of a nationwide telecommunications company in New Zealand.

M4.4 In respect of Chorus' network opex, we applied an upwards adjustment to Chorus' network maintenance opex by a multiplier of 111% based on line fault indexes (LFIs). We consider that this adjustment is warranted because our hypothetical efficient operator's FTTH network has a larger proportion of aerial deployment relative to Chorus' copper network, which would likely lead to higher line faults. The LFI data that we have used to determine the 111% figure and make this adjustment is the best objective evidence that we have available.

M4.5 We have then scaled down the adjusted maintenance opex and the remainder of Chorus' network opex by a factor of 40%,[1626] because we consider that this adjustment is required to reflect the likely lower network opex that can be achieved on our hypothetical efficient operator's new FTTH access network as compared to Chorus' copper access network. The 40% figure that we have used to make this adjustment is based on the best objective evidence that we have available.

M4.6 We made no further adjustments to Chorus' non-network opex, as we consider that this provides the appropriate level of non-network opex of our hypothetical efficient operator. For further discussion of this see Attachment N – Cost allocation.

M4.7 We also made no further adjustments to the Vodafone RBI opex, as we consider that this provides the appropriate opex level for the FWA network opex of our hypothetical efficient operator.

**Relevance of opex to TSLRIC**

M5 Our TSLRIC model seeks to reflect all of the forward-looking long run incremental costs of the telecommunications network that we model. This includes the ongoing costs of operating the telecommunications network on a day-to-day basis, and the costs of operating the telecommunications company itself. Accordingly, determining the appropriate level of this operating expenditure is an important input in to the TSLRIC model.

[1626] Overall the net effect on Chorus' maintenance opex is a downwards adjustment. That is, the downwards adjustment for a new FTTH more than offsets the upwards adjustment for aerial deployment.

### Terminology

M6 In broad terms, operating expenditure (opex) relates to costs incurred by the hypothetical efficient operator for the ongoing operation of its business. It contrasts with capital expenditure (capex) which relates to costs incurred by the hypothetical efficient operator in building its network, and also contrasts with costs such as those associated with financing (eg, interest) and income tax costs. In this Attachment, we only consider opex.

M7 We have classified opex into network opex and non-network opex. Network opex relates to the ongoing costs that are directly incurred in providing services associated with the telecommunications network itself. This includes network repairs and maintenance, and the electricity, insurance, council rates and rents incurred in operating network infrastructure.

M8 Non-network opex are the ongoing costs that are not directly incurred in providing services associated with the telecommunications network, but are nonetheless required to operate a telecommunications company. Non-network opex may include the wages and salaries of non-operation staff, rent for corporate head offices, advertising, and regulatory levies (such as the Telecommunications Development Levy).

### Our starting point for assessing network opex for the FTTH network and non-network opex

M9 Throughout our FPP process we have considered what the best starting point to derive the estimated network opex is and the non-network opex of the hypothetical efficient operator is.[1627]

M10 Chorus has supported the use of its operating costs as a starting point to assess network and non-network opex for the hypothetical efficient operator. In particular, Chorus submitted that these costs provide the best available evidence of a nationwide fixed line telecommunications operator in New Zealand, regardless of the choice of MEA.[1628]

M11 In contrast, WIK submitted that relying on the use of Chorus' accounting information on opex in a bottom-up cost model is questionable, noting that opex from Chorus' copper network provides no information on the relevant costs of the MEA

[1627] See, for example, Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014, paragraphs [342]-[345].

[1628] Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and Process and Issues Update Paper for the UCLL and UBA Pricing Review Determinations" CONFIDENTIAL, 20 February 2015, paragraph [166]. See also Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services - Public version (2 July 2015)" 13 August 2015, paragraph [137].

network.[1629] WIK and Spark also submitted that the use of Chorus' accounting data results in a top-down approach to what is intended to be a bottom-up model.[1630, 1631]

M12 As an alternative, WIK considered a mark-up on capex approach to be superior, with the mark-ups derived from international benchmarks.[1632] WIK submitted that this approach would provide a more coherent fit with our choice of MEA network.

M13 Analysys Mason submitted that, WIK's proposed approach would in fact result in benchmark networks being different from the network modelled.[1633] Analysys Mason also noted that the mark-up on capex approach could have cost allocation issues if implemented crudely.

M14 We disagree with WIK. Consistent with our regulatory framework that evidence often drives our modelling decisions, we believe that Chorus' operating costs are the best objective starting point for estimating the network opex for a nationwide fixed line telecommunications network in New Zealand. As the modelled opex needs to be consistent with New Zealand conditions, the best evidence of this is opex available from an existing New Zealand telecommunications provider. International benchmarks applied under the mark-up on capex approach may not necessarily be representative of New Zealand conditions.[1634]

M15 For this reason, our final decision is to use Chorus' network opex as the starting point to assess opex for the FTTH network in our TSLRIC model.

M16 Similarly, our final decision is to use Chorus' data on its non-network opex as the starting point to assess non-network opex in our TSLRIC model. This is because we consider that this provides the best objective starting point for estimating the non-network opex of a nationwide telecommunications company in New Zealand.

M17 While this approach requires the use of top-down data, opex is only one component of our model, and does not make our TSLRIC model a top-down model. A top-down approach would use the incumbent's data in its entirety, including in regards to network design, capex, etc. We consider that the use of Chorus' top-down opex data

[1629] WIK-Consult "Submission in response to the Commerce Commission's Draft pricing review determination for Chorus' unbundled bitstream access and unbundled copper local loop services including the cost model and its reference documents" CONFIDENTIAL, 20 February 2015, paragraph [140].

[1630] WIK-Consult "Submission In response to the Commerce Commission's "Further draft pricing review determination for Chorus' unbundled bitstream access service" and "Further draft pricing review determination for Chorus' unbundled copper local loop service" including the revised cost model and its reference documents" 12 August 2015, paragraph [400].

[1631] Spark "Further draft pricing review determination for Chorus' UBA and UCLL services - Public version" 13 August 2015, paragraph [293].

[1632] WIK-Consult "Submission in response to the Commerce Commission's Draft pricing review determination for Chorus' unbundled bitstream access and unbundled copper local loop services including the cost model and its reference documents" CONFIDENTIAL, 20 February 2015, paragraph [145].

[1633] Analysys Mason "Report for Chorus - UCLL and UBA FPP draft determination cross submission" CONFIDENTIAL, 20 March 2015, section [4.1].

[1634] As an example, electricity prices can vary across countries, and therefore opex associated with electricity use by network infrastructure could also differ internationally compared with New Zealand.

is the best available evidence in these circumstances, and this does not invalidate the use of a bottom-up model.

M18 As we discuss further below, we also make adjustments to Chorus' network opex data to better reflect the network opex we consider would be incurred by the hypothetical efficient operator.

M19 We do not consider that any further adjustments to Chorus' non-network opex are warranted, as it likely reflects a similar level of non-network opex to that which would be incurred by the hypothetical efficient operator. We also discuss the issue of adjustments to non-network opex in more detail in Attachment N – Cost allocation.

**Our starting point for assessing network opex for the FWA network**

M20 The hypothetical efficient operator's network also includes some FWA deployment, and we have considered the appropriate starting point for assessing network opex for the FWA network.

M21 In submissions on this issue, Analysys Mason stated that the FWA opex used in our TSLRIC model was lower than international benchmarks from cost models used by regulators in Europe.[1635]

M22 In contrast, Network Strategies submitted that:[1636]

> The information submitted by Vodafone would be a superior estimate of the opex that an HEO will incur to provide FWA in New Zealand. Opex from other markets such as the EU would not capture the characteristics of New Zealand's local conditions.

M23 We agree with Network Strategies, and consider that Vodafone's opex data in relation to the RBI provides the best available evidence of network opex incurred by a provider of fixed wireless services in New Zealand. For this reason, our final decision is to use Vodafone opex data in relation to the RBI as the starting point to assess network opex for FWA in our TSLRIC model.

M24 In addition, we do not consider that any further adjustments to the Vodafone data are warranted, as it likely reflects a similar level of opex to that which would be incurred by the hypothetical efficient operator in respect of its FWA network.

**Adjustment to network maintenance opex for aerial deployment**

*The conceptual basis for an adjustment to network maintenance opex*

M25 While we take Chorus' copper opex as our starting point, we note that the proportion of aerial deployment in the modelled FTTH network is higher than that for Chorus' actual copper network. In particular, Chorus' copper network has

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[1635] Analysys Mason "Report for Chorus - UCLL and UBA FPP draft determination submission" CONFIDENTIAL, 20 February 2015, p. 45.

[1636] Network Strategies "Final report for Spark New Zealand and Vodafone New Zealand - Review of issues from UCLL and UBA submissions" CONFIDENTIAL, 20 March 2015, p. 10.

approximately 5% aerial deployment,[1637] while our modelled FTTH network has approximately 47% aerial deployment.

M26 Some submitters have suggested that a higher proportion of aerial deployment will result in higher maintenance opex as a result of increased line faults. For example, Analysys Mason and Chorus submitted that the higher proportion of aerial deployment would require the modelled maintenance opex to be increased.[1638, 1639] Similarly, L1 Capital submitted that the amount of overhead versus underground deployment is a factor to consider in assessing opex adjustments, and that line faults reported by New Zealand electricity distribution companies are higher than Chorus' due to a higher proportion of overhead infrastructure.[1640]

M27 No submitters critiqued this proposition, and we agree with Chorus, Analysys Mason and L1 Capital that, as a general principle, a higher proportion of aerial deployment can lead to a higher level of line faults and therefore higher network opex. Given that the modelled network has a higher proportion of aerial deployment relative to Chorus' network, we agree that this would likely result in higher line faults on our modelled network.

M28 Accordingly, our final decision is to make an adjustment to account for the higher proportion of aerial deployment. We apply this adjustment only to Chorus' network maintenance opex, as this is the category of opex that would be influenced by an increase in line faults associated with a higher proportion of aerial deployment.

*Quantifying the adjustment to network maintenance opex*

M29 In the TSLRIC model for our July 2015 UCLL further draft determination paper, we increased Chorus' network maintenance opex by a multiplier of 111% to account for the increased proportion of aerial deployment in our modelled FTTH network relative to Chorus' copper network. This figure was based on confidential data available to TERA,[1641] on the difference between aerial LFIs and underground LFIs.[1642]

M30 Analysys Mason submitted an alternative calculation approach based on data from the publicly available Automated Reporting Management Information System (ARMIS) collected from US telecommunications carriers by the Federal Communications Commission. Using this data, Analysys Mason calculated that

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1637 Analysys Mason "Report for Chorus - UCLL and UBA FPP draft determination submission" CONFIDENTIAL, 20 February 2015, p. 39.

1638 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and Process and Issues Update Paper for the UCLL and UBA Pricing Review Determinations" CONFIDENTIAL, 20 February 2015, paragraph [183].

1639 Analysys Mason "Report for Chorus - UCLL and UBA FPP draft determination submission" CONFIDENTIAL, 20 February 2015, p. 39.

1640 L1 Capital "Submission on draft UCLL and UBA pricing review determinations" 20 February 2015, p. 6.

1641 TERA Consultants "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services – Model documentation" June 2015, section [8.1].

1642 The difference was four percentage points. An adjustment of 4%x(47%-5%) (being the difference between aerial deployment on the modelled FTTH network and Chorus copper network) was added to Chorus' actual line fault index, and the ratio of this adjusted line fault index to Chorus' actual line fault index was calculated as 111%.

maintenance costs for aerial cable were approximately 167% higher than maintenance costs for buried cable. Based on a move from a 5% to a 47% aerial network, Analysys Mason calculate that this would lead to a network maintenance opex multiplier of 127% (rather than the 111% referred to above).[1643]

M31 We have some concerns with the use of the ARMIS data in this case.

M31.1 The ARMIS data used is 2007 data, as the ARMIS data collected after this date does not contain all the data needed to undertake the relevant calculations.[1644] This is relatively old data, so it may have less relevance in respect of maintenance opex today and looking forward.

M31.2 The ARMIS opex data includes not only maintenance opex for poles and conduit, but also pole and conduit rental charges.[1645] The inclusion of rental costs within this data is likely to distort the analysis undertaken by Analysys Mason.

M31.3 Analysys Mason uses the ARMIS data to compare aerial maintenance costs with maintenance costs for buried cable (where cable is directly buried without any ducting). However, this is unlikely to be an appropriate comparison, since we are adjusting network maintenance opex from Chorus' current copper network, which has both buried cable and ducted cable.

M32 We also asked Chorus whether it had or was aware of any New Zealand-specific data on the difference between underground and aerial maintenance opex. Chorus replied that, to the best of its knowledge, no such data was available.[1646]

M33 In the absence of preferable data, the confidential data available to TERA on the difference between aerial and underground LFIs is the best available to us. Accordingly our final decision is to use this data to increase Chorus' network maintenance opex by a multiplier of 111% to account for the increased proportion of aerial deployment in our modelled FTTH network relative to Chorus' copper network.

**Adjustment to network opex for use of FTTH technology**

*The conceptual basis for an adjustment for FTTH technology*

M34 Submitters have noted that network opex on a FTTH network like that which we have modelled is likely to be lower than that for a copper network.[1647, 1648, 1649]

1643 Analysys Mason "Report for Chorus - UCLL and UBA FPP further draft determination submission" CONFIDENTIAL, 11 August 2015, p. 25.

1644 Analysys Mason "Report for Chorus - UCLL and UBA FPP draft determination submission" CONFIDENTIAL, 20 February 2015, Annex B.

1645 See "FCC Report 43-01 and Pole Attachment Data Report Definitions December 2014", where pole and conduit expenses are split into maintenance and rental expenses.

1646 TERA Consultants "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services: – Analysis of the Responses to the second consultation following the further draft determination" December 2015.

M35 We agree with these submitters, and we consider it appropriate to apply an efficiency adjustment to Chorus' network opex for its copper access network so as to better reflect the network opex on a FTTH access network. We apply this adjustment only in respect of network opex, as non-network opex will not be materially affected by the nature of the network access technology. The implication of this is that the efficiency adjustment which we discuss below is not applied to non-network opex, which includes costs associated with industry levies, fees, licences, etc.[1650]

M36 We have based our efficiency adjustment on a number of studies that have assessed the difference in opex between copper and fibre networks – we discuss the results of these studies in more detail below.

M37 The studies that we analyse all compare copper and fibre opex in general terms, and it is unclear as to whether the figures they report are based on adjusting the opex of an old copper network to a new fibre network, or a new copper network to a new fibre network.[1651]

M38 Nonetheless, we consider that the more likely interpretation of the figures from the various studies assessing copper opex relative to fibre opex is that they are based on opex for an old copper network. Accordingly, we apply our fibre opex adjustment to Chorus' opex from its copper network, so that it is more in line with the likely opex we would expect for the fibre network of our hypothetical efficient operator.

M39 WIK has submitted that this approach is "conceptually misleading" because by "[a]pplying the fibre adjustment on the cost to the actual OPEX of an old copper network conceptually generates the OPEX of an old fibre network".[1652] Similarly, Spark submitted that we are applying the fibre efficiency adjustment to shift from an old copper network to an old fibre network, and also applying an adjustment based on LFIs to adjust from an old fibre network to a new fibre network.[1653]

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[1647] Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and Process and Issues Update Paper for the UCLL and UBA Pricing Review Determinations" CONFIDENTIAL, 20 February 2015, paragraph [176].

[1648] WIK-Consult "Submission In response to the Commerce Commission's "Further draft pricing review determination for Chorus' unbundled bitstream access service" and "Further draft pricing review determination for Chorus' unbundled copper local loop service" including the revised cost model and its reference documents" 12 August 2015, paragraph [251].

[1649] Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" CONFIDENTIAL, 13 August 2015, paragraph [294].

[1650] This address a letter we received from Chorus regarding the Telecommunications Development Levy (TDL) (Chorus letter dated 22 September 2015), that the TDL would be subject to the opex efficiency adjustment in our TSLRIC model. As just described, this is not correct.

[1651] A similar point was made in Analysys Mason's submission – see Analysys Mason "Report for Chorus - UCLL and UBA FPP draft determination submission" CONFIDENTIAL, 20 February 2015, p. 41.

[1652] WIK-Consult "Submission In response to the Commerce Commission's "Further draft pricing review determination for Chorus' unbundled bitstream access service" and "Further draft pricing review determination for Chorus' unbundled copper local loop service" including the revised cost model and its reference documents" 12 August 2015, paragraph [250].

[1653] Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" CONFIDENTIAL, 13 August 2015, paragraph [299].

M40 Spark and WIK seem to have misinterpreted our approach. As explained above, we apply an adjustment based on LFIs to maintenance opex to account for the higher proportion of aerial deployment (and therefore higher line fault rates) on our modelled network relative to Chorus' copper network. We apply our fibre efficiency adjustment to adjust Chorus' overall network opex on its old copper network to what we would expect on a new fibre network.

M41 Accordingly, our final decision is to apply an efficiency adjustment to Chorus' network opex so that it reflects the likely network opex incurred by our hypothetical efficient operator on a FTTH access network. This adjustment is applied after making the adjustment to network maintenance opex for the level of aerial deployment.

*Quantifying the fibre opex efficiency adjustment*

M42 TERA has identified and analysed a number of studies which compare opex on copper networks with opex on fibre networks.[1654] In particular, TERA has identified the following studies:

M42.1 a study by Agcom reporting opex savings for FTTH compared with copper for NTT/Verizon of 40-60%, giving an average of 50%;[1655]

M42.2 a report by the FTTH Council which records opex savings for fibre networks of 20%;[1656]

M42.3 a study by Plum Consulting with average savings for fibre networks compared with copper of 40%;[1657]

M42.4 a report by Ovum Consulting reporting opex savings for FTTH compared with legacy copper networks of, on average, 50%;[1658] and

M42.5 a report of opex cost savings for a FTTH network of 35% for the Australian National Broadband Network.[1659]

M43 In our July 2015 UCLL further draft determination, we calculated the median of these studies, at 40%, and applied this as our fibre opex efficiency adjustment.[1660]

1654 TERA Consultants "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services – Model documentation" December 2015, section [8.2].

1655 Agcom "Challenges in moving towards the next generation of fixed and mobile networks" 28 January 2010.

1656 Available at: http://www.ftthcouncil.org/p/bl/et/blogid=3&blogaid=182 .

1657 Plum Consulting "A Framework for Evaluating the Value of Next Generation Broadband" A report for the broadband stakeholder group, June 2008.

1658 Ovum Consulting "Comparative Costs for Fibre to the Node and Fibre to the Home Rollouts in Australia", Final Report to ACCC, 10 August 2007.

1659 Available at: http://savethenbn.com/economic.php.

1660 Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 2 July 2015, paragraph [1696].

M44 Submitters have proposed various other studies which they consider should also be taken into account, either instead of or in addition to the studies above. Spark and WIK have reported data provided by Verizon which indicates that fibre opex is 60% cheaper than copper opex.[1661, 1662]

M45 However, the Verizon study reported by Spark and WIK appears to be an update to the Verizon data already included in the analysis. It is also not clear that the Verizon figure reported by Spark and WIK is any different from the top end of the 40-60% range for the Verizon data already included in the analysis.[1663] We therefore do not consider that this warrants a change to the figures included in this analysis.

M46 Analysys Mason has submitted that the cost model in Denmark calculates a reduction in opex per line from copper to fibre networks as either 13% (for a FTTH PTP network) or 25% (for a FTTH GPON network).[1664] Based on data from the Danish cost and the FTTH Council figure reported above, Chorus submitted that "the opex savings reduction following a shift from legacy copper assets to fibre assets is likely to be in the order of 15% to 30%".[1665]

M47 While we have included the FTTH Council figure in our analysis, the Danish cost model figures are not relevant because they compare the difference in opex between a *new* copper network and a new fibre network. In contrast, and as noted above, the intention of our FTTH efficiency adjustment is to adjust for the difference in opex between an *old* copper network and a new fibre network. We therefore do not consider that the Danish cost model figures should be incorporated into this analysis.

M48 Submitters also appeared to be focussing either on the low end or high end of the range of studies we have considered. In our view the best method is to review a broad range of studies to assess the likely fibre opex efficiencies, rather than focusing only on studies at the high or low end of the range. Indeed, in response to L1 Capital's submission that no rigour has been added by considering several studies (rather than a single study),[1666] we believe that a broader sample size provides a more robust result. We consider that the studies identified above provide a valid

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1661 WIK-Consult "Submission In response to the Commerce Commission's "Further draft pricing review determination for Chorus' unbundled bitstream access service" and "Further draft pricing review determination for Chorus' unbundled copper local loop service" including the revised cost model and its reference documents" 12 August 2015, paragraph [251].

1662 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" CONFIDENTIAL, 13 August 2015, paragraph [300].

1663 The same point is made in the submission of Analysys Mason – see Analysys Mason "Report for Chorus - UCLL and UBA FPP draft determination cross-submission" CONFIDENTIAL, 22 September 2015, section 5.2.

1664 Analysys Mason "Report for Chorus - UCLL and UBA FPP draft determination cross-submission" CONFIDENTIAL, 22 September 2015, section 5.2.

1665 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services - Public version (2 July 2015)" 13 August 2015, paragraph [138].

1666 L1 Capital "Submission on the further draft pricing determination for Chorus' unbundled copper local loop and unbundled bitstream access services" 13 August 2015, p. 2.

basis against which to assess the difference in opex between a copper and fibre network.

M49 Accordingly, our final decision is to apply a fibre opex adjustment of 40%. We consider that this is consistent with our regulatory framework in that we apply the best objective evidence to determine the appropriate parameter in this instance.

M50 To summarise, the adjustments we make in respect of opex are:

M50.1 we take Chorus' copper opex from its financial accounts as our starting point for FTTH opex, and classify it as either network or non-network opex. Similarly, we take Vodafone's RBI opex as our starting point for FWA opex;

M50.2 for non-network opex and FWA opex we make no further adjustments;

M50.3 for FTTH network opex, we increase network maintenance opex by a multiple of 111% to account for the higher proportion of aerial deployment in our modelled network; and

M50.4 we then decrease all FTTH network opex by 40% to account for increased cost efficiency of our modelled FTTH network relative to Chorus' copper network.

**Opex in the modelled copper network**

M51 We comment briefly on the approach to modelling opex in the modelled copper network, as we have received some submissions on this issue. We have modelled a copper network so as to compare against the costs of the FTTH network and to consider whether a MEA adjustment is appropriate (as discussed in Attachment B – Selecting the MEA for the UCLL Service). A complete description of the modelling approach is provided in the various papers published by TERA alongside this final determination.

M52 In the TSLRIC model in our July 2015 UCLL further draft determination paper, our starting point for opex in the copper model was to use Chorus' opex. We made an adjustment to this opex to reflect the likely lower line faults on a newly built copper network relative to Chorus' copper network. We based this on LFI data from actual line faults over 2013-2014 for the incumbent telecommunications provider Eircom in Ireland, of 16.4%.[1667]

M53 Analysys Mason submitted that the Irish actual LFI data for 2013-2014 was strongly affected by a single exceptional event that increased the LFI, and accordingly led to a larger adjustment to opex (and therefore lower opex on the modelled copper network).[1668] Analysys Mason stated that "it is unreasonable to view exceptional

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[1667] TERA Consultants "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services – Model documentation" June 2015, section [8.1].

[1668] Analysys Mason "Report for Chorus - UCLL and UBA FPP further draft determination submission" CONFIDENTIAL, 11 August 2015, p. 24.

poor performance in Ireland as implying lower costs in New Zealand", and that the lower "target" LFI figure of 12.8% should be used to make the adjustment.

M54 In our view there are various ways in which the LFI adjustment can be made for the modelled copper network. Possible alternatives are to use the actual 2013-2014 data, as in our July 2015 UCLL further draft determination, or the Irish target LFI figure, as submitted by Analysys Mason. Another possibility is to take an average LFI across the entire time series of the actual Irish LFI data, for as far as the data are available. This approach leads to an LFI figure of 14.3%.[1669]

M55 We have tested all of these approaches, and while they lead to different levels of opex in our modelled copper network, in no case does this result in the modelled copper network having lower costs overall than our modelled FTTH network. That is, the decision on the appropriate LFI to adjust copper opex does not influence our decision to not make a MEA adjustment.

M56 Accordingly, we consider that we do not have to come to a firm view on the approach to adjusting copper opex. However, our TSLRIC model of the copper network does require us to implement one of the approaches discussed above to determine the appropriate level of opex. For this we have used the approach where opex is adjusted by the average Irish LFI over the period for which data are available. It is important to note, however, that this approach acts only as a means of deriving a single result from our TSLRIC model of the copper network, and as discussed we have not come to a firm view on the appropriate approach to adjusting copper opex.

[1669] TERA Consultants "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services – Model documentation" December 2015, section [8.1].

# Attachment N: Cost allocation

**Purpose**

N1 In this Attachment we explain our final decisions with regard to the allocation of forward-looking common costs in our TSLRIC model for the UCLL service.

N2 In particular, in this Attachment we:

N2.1 outline our final decisions in respect of how we allocate forward-looking common costs;

N2.2 explain the relevance of cost allocation to TSLRIC and some cost definitions we use in this Attachment;

N2.3 outline how we have determined the total quantum of forward-looking common costs to be allocated;

N2.4 describe our allocation approach for network and non-network costs; and

N2.5 explain our approach for avoiding double recovery in allocating costs between UCLL and UBA.

**Our final decisions**

N3 Our final decisions and reasons with regard to how we allocate forward-looking common costs in our TSLRIC model for the UCLL service are as follows.

N3.1 For network costs, we use a capacity-based allocation approach, with specific allocation keys identified for different categories of network costs. We consider that this provides a reasonable allocation of network costs because of the use of this approach by regulators elsewhere, its greater objectivity and transparency (relative to alternative approaches), and the support for this approach by submitters.

N3.2 For non-network costs, we use the method of equi-proportional mark-up (EPMU). We consider that this provides a reasonable allocation of non-network costs because of the use of this approach by regulators elsewhere, its greater simplicity (relative to alternative approaches), and the support for this approach by submitters.

N3.2.1 For the allocation of non-network costs between the UCLL and UBA (in aggregate) and other services (for example, co-location and non-recurring charges), we use EPMU that is modified to be based on revenue-shares (which we refer to in this final determination as "modified EPMU"), as we do not have appropriate data to undertake a standard EPMU approach.

N3.2.2 For the allocation of non-network costs between the regulated services (UCLL and UBA), we do have the appropriate data so we use the standard EPMU approach based on each service's share of total attributable costs.

### Relevance of cost allocation to TSLRIC

N4 The Act's definition of TSLRIC includes reference to "a reasonable allocation of forward-looking common costs". As we discuss in more detail below, this requires us to consider costs that cannot be wholly or solely associated with a service, and include an allocation of these costs in our TSLRIC model. This requires us to consider issues such as the nature and quantum of "forward-looking common costs", and an appropriate methodology to provide for a "reasonable allocation" of these costs to be included in our TSLRIC model. We discuss these issues in more detail in this Attachment.

### Cost definitions

N5 In order to explain our approach to the allocation of forward-looking common costs, it is helpful to start with some definitions of the costs that we are considering.

N6 The definition of TSLRIC contains two limbs.[1670] Limb (b) refers to "a reasonable allocation of forward-looking common costs". As we have explained in Chapter 2, together the two limbs of the definition capture all relevant forward-looking costs.

N7 The Act defines "forward-looking common costs" as "those costs efficiently incurred by the service provider in providing the service that are not directly attributable to providing an additional unit to that service".

N8 There are certain costs that are not directly attributable to providing an additional unit to the service, but that only relate to a single service. Because these are contained within limb (a) of the definition of TSLRIC, we do not include these within the category of "forward-looking common costs". Accordingly we only consider costs not directly attributable, ie, those that cannot be wholly or solely associated with a service.

N9 As a subset of costs not directly attributable to the provision of the service, we define two further cost categories, network costs and non-network costs.[1671]

N9.1 Network costs are costs associated with network elements, such as trenches and ducts, which are used in the provision of more than one service. These include costs which are incurred in producing a given set of services (joint or shared network costs), or all services (network common costs). These costs are incurred in providing services associated with the telecommunications network itself, and relate to a group of, or all, services (rather than only a single service). For consistency with the terminology in our previous

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[1670] Telecommunications Act 2001, sch 1, pt 1, sub-pt 1 provides that: "**TSLRIC**, in relation to a telecommunications service,—

(a) means the forward-looking costs over the long run of the total quantity of the facilities and functions that are directly attributable to, or reasonably identifiable as incremental to, the service, taking into account the service provider's provision of other telecommunications services; and

(b) includes a reasonable allocation of forward-looking common costs."

[1671] See also Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014, paragraph [850].

papers,[1672] we will refer to these costs as "network costs", although it is important to bear in mind that it is only the joint and common network costs that are of concern for our cost allocation exercise.

N9.2 Non-network costs comprise corporate overheads, such as finance, human resources, legal and planning departments. They are also referred to as "non-network common costs". These are costs which are not directly incurred in providing services associated with the telecommunications network itself, but are nonetheless required to operate a telecommunications company. For consistency with the terminology in our previous papers, we will refer to these costs as "non-network costs".

**The quantum of network and non-network costs**

N10 Our TSLRIC model determines the total quantum of network and non-network costs to be allocated, and then allocates some proportion of these costs across the relevant shared services.

N11 Network costs consist of capital expenditure (capex) and operating expenditure (opex) that are incurred in providing a group of, or all, network services. Network capex is determined as discussed throughout this final determination, depending on the nature of the capital equipment (see, eg, Attachment E – Asset valuation, and Attachment J – Trenching costs), while network opex is derived from Chorus' financial accounts with appropriate efficiency adjustments (see Attachment M – Operating expenditure).

N12 As noted above, non-network costs comprise corporate overheads, and as such relate only to opex. The total non-network costs to be allocated were determined from Chorus' financial accounts, but were not subject to the same efficiency adjustments that were applied in respect of network costs.

N13 In submissions, WIK was critical of the lack of any checks or adjustments for efficiency in respect of non-network costs.[1673]

N14 While no specific efficiency adjustment has been made to non-network costs, we have excluded some non-network common costs taken from Chorus' financial accounts because they were considered to be out of scope.

N15 Aside from this, we note that it is difficult to undertake an objective assessment of what is efficient or reasonable in respect of non-network common costs such as salaries, IT expenditure, etc. The most appropriate and objective way to do so would likely be to obtain comparable data on non-network common costs for a similar business, against which to compare Chorus' non-network common costs.

[1672] In particular, our July 2014 regulatory framework and modelling approach paper, our December 2014 UCLL draft determination paper, and our July 2015 UCLL further draft determination paper.

[1673] WIK-Consult "Submission In response to the Commerce Commission's "Further draft pricing review determination for Chorus' unbundled bitstream access service" and "Further draft pricing review determination for Chorus' unbundled copper local loop service" including the revised cost model and its reference documents" 12 August 2015, paragraphs [288] and [358].

N16 In regards to comparable data, WIK has submitted that an efficiency check can be undertaken by comparing the share of non-network common costs in the TSLRIC model against international benchmarks.[1674] However, the difficulty with applying international benchmarking in these circumstances is that the scope of what is covered in non-network common costs compared with network opex can vary across countries due to regulatory accounting rules on where the different costs are classified.

N17 In addition, Chorus is a vertically separated business but other countries have vertically-integrated telecommunications providers, and this makes it difficult to compare non-network common costs in New Zealand with elsewhere. That is, because telecommunications providers overseas have both a wholesale and retail business, their corporate overheads may be quite different from those of Chorus, with just a wholesale business.

N18 Similarly it is difficult to benchmark non-network common costs against New Zealand telecommunications operators. In considering the potential New Zealand benchmarks, while LFCs operate a wholesale-only business, they do not have the scale of operations that Chorus does. Large access seekers such as Vodafone and Spark may have a similar scale to that of Chorus, but are vertically-integrated businesses with both wholesale and retail operations, including for mobile telecommunications networks.

N19 Similar points were made in submissions by Analysys Mason, with which we agree:[1675]

> …it is worth noting that there are economies of scale in overheads, so comparison to larger countries will not be a good comparison. In addition to this purely national effect, Chorus, being structurally separated, does not have the same economies of scale in overhead costs relative to e.g. retail telcos.

N20 Accordingly, because of the practical difficulties in undertaking an objective assessment of the efficiency of non-network costs, we have not undertaken such an assessment.

N21 Even if it were possible to check the efficiency of non-network common costs, it is not clear how an efficiency adjustment could be applied if it were considered necessary. We are not aware of any approach that could be used to undertake such an efficiency adjustment in an objective manner, and submitters have not proposed how such an adjustment should be made.

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1674 WIK-Consult "Submission In response to the Commerce Commission's "Further draft pricing review determination for Chorus' unbundled bitstream access service" and "Further draft pricing review determination for Chorus' unbundled copper local loop service" including the revised cost model and its reference documents" 12 August 2015, paragraph [359].

1675 Analysys Mason "Report for Chorus - UCLL and UBA FPP draft determination cross-submission" CONFIDENTIAL, 20 March 2015, section 4.12.

N22 On balance, we are satisfied that we have appropriately addressed the issue of using Chorus' financial accounts to determine the quantum of non-network common costs to be allocated across services.

**Allocating network costs**

*Our choice of allocation approach*

N23 In our previous papers throughout this FPP process we considered two possible approaches for the allocation of network costs, a Shapley-Shubik approach or a capacity-based approach.[1676]

N23.1 A Shapley-Shubik approach allocates network costs based on the average share of incremental costs for each service, where the average is determined across all possible combinations of different "orderings"[1677] of the relevant services (based on multiple model runs).[1678]

N23.2 A capacity-based approach allocates network costs based on the share of network capacity required by each service.

N24 Our final decision is to use a capacity-based approach for the allocation of network costs, for the reasons set out below.

N25 We consider that a capacity-based allocation is a more objective and transparent approach than the alternative Shapley-Shubik approach. This has been recognised by some submitters. For example, Analysys Mason submitted that the Shapley-Shubik approach "leads to an undesirable dependence of the result on the number of services modelled", and lacks transparency because of the difficulties in comparing multiple model runs to assess the rationale for a particular cost allocation.[1679]

N26 We also view it as relevant to consider how regulators elsewhere have implemented TSLRIC models. A capacity-based allocation is a common (albeit not ubiquitous)[1680] approach used by regulators to allocate costs between services.[1681]

N27 Our expert advisor TERA supports the use of the capacity-based approach, and notes that this approach follows the cost drivers and allocates a proportionately larger

1676 Commerce Commission "Consultation paper outlining our proposed view on regulatory framework and modelling approach for UBA and UCLL services" 9 July 2014, paragraph [279]; Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014, paragraph [851].

1677 For example, if there were two services, then there are two possible orderings of the services: service one comes first, then service two; and vice versa.

1678 For an example of this approach, see TERA Consultants "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services: - Model Reference Paper" December 2015, section [4.1.1].

1679 Analysys Mason "Report for Chorus – Response to Commission consultation on regulatory framework and modelling approach for UCLL and UBA" 6 August 2014, paragraph [1.17.2].

1680 For example, TERA has noted that the Shapley-Shubik approach has been considered by regulators in France and Ireland (TERA Consultants "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services: - Model Reference Paper" December 2015, section 4.1.1).

1681 TERA Consultants "TSLRIC literature review on UBA and UCLL costing approaches" June 2014, p. 33.

share of network costs to services that have a proportionately greater network loading.[1682] We agree that this provides a further rationale for the use of a capacity-based approach over the Shapley-Shubik approach.

N28 In submissions on our previous papers throughout the FPP process, submitters have agreed that we should implement a capacity-based allocation approach rather than a Shapley-Shubik approach.[1683] In further submissions and cross submissions on our July 2015 UCLL further draft determination paper, Chorus continued to support the use of a capacity-based approach rather than a Shapley-Shubik approach,[1684] and Spark more generally supports our choice of cost allocation methodologies for network costs.[1685]

N29 Accordingly, our final decision is to use a capacity-based approach for the allocation of network costs. It is relevant to consider how regulators elsewhere implement TSLRIC models, and a capacity-based approach is a common approach used by regulators to allocate network costs. Along with the greater objectivity and transparency of the capacity-based approach (relative to Shapley-Shubik), and the support for this approach by submitters (as noted above), we consider that a capacity-based approach provides a reasonable allocation of network costs.

*Implementation of the capacity-based allocation approach*

N30 We implement the capacity-based approach when the costs of different network elements are shared across multiple services. This occurs in particular when the costs of different infrastructure assets are shared across different network levels. For example, the costs of trenches and ducts can relate not only to the UCLL network, but also to the core network and the SLU backhaul network. In these cases, we use a measure of capacity to allocate a proportion of these costs to the UCLL services modelled in our TSLRIC model.

N31 The relevant measure of capacity that we use to allocate costs depends on the nature of the infrastructure assets for which costs are being allocated. TERA has recommended that the most appropriate measures of capacity to use as “allocation keys” with which to allocate network costs are as follows:[1686]

N31.1 for trenches and manholes, the number of ducts in the trench;

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1682 TERA Consultants “TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services: - Model Reference Paper” December 2015, section 4.1.1.

1683 Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014, paragraph [857].

1684 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus’ Unbundled Copper Local Loop and Unbundled Bitstream Access Services - Public version" 2 July 2015, paragraph [174].

1685 Spark "Further draft pricing review determination for Chorus’ UBA and UCLL services - Public version" 13 August 2015, paragraph [308].

1686 TERA Consultants “TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services: – Model Specification” December 2015, section 8.7.1.

N31.2 for ducts, the surface of the sub-ducts or, in the case of cables that are not protected by sub-ducts, the surface of the cables; and

N31.3 for poles, the number of joints carried by the pole.

N32 Throughout this FPP process we have not received any submissions on the choice of the appropriate measures of capacity with which to allocate costs using the capacity-based approach. As noted above, however, there was acceptance of the capacity-based allocation approach more generally.

N33 Our final decision is to use the allocation keys as set out above to implement the capacity-based allocation approach. We consider that the capacity-based allocation keys are reasonable and provide a valid basis for allocating network costs. Consistent with our regulatory framework, we consider that the determination of appropriate allocation keys is largely an evidential matter, and we consider that the allocation keys set out above provide the best objective way of allocating network costs.

**Allocating non-network costs**

*Our choice of allocation approach*

N34 In our FPP process we have considered two possible approaches for the allocation of non-network costs, EPMU and Ramsey-pricing.[1687]

N34.1 EPMU allocates non-network common costs to services in proportion to the share of total attributable costs across the services.

N34.2 Ramsey-pricing allocates non-network common costs to services based on the relative price elasticity of demand for the service.

N35 Our final decision is to use EPMU for the allocation of non-network costs, for the reasons set out below.

N36 EPMU is a relatively simple method to implement, compared to Ramsey-pricing. The latter requires the estimation of demand elasticities for different services, which can be difficult to determine. This requires specific data on demand which may not always be available, and where the data is available the analysis required can often be complex and contentious. In contrast, EPMU is a more transparent approach that utilises cost data, which is typically available in the regulated business' accounts, and involves a relatively straightforward calculation based on that cost data.

N37 We also view it as relevant to consider how regulators elsewhere have implemented TSLRIC models, with EPMU being used by regulators as a methodology to allocate non-network costs between services.[1688]

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[1687] Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop services" 2 December 2014, paragraph [860-863]; and Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop services" 2 July 2015, paragraph [1718].

[1688] TERA Consultants "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services: - Model Reference Paper" December 2015, section 4.1.2.

N38 Given its use by regulators elsewhere, and its relative simplicity, our expert advisor TERA also supports the use of the EPMU methodology.[1689]

N39 In submissions throughout our FPP process, submitters have agreed that EPMU was a preferable approach to Ramsey-pricing for the allocation of non-network costs.[1690] For example, Chorus supported the use of EPMU,[1691] as did Spark, who submitted that Ramsey-pricing is "difficult to implement practically".[1692] While, in principle, Ramsey-pricing is a valid methodology, it is the practical difficulties with implementing the approach that are of concern.

N40 Accordingly, our final decision is to use EPMU for the allocation of non-network costs. It is relevant to consider how regulators elsewhere implement TSLRIC models and EPMU is a common approach used by regulators to allocate costs to services. Along with the relative simplicity of EPMU (compared to Ramsey-pricing), and the support for this approach by submitters, we consider that the EPMU approach provides a reasonable allocation of non-network costs.

N41 We explain below that in some respects the necessary data to implement a standard EPMU approach is not available, and we have instead adopted a modified EPMU approach.

*Implementation of the EPMU allocation approach*

N42 We implement EPMU by allocating a share of non-network common costs to each of the relevant services, in proportion to the share of total attributable costs across the services. The cost shares for implementing EPMU are typically identified using accounting cost data from the regulated firm's accounts.[1693] However, based on our review of Chorus' financial accounts, a breakdown of costs by service is not necessarily always available.

N43 In the absence of a breakdown of costs by service, a proxy for the EPMU approach is to allocate costs based on a breakdown of revenue by service, where the revenue breakdown is available in the financial accounts. As noted above, we refer to this approach in this final determination as modified EPMU.

N44 Our final decision is to apply the modified EPMU approach to allocate a share of non-network costs to the UCLL and UBA services (in aggregate), while the remaining share of non-network costs is allocated to other services (for example, co-location

1689 TERA Consultants "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services: - Model Reference Paper" December 2015, section 4.1.2.

1690 Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014, paragraphs [860-863].

1691 Chorus "Submission in response to the Commerce Commission's Consultation paper outlining its proposed view on regulatory framework and modelling approach for UBA and UCLL services (9 July 2014)" 6 August 2014, paragraph [112].

1692 Spark "UCLL and UBA FPP: consultation on regulatory framework and modelling approach – Cross submission Commerce Commission" 20 August 2014, paragraph [131].

1693 Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014, paragraph [864]; Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop services" 2 July 2015, paragraph [1719].

and ancillary charges). We apply the modified EPMU approach in this instance because Chorus' financial accounts did not provide a sufficient breakdown of costs to apply the standard EPMU approach.

N45 However, we were able to use Chorus' financial accounts to implement a standard EPMU approach to allocate non-network costs between the regulated UCLL and UBA services. Our final decision is therefore to apply the standard EPMU approach in this instance.

N46 While we have applied modified EPMU in one instance and EPMU in another, as we discussed in our July 2015 UCLL further draft determination,[1694] we consider that this is a valid approach. We are of the view that an allocation approach based on standard EPMU is preferable where the data are available. We have only used modified EPMU where the data necessary to implement a standard EPMU approach are not available. Modified EPMU would not be an appropriate cost allocation approach to apply if the data were otherwise available to apply the standard EPMU approach (which is the case for cost allocation between the UCLL and UBA services). Since our July 2015 UCLL further draft determination, none of the submitters have questioned our use of modified EPMU in one instance and standard EPMU in another.

N47 In the absence of data we consider that the modified EPMU approach is the most suitable available proxy. The suitability of this approach as a proxy for EPMU relies on the assumption that revenue is distributed across services in similar proportions to total attributable costs.

N48 Where this is not the case (which may be because the mark-up on costs is proportionately greater for some services than for others, for example, those services for which demand is relatively more inelastic), the modified EPMU approach has some similarities with the Ramsey-pricing approach. Under the modified EPMU allocation approach, relative to the standard EPMU approach, an access provider would only under-recover its costs of providing the service for which we set a regulated price if it were to earn a greater profit margin on unregulated services relative to regulated services.

N49 In our December 2014 UCLL draft determination paper, when we implemented the standard EPMU approach we allocated costs in proportion to each service's share of opex only, rather than both capex and opex. However, we corrected this approach in our July 2015 UCLL further draft determination paper, where we agreed with submitters that the correct approach was to use total attributable costs, which reflect both capex and opex.[1695] We have maintained the corrected approach for this final determination.

[1694] Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop services" 2 July 2015, paragraphs [1725]-[1727].

[1695] Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop services" 2 July 2015, paragraph [1728].

N50 The change in approach between the December 2014 and July 2015 drafts resulted in a change in the proportion of non-network common costs in the UCLL service. In contrast to the submissions of WIK and Spark,[1696,1697] the increase in the share of non-network common costs in the UCLL service is explained by this change, and is not reflective of an error in the model.

**Avoiding double recovery in allocating costs between UCLL and UBA**

N51 We have explained earlier in this final determination that for the UCLL service, we are modelling a hypothetical network based on a MEA that includes FTTH, whereas when we calculate the additional costs of the UBA service we use a MEA for the UBA increment that utilises a copper-based access network. In our previous papers throughout this FPP process we identified the potential for double recovery arising from this.[1698] We noted that this is because the same trench and duct (between the active cabinet and the MDF) is covered more than once in the TSLRIC model for UBA and the TSLRIC model for UCLL.

N52 As discussed in Chapter 2, clause 4B of the Act requires that we must ensure no double recovery of costs in prices of designated or specified services.

N53 Chorus disagreed that there was double recovery in this particular case, arguing that the intention of the Act is that the UBA price would cover both trenching costs.[1699] In contrast, Spark submitted that Chorus' approach "makes no sense" as it would involve the deployment of overlay trenches and the double counting of costs within the model.[1700]

N54 We agree with Spark that there is clear evidence of double recovery in this instance. Our final decision is to use the following approach to ensure that there is no double recovery in this particular case.

N54.1 Calculate the potential double recovery as a result of the trench shared between UBA and UCLL.

N54.2 Allocate trench and duct costs between UBA and UCLL. The cost allocation is based on the capacity-based allocation approach as outlined earlier in this Attachment.

[1696] WIK-Consult "Submission In response to the Commerce Commission's "Further draft pricing review determination for Chorus' unbundled bitstream access service" and "Further draft pricing review determination for Chorus' unbundled copper local loop service" including the revised cost model and its reference documents" 12 August 2015, paragraph [291].

[1697] Spark "Further draft pricing review determination for Chorus' UBA and UCLL services - Public version" 13 August 2015, paragraph [308].

[1698] Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014, paragraph [872]; Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop services" 2 July 2015, paragraph [1729].

[1699] Chorus "Submission in response to the Commerce Commission's Consultation paper outlining its proposed view on the regulatory framework and modelling approach for UBA and UCLL services (9 July 2014)" 6 August 2014, paragraph [152].

[1700] Spark New Zealand "UCLL and UBA FPP: consultation on regulatory framework and modelling approach - Cross-submission Commerce Commission" 20 August 2014, paragraph [143].

N54.3 UBA TSLRIC are reduced by the UCLL share to ensure against any potential double recovery.

N55 This approach is recommended by our expert advisor, TERA.[1701] We agree with TERA's view, and consider that it provides an appropriate way to ensure against this particular source of double recovery. Spark supported our approach to remove this source of double recovery,[1702] but we have otherwise received no further submissions on this particular issue.

[1701] TERA Consultants "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services: – Model Specification" December 2015, section 8.9.2.2.

[1702] Spark New Zealand "UCLL and UBA FPP: consultation on regulatory framework and modelling approach - Cross-submission Commerce Commission" 20 August 2014, paragraph [147].

# Attachment O: Implementation of aggregation to allocate ULL TSLRIC costs to UCLL and SLU services

## Purpose

O1 This Attachment sets out the implementation of our aggregation approach, which is used to allocate ULL TSLRIC costs to the UCLL and SLU services.

O2 As noted in Chapter 4, our FTTH/FWA model cannot directly determine UCLL and SLU costs because it does not include active cabinets. However, we need an approach to determine prices for these services because we are required to update the UCLL and SLU STDs..

O3 As also explained in Chapter 4, our final decision is to set the same price for access between the end-user and the exchange, irrespective of whether the line is cabinetised or non-cabinetised. We refer to this approach as aggregation.

O4 Aggregation requires, in principle, that the price for UCLL equals the price for SLU plus the modelled TSLRIC for the proportion of the cost per line of UBA backhaul between the exchange and the cabinet (which we refer to as the "fibre feeder"). This formula is simultaneously solved with the average cost per line to connect all customers. The fibre feeder is used as an input to determine the relationship between UCLL and SLU.

O5 The formulae used in our model to implement the aggregation approach are set out in more detail in this Attachment. We consulted on these formulae in our July 2015 UCLL further draft determination, and while we received some submissions on the results of these formulae (which are discussed in Chapter 4), we have not received any submissions on the formulae themselves.[1703]

## Formulae used in model to implement aggregation

O6 To implement our aggregation approach, we allocated the monthly TSLRIC unit costs for ULL to UCLL and SLU.

O7 For this approach, we used the following inputs:

- O7.1 the TSLRIC model for the unbundled local loop, which determined the monthly TSLRIC unit costs for ULL;
- O7.2 the TSLRIC model for UBA, which determined the monthly TSLRIC unit costs for the fibre feeder;
- O7.3 the demand for ULL, which is the total number of current connections. This is the same as the demand profile set out in Attachment A – Network footprint and demand; and

[1703] Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 2 July 2015, Attachment O.

O7.4 the demand for the fibre feeder, which is the number of UBA connections at an active cabinet.[1704]

O8 We assumed that demand for SLU is equal to demand for the fibre feeder. This assumption is supported by both services being used together in most cases.[1705]

O9 We also applied the relationship that demand for UCLL is equal to the total demand for the full local loop minus the demand for SLU.

O10 To implement aggregation, the cost per line should be the same whether or not the line is cabinetised:

(1)
$$UCLL = SLU + fibre\_feeder$$

O11 Our starting point was to calculate the average cost per line to connect all customers to the exchange:[1706]

(2)
$$Cost\_per\_line_{unit} = \frac{C_{ULL\_fibre} + C_{fibre\_feeder}}{Demand_{ULL}}$$

*Where*

- **Cost_per_line**$_{\mathbf{unit}}$ is the average cost per line to connect all customers
- **C**$_{\mathbf{ULL\_fibre}}$ is the estimated monthly cost of the unbundled local loop from the TSLRIC model for ULL in the fibre network
- **C**$_{\mathbf{fibre\_feeder}}$ is the estimated monthly cost of the fibre feeder from the TSLRIC model for UBA
- **Demand**$_{\mathbf{ULL}}$ is the demand profile for the unbundled local loop

O12 Since, from equation (1), the cost per line is the same whether or not the line is cabinetised, it follows from equation (2) that the cost per line for UCLL is:

(3)
$$UCLL = \frac{C_{ULL\_fibre} + C_{fibre\_feeder}}{Demand_{ULL}}$$

O13 The cost per line for the fibre feeder was calculated as follows:

(4)
$$Fibre\_Feeder = \frac{C_{fibre\_feeder}}{Demand_{fibre\_feeder}}$$

[1704] We use the term “demand” in respect of the fibre feeder loosely – it is not intended to imply the final demand for services using the fibre feeder, but rather refers more generally to the relevant measure of output over which the costs of lines using the fibre feeder are recovered.

[1705] We are only aware of one case where the services are not used in a bundle, where an access seeker is unbundling at a cabinet but is providing its own backhaul.

[1706] See also TERA Consultants “TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services: – Model Documentation” December 2015, section [6.5.1.2].

*Where*

- **Fibre_Feeder** is the average cost per line for the fibre feeder
- **$C_{fibre\_feeder}$** is the estimated monthly cost of the fibre feeder from the TSLRIC model for UBA
- **$Demand_{fibre\_feeder}$** is the demand profile for UBA connections at active cabinets

O14 Rearranging equation (1), and substituting in equations (3) and (4), the cost per line for SLU is:

(5)

$$SLU = UCLL - Fibre\_Feeder = \frac{C_{ULL\_fibre} + C_{fibre\_feeder}}{Demand_{ULL}} - \frac{C_{fibre\_feeder}}{Demand_{fibre\_feeder}}$$

O15 Equation (5) is used in our model to determine the SLU cost, based on the inputs discussed above.

# Attachment P: International comparators

**Purpose**

P1 This Attachment looks at the evidence of whether our estimates of the TSLRIC-based cost for UCLL in New Zealand are reasonable when compared to international comparators (and some domestic benchmarks).

P2 During this process we have received evidence from access seekers, Chorus, and independent experts on this topic. We also commissioned analysis from TERA and examined evidence from our previous IPPs.

**Our final decision**

P3 In contrast to the IPP, which relied on benchmarking against international comparators, the FPP requires us to build our own TSLRIC-based cost model. This reduces the role of international comparators. Even so, following a submission from Spark in response to our December 2014 draft determination, we asked whether there is any reason to think that our FPP model is producing cost estimates outside what is reasonable.[1707] Despite this, and further submissions and cross submissions on our July 2015 further draft determination, our conclusion remains that the evidence does not suggest our TSLRIC-based price for UCLL is unreasonable.

P4 The three groups of evidence are: data from overseas price determinations; evidence from similar overseas TSLRIC models; and other evidence on key variables (such as the asset valuation).

P5 We examined overseas prices extensively in our 2012 UCLL IPP determination and found limited existing comparator countries, with only Sweden meeting the criteria. A lack of comparable data also applies to the dataset provided by Spark in its submission on the December 2014 draft determination.[1708] In circumstances where parties have requested us to review the IPP price according to the FPP, we consider that it would be a mistake to alter the FPP price on the basis of benchmarking data that we do not consider to be robust for this purpose.

P6 In respect of altering overseas models to make them more comparable we note the following.

P6.1 For our July 2015 further draft determination we commissioned TERA to examine the TSLRIC models of four countries: France, Ireland, Sweden, and Denmark. This report was published in July 2015.[1709] A subsequent report has also been prepared that responds to comments received in submissions

[1707] Spark "UBA and UCLL FPP pricing review draft decision" 20 February 2015.

[1708] ibid, pp. 6-8.

[1709] TERA Consultants "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services: International Comparison of TSLIRIC UCLL and UBA costs and prices" June 2015.

and cross submissions.[1710] TERA did not find any issues or comments that led it to be concerned about its comparability analysis. We have also found no comments that undermine our confidence in TERA's comparability study or the FPP TSLRIC model.

P6.2 WIK provided evidence by inputting New Zealand capital costs into the Swedish TSLRIC model, and submitted that this raised concerns.[1711] WIK found that when the Swedish model was populated with New Zealand data, it produced a significantly lower price than the New Zealand TSLRIC-based price. However, TERA and Analysys Mason have since found significant errors with WIK's modelling which, once corrected, results in a price comparable with the FPP.[1712,1713]

P6.3 While others have submitted that further work on different countries' models should be carried out, no other actual evidence has been submitted. For example, Network Strategies noted that TERA did not consider other publicly available TSLRIC models such as the Netherlands, Norway, and Spain.[1714]

P7 We note that Chorus has also provided evidence comparing specific aspects of the TSLRIC model with other New Zealand and Australian benchmarks.

P7.1 Chorus has previously provided comparisons with Telstra and the regulated asset base of New Zealand electricity distribution businesses (EDBs).[1715] We do not believe these are valid comparisons because EDBs deploy different assets to telecommunication providers and both EDBs and Telstra are subject to different regulatory regimes.

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1710 TERA Consultants "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services: International Comparison of TSLIRIC UCLL and UBA costs and prices – Analysis of critiques to the international comparator report" December 2015.

1711 WIK-Consult "Submission In response to the Commerce Commission's "Further draft pricing review determination for Chorus' unbundled bitstream access service" and "Further draft pricing review determination for Chorus' unbundled copper local loop service" including the revised cost model and its reference documents" 12 August 2015, pp. 123-125.

1712 TERA Consultants "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services: International Comparison of TSLIRIC UCLL and UBA costs and prices – Analysis of critiques to the international comparator report" December 2015.

1713 Analysys Mason "Report for Chorus - UCLL and UBA FPP draft determination cross-submission – Public version" 22 September 2015, section 2.5.

1714 Network Strategies "Final report for Spark New Zealand and Vodafone New Zealand - Revised draft determination for the UCLL and UBA price review" 13 August 2015, p. 98.

1715 Chorus' cross submission to the December 2014 draft determination is not specific in this respect, however see Chorus, "Submission in response to the Commerce Commission's Consultation paper" outlining its proposed view on the regulatory framework and modelling approach for UBA and UCLL services (9 July 2014), 6 August 2014, p. 6. Chorus has also referred to this in other public documents, for example, see Chorus investor presentation, Chorus network modelling, 2 December 2014 and Chorus Institutional Investor Briefing, 21 May 2014.

P7.2 Investors and Chorus have provided comparisons with the entry-level UFB price.[1716] However, we do not consider that this is a useful comparison. The purpose of the TSLRIC model that we have developed is to model the cost of a replacement network carried out by a hypothetically efficient operator rather than modelling a network being rolled out in parallel to Chorus' existing copper/fibre network and subject to government support.

**How international comparators relate to TSLRIC**

P8 The FPP is an important part of the regulatory framework for telecommunication price determinations. Prices are first determined under the IPP methodology of benchmarking against international comparators. Parties have the option to require a full model to be produced under the FPP, under section 42 of the Act.

P9 In the context of a FPP, the role of international comparators is much reduced.[1717] Concerns with the accuracy of the comparators used in the IPP analysis can be one reason for parties to request that we conduct a FPP. The difficulty in using international comparators is highlighted in the case of the UCLL price, where the last re-benchmarking process found only one comparable country, Sweden. This meant that we had to use alternatives to our previous benchmarking methodology to make best use of the data available to determine a price.

P10 Even so, we have examined the available evidence and asked whether this is indicative that our FPP model is producing cost estimates outside what is reasonable. We have found that it is not.

P11 WIK submitted that as the model has produced a cost higher than the IPP cost, we should examine our model more carefully.[1718] We note that, equally, some parties believed the IPP price is too low.[1719]

P12 We note benchmarking can play a role in the FPP where it can act as evidence of what is an efficient cost element within the TSLRIC model. There may be specific parameters which can be guided by international comparators, for example, where a cost input is traded internationally or is otherwise unlikely to vary between countries. For several elements of the TSLRIC model, we have drawn on such evidence, including for asset lives, certain price trends, and elements of non-recurring charges.

[1716] Chorus, Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services (2 December 2014), 20 February 2015, paragraph [11].

[1717] Chorus made a similar point in its cross submission on our draft report (Chorus "Cross-submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services", 20 March 2015, paragraph [5].

[1718] WIK-Consult "Submission In response to the Commerce Commission's "Further draft pricing review determination for Chorus' unbundled bitstream access service" and "Further draft pricing review determination for Chorus' unbundled copper local loop service" including the revised cost model and its reference documents" 12 August 2015, p. 121.

[1719] Chorus "Submission in response to the Revised Draft Determination on the benchmarking review for the Unbundled Copper Local Loop service" June 2012, p. 11.

P13 In our view, the distinction between using benchmarked data to assist us in determining the efficient cost of a particular element within our TSLRIC model, and the benchmarking of overall results, is significant.

**Why we believe the overseas price comparisons do not indicate the TSLRIC-based estimate is unreasonable**

P14 We have twice determined the UCLL price based on international comparators pursuant to the IPP methodology. When we first determined the UCLL price under the IPP in 2007, we had a large database of comparators, including the United States, Australia and countries from the European Union.[1720] We found that the prices determined by US state regulators were significantly higher than other regulators.

P15 When we last determined the UCLL price under the IPP in 2012, we found only one country, Sweden, was comparable. [1721] Given the concerns of basing prices on a single benchmark, we explored other options. This concern was compounded by the absence of US state comparators, which could not be used because prices had not been updated. Excluding the United States had a significant downward influence on the price observed in the 2012 peer group benchmarking. The 2012 IPP outlines that the absence of US state data was a primary contributor to the 30% reduction in price observed in comparison to the 2007 dataset.

P16 Two practical responses were found.

P16.1 We could expand the benchmark set by indexing changes in price since 2007. This indicated a price reduction of 2.11% that could be applied to the 2007 price to determine an updated price.

P16.2 We could adjust non-comparable benchmarks by observed econometric relationships between price and country characteristics. This could also adjust the price to the difference observed in 2007 between the US and other countries.

P17 The 2012 re-benchmarking process used both methodologies to determine the price. In doing so, it set an IPP price above all the raw benchmarks; the higher price reflecting the key issues of the loss of the US state dataset and lack of comparators.

P18 Since the 2012 IPP process, the only new dataset submitted was a benchmark set provided by Spark in response to the December 2014 draft determination. However, the Spark dataset had two key issues.

P18.1 It did not address the main issue that arose in the 2012 IPP—that the loss of the US state comparators created a downward bias in the sample set.

[1720] Commerce Commission "Standard Terms Determination for the designated service Telecom's unbundled copper local loop network" 7 November 2007, Decision 609.

[1721] Commerce Commission "Final determination on the benchmarking review for the unbundled copper local loop service", December 2012.

P18.2 The majority of the countries in Spark's dataset had already been determined as non-comparable in 2012 because the country either differs significantly from New Zealand in a way that is expected to drive costs, or does not use a TSLRIC-based methodology.[1722,1723]

P19 The evidence before us suggests that these differences due to methodology and country-specific factors can significantly impact results. For example:

P19.1 on the basis of WIK's submission, replacing the Swedish model's inputs with New Zealand inputs increases the price from $17.26 to $23.09.[1724,1725,1726] If we accept TERA and Analysys Mason corrections to this adjustment, using the Swedish model, the benchmark UCLL New Zealand price rises to between $34 and $39;[1727,1728] and

P19.2 in the European dataset provided by Spark, the range of prices was $8.[1729] In our previous 2007 IPP dataset, which included US states, Australia, and European countries, the spread of prices approached $20.[1730]

*2007 IPP Dataset*

P20 The 2007 IPP, which had the best comparator database we have achieved under an IPP, is the best illustration of the range of UCLL price in comparable economies. We have reproduced this below and have added the FPP prices for UCLL.

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1722 For example, Belgium, Germany, and the Netherlands all have high levels of population density so are not good comparisons with New Zealand.

1723 For example, Austria, the Netherlands, Portugal, and Spain do not use TSLRIC models.

1724 The Swedish UCLL price becomes $23.09 when New Zealand capital costs are used in the model: WIK-Consult "Submission In response to the Commerce Commission's "Further draft pricing review determination for Chorus' unbundled bitstream access service" and "Further draft pricing review determination for Chorus' unbundled copper local loop service" including the revised cost model and its reference documents" 12 August 2015, p. 128.

1725 The current Swedish national average cost of UCLL is $17.26, as reported by TERA in: "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services: International Comparison of TSLIRIC UCLL and UBA costs and prices" June 2015, p. 13.

1726 WIK-Consult "Submission In response to the Commerce Commission's "Further draft pricing review determination for Chorus' unbundled bitstream access service" and "Further draft pricing review determination for Chorus' unbundled copper local loop service" including the revised cost model and its reference documents" 12 August 2015, pp. 123-125.

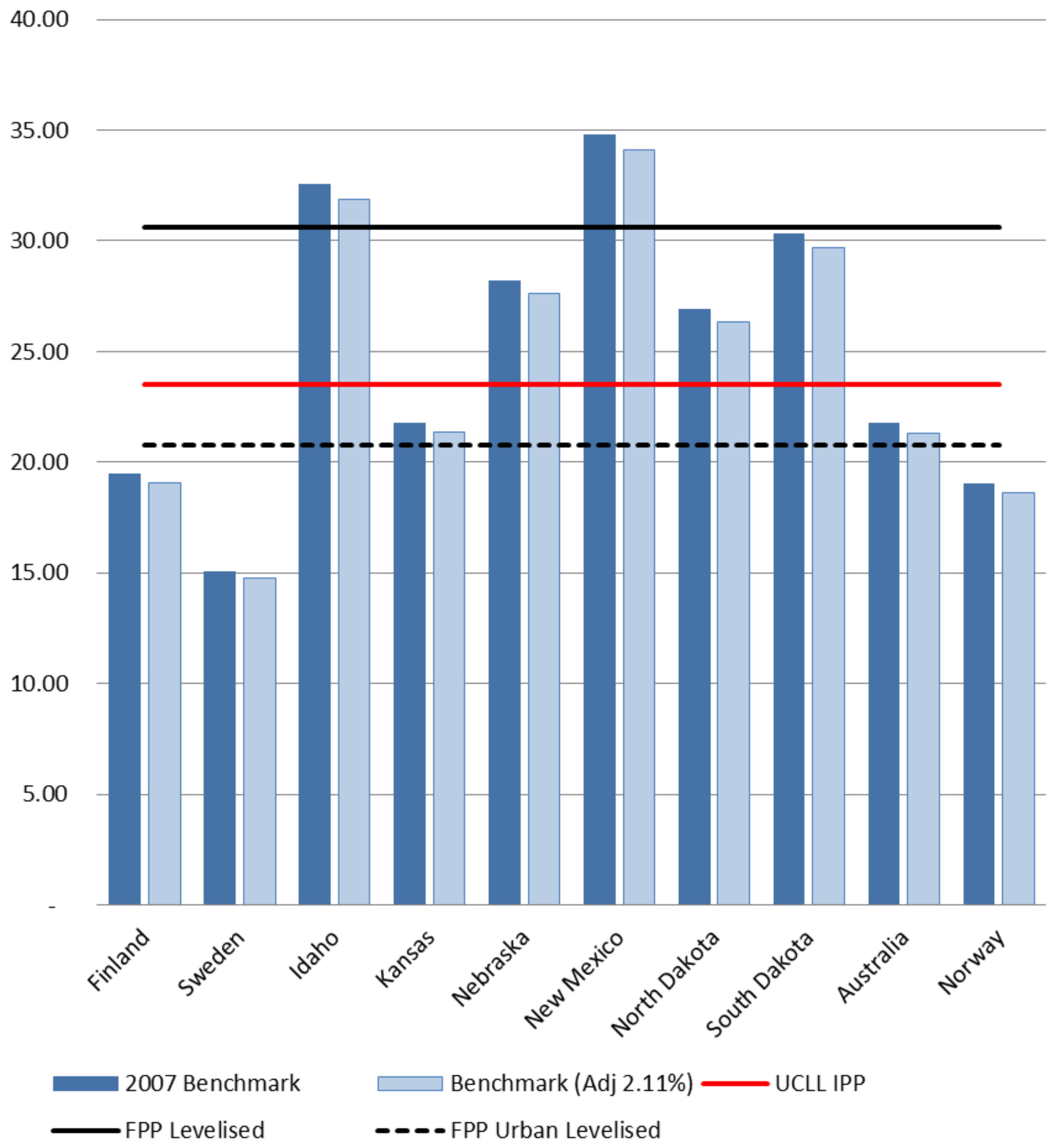
1727 Analysys Mason "Report for Chorus - UCLL and UBA FPP draft determination cross-submission – Public version" 22 September 2015, section 2.5.

1728 TERA Consultants "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services: International Comparison of TSLIRIC UCLL and UBA costs and prices – Analysis of critiques to the international comparator report" December 2015, p. 15.

1729 Spark "UBA and UCLL FPP pricing review draft decision" 20 February 2015, paragraph [7].

1730 Commerce Commission "Final determination on the benchmarking review of the unbundled copper local loop service" 3 December 2012, NZCC 37, p. 24.

**Figure P1: FPP comparison with 2007 dataset**




*Source: Commerce Commission*

P21 The figure above shows that the FPP prices are within the range of US and EU prices, albeit in the upper end of the range. We note, as with the other datasets, there are significant limitations with using this approach as a cross-check to the FPP model and there is limited information we can draw from this to guide the FPP modelling. However, it is a useful addition to other datasets, such as the one provided by Spark in response to the December 2014 draft determination, which does not address the absence of the US state data.

*Network Strategies' submission that the use of US state data is misleading*

P22 Network Strategies criticised the comparison of New Zealand prices to US state prices as misleading and note the US state prices are no longer forward-looking costs and are outdated.[1731] In particular, Network Strategies pointed to the following paragraph of our July 2015 further draft determination:[1732]

> Our experience with international benchmarking dates back to our first determination of the UCLL service in 2007. At that time we used a variety of benchmarks, including Europe, but also those of US state Regulators. The exclusion of the US state benchmarks largely skews the results of this benchmarking downwards.

P23 This paragraph reflects the findings of the 2012 IPP in which we stated:[1733]

> The Commission's view remains that US states do not comply with the forward-looking cost-based requirement, because UNE-L prices fail to meet the "forward-looking LRIC" and "updated and recent" requirements of the benchmarking criteria.
>
> However, excluding US states creates a potential source of downwards bias in the benchmarking data compared to the 2007 UCLL STD. In the 2007 STD, the Commission noted that "…UCLL rates in the US appear to be consistently higher than the non-US observations" for reasons that were not clear. Therefore, excluding these relatively high US prices from the benchmarking data set will lead to a lower price than would have resulted if the US states were included.

P24 We agree that the US prices do not represent forward-looking costs, but still believe that excluding these prices introduces a downward bias to the benchmark set.[1734] We recognise that the underlying cause of the difference between US and European comparators is unknown. This was an inherent limitation of the IPP determination which was recognised at that time. However, we also believe it is very problematic that a full FPP exercise is tested for reasonability against a similar dataset to the IPP (eg, that provided by Spark) but that dataset excludes the US state prices or does not seek to address the downward bias that the absence of the US state data creates.

P25 Consequently, we do not believe the above figure is misleading for the purpose used—asking whether the evidence provided by Spark suggests that the TSLRIC estimate is unreasonable. Instead, the 2007 indexed dataset indicates the spread of prices that may result from TSLRIC modelling, and directly addresses the issue raised in the 2012 IPP (ie, lack of comparable countries and the absence of US state data).

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[1731] Network Strategies "Final report for Spark New Zealand and Vodafone New Zealand - Revised draft determination for the UCLL and UBA price review" 13 August 2015, p. 96.

[1732] Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" and "Further draft pricing review determination for Chorus's unbundled bitstream access" July 2015, p. 9.

[1733] Commerce Commission "Final determination on the benchmarking review of the unbundled copper local loop service" 3 December 2012, NZCC 37, p. 29.

[1734] Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" and "Further draft pricing review determination for Chorus's unbundled bitstream access" July 2015, p. 347.

P26 We note that Network Strategies has not provided an alternative comparable benchmark that would allow a robust comparison between the New Zealand TSLRIC-based price and other international regulated prices.

P27 In relation to the 2007 dataset, WIK submitted that the Commission should adjust the New Zealand price used in this comparison by re-introducing the capital costs excluded in the model due to the TSO boundary.[1735] We have considered whether this would be appropriate given similar adjustments may or may not also be required for other comparator countries.[1736] Overall, given that excluding capital costs will lead to a lower price and including them will lead to a higher price, we believe all of the 2007 dataset comparators would need examining and adjusting. The evidence prepared by TERA in its recent international comparator analysis more fully represents such comparisons rather than the partial adjustments suggested by WIK.

*WIK's submission that we have applied different standards of analysis*

P28 WIK submitted in response to our July 2015 further draft determination "…the question is raised whether the Commission applies […] different standards as to the question of when a benchmark may […] be comparable and when not."[1737] In particular it noted the analysis of the Irish price in TERA's comparator model that accompanied the July 2015 further draft determination, and the Swedish price identified as a comparator in the 2012 IPP.[1738,1739]

P28.1 With regards to the example WIK has referred to, in our July 2015 further draft determination we stated in respect of the Irish price:

> […] we understand that the Irish Regulator's price for UCLL is highly weighted to only the largest exchanges and may, therefore be more comparable to the New Zealand urban price. Within the chart we have included the Irish price set in 2007 when, we understand, such a methodology was not employed. Accepting the limitations in using a 2007 price and non-comparable country as a comparator (or any single data point), we can note that Ireland (unlike Sweden) is similar to our

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1735 WIK-Consult "Submission in response to the Commerce Commission's "Further draft pricing review determination for Chorus' unbundled bitstream access service" and "Further draft pricing review determination for Chorus' unbundled copper local loop service" including the revised cost model and its reference documents" 12 August 2015, p. 121.

1736 For example, we know some countries have similar adjustments (such as Ireland where a large number of capital costs are excluded), as detailed in TERA's report: "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services: International Comparison of TSLIRIC UCLL and UBA costs and prices" December 2015, p. 10.

1737 WIK-Consult "Submission in response to the Commerce Commission's "Further draft pricing review determination for Chorus' unbundled bitstream access service" and "Further draft pricing review determination for Chorus' unbundled copper local loop service" including the revised cost model and its reference documents" 12 August 2015, p. 122.

1738 TERA Consultants "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services: International Comparison of TSLIRIC UCLL and UBA costs and prices" June 2015.

1739 Commerce Commission "Final determination on the benchmarking review for the unbundled copper local loop service", December 2012.

modelled FPP price and its 2007 price is close to our modelled FPP geographic average price.[1740]

P28.2 The other reference provided by WIK, concerning our approach to Sweden, was a statement of our approach under the 2012 IPP:[1741]

> When we last determined the UCLL price under the IPP in 2012, we found only one country, Sweden, was comparable. Given the concerns of basing prices on a single benchmark we explored what other options could be used.

P28.3 We concluded in Attachment Q to the July 2015 further draft determination:[1742]

> In our full examination of comparators in 2012, we concluded, nonetheless, that there were significant problems with the available data which undermined its value as a guide to forward looking costs in New Zealand. Using this now to guide the FPP modelling would undermine the value of the FPP modelling, which has been requested in response to the IPP price.

P28.4 Overall, we found with respect to all the potential comparisons against international regulated prices that "…there are significant limitations with using this approach as a cross-check to the FPP model and there is limited information we can draw from this to guide the FPP modelling".[1743] Our final conclusion with respect to this remains unchanged. In response to WIK's submission that we apply different standards to different benchmarks, we cannot see how the process of seeking out comparable datasets can be interpreted as placing weight only on evidence that supports the TSLRIC model.

P29 WIK also submitted that the Commission should more carefully examine the TSLRIC model where the estimate "…is higher than the cost figures from at least some of the benchmark countries".[1744] We disagree. While we are open to insights from other countries, it is important to remember that this data is being used as a cross-check, and that where the New Zealand price is higher against some benchmarks, but equivalent to or lower against some other benchmarks, we may not have cause to believe the estimate is unreasonable.

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[1740] Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" and "Further draft pricing review determination for Chorus's unbundled bitstream access" July 2015, p. 350.

[1741] ibid p. 347.

[1742] Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" and "Further draft pricing review determination for Chorus's unbundled bitstream access" July 2015, p. 350.

[1743] ibid p. 353.

[1744] WIK-Consult "Submission in response to the Commerce Commission's "Further draft pricing review determination for Chorus' unbundled bitstream access service" and "Further draft pricing review determination for Chorus' unbundled copper local loop service" including the revised cost model and its reference documents" 12 August 2015, p. 121.

P30 Consequently, we do not believe direct comparisons with overseas regulators' UCLL prices offer any evidence to suggest that the TSLRIC-based estimate for New Zealand is unreasonable.

**Why we believe the examination of the overseas TSLRIC models does not indicate the TSLRIC-based estimate is unreasonable**

P31 We commissioned TERA to examine the publicly available TSLRIC models of France, Ireland, Sweden, and Denmark to examine what was driving the difference in international prices with the draft FPP. [1745,1746] TERA has also prepared a subsequent report to respond to submissions on its analysis.[1747]

P32 In July, TERA advised us that customer dispersion across the country is an important cost-driver and that a good indicator of this is the length of network for each customer.

P33 Based on this indicator, TERA has informed us that New Zealand has a materially more dispersed population than Sweden, France, and Denmark. Notably, while Sweden has a population density similar to New Zealand, it is less dispersed.

P34 In making comparisons between the countries modelled, TERA has confirmed that New Zealand's modelled costs:

P34.1 are greater than France's due to New Zealand's higher network length for each customer;

P34.2 are greater than Sweden's due to New Zealand's longer network length for each customer and higher trenching costs; and

P34.3 are greater than Denmark's due to New Zealand's higher trenching costs and longer network length for each customer and Denmark's lower opex due to the network being fully underground.

P35 New Zealand experiences higher per unit trenching costs than Sweden and Denmark. The higher cost per unit of trenching is then exacerbated by New Zealand's population dispersion, which means more trenching is required for each active line.

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[1745] TERA Consultants "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services: International Comparison of TSLIRIC UCLL and UBA costs and prices" June 2015.

[1746] Most countries' TSLRIC models are not publicly available.

[1747] TERA Consultants "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services: International Comparison of TSLIRIC UCLL and UBA costs and prices – Response to Submissions" December 2015.

*Submissions on TERA's international comparators analysis*

P36 Since the July 2015 further draft determination, we have received several submissions and cross submissions in response to TERA's analysis, which TERA has responded to in its subsequent report.[1748] Comments in the submissions and cross submissions have included the following.

P36.1 Network Strategies requested that we add further countries to the list of comparators.[1749] We see little benefit from further work here. If we found that four further countries raised questions about our estimates while the original four countries did not, it would be difficult to see how that result would lead us to conclude the FPP estimates are unreasonable;

P36.2 Network Strategies suggested that the limited public information in some of these countries, or the age of the models, undermines their usefulness.[1750] Part of TERA's initial comparator analysis was to address the shortcomings in the models.[1751] In respect of Sweden, TERA explains that 2009 Swedish costs are not materially different from the most up-to-date costs. Further, Sweden's older model is better as it is based on a copper network, which makes it comparable with the other countries' models.[1752] In respect of Ireland, TERA has explained that Irish prices are now public and the prices are within the range of prices initially calculated by TERA using non-publicly available information.[1753]

P36.3 WIK pointed to evidence that, compared to New Zealand, Sweden is more geographically dispersed rather than less. WIK contended that the population dispersion between New Zealand and Sweden cannot be that different given the similar levels of urbanisation.[1754] In its most recent report responding to submissions, TERA explained that using the metric of population density or road length per line to calculate population dispersion is inferior to using the network length per line. This is because population density does not adequately account for uninhabited land mass and road

[1748] TERA Consultants "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services: International Comparison of TSLIRIC UCLL and UBA costs and prices – Analysis of critiques to the international comparator report" December 2015.

[1749] Network Strategies "Final report for Spark New Zealand and Vodafone New Zealand - Revised draft determination for the UCLL and UBA price review" 13 August 2015, pp. 96-108.

[1750] Network Strategies "Final report for Spark New Zealand and Vodafone New Zealand - Revised draft determination for the UCLL and UBA price review" 13 August 2015, pp. 14-16.

[1751] TERA Consultants "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services: International Comparison of TSLIRIC UCLL and UBA costs and prices" July 2015, p. 7-11.

[1752] TERA Consultants "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services: International Comparison of TSLIRIC UCLL and UBA costs and prices – Analysis of critiques to the international comparator report" December 2015. p. 4.

[1753] Ibid p. 5.

[1754] WIK-Consult "Submission In response to the Commerce Commission's "Further draft pricing review determination for Chorus' unbundled bitstream access service" and "Further draft pricing review determination for Chorus' unbundled copper local loop service" including the revised cost model and its reference documents" 12 August 2015, pp. 128-129.

length per line does not account for motorways with no access network between regions.[1755] We agree with TERA's explanation and consider that network length per line is the most appropriate metric available for determining population dispersion.

P36.4 WIK was not convinced that network length per line is higher in New Zealand and queried whether it is a modelling error.[1756] Similarly Network Strategies' own analysis of road length per active line suggested New Zealand and Sweden are similar.[1757] In response to WIK, TERA outlined that its calculation of network length per line is simply the total length of infrastructures divided by the number of active lines.[1758] In response to Network Strategies, and as outlined above, TERA advised that road length per line does not account for motorways with no access network between regions. TERA also advised that this means Network Strategies' comparison is unreliable.[1759] We therefore do not believe that submissions from WIK and Network Strategies present problems with TERA's analysis.

P36.5 We have noted Vodafone's evidence from the OECD that suggests New Zealand is more urbanised than Sweden.[1760] Like Vodafone, we have contacted the OECD and received no reply. However, we do query this evidence, given it suggests that no one in New Zealand lives in a predominantly rural area. By contrast 70% of Ireland's population falls into this category. In the absence of further detail of the OECD's approach, we consider this evidence is not sufficiently reliable.

P36.6 Network Strategies submitted that specific adjustments in TERA's modelling are not accurate, eg, WACC.[1761] TERA has advised that it did not harmonise WACC between the countries compared as it analysed cost differences stemming from discrepancies in depreciation instead. In the case of long-term assets in TSLRIC models, differences in depreciation are driven largely

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1755 TERA Consultants "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services: International Comparison of TSLIRIC UCLL and UBA costs and prices – Analysis of critiques to the international comparator report" December 2015. p. 11.

1756 WIK-Consult "Submission In response to the Commerce Commission's "Further draft pricing review determination for Chorus' unbundled bitstream access service" and "Further draft pricing review determination for Chorus' unbundled copper local loop service" including the revised cost model and its reference documents" 12 August 2015, pp. 128-129.

1757 Network Strategies "Final report for Spark New Zealand and Vodafone New Zealand - Revised draft determination for the UCLL and UBA price review" 13 August 2015, p. 105.

1758 TERA Consultants "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services: International Comparison of TSLIRIC UCLL and UBA costs and prices – Analysis of critiques to the international comparator report" December 2015, p. 9.

1759 ibid p. 11.

1760 Vodafone "Submission to the New Zealand Commerce Commission on further draft pricing review determination for Chorus' unbundled copper local loop service and further draft pricing review determination for Chorus' unbundled bitstream access service - Public version" 13 August 2015, p. 64.

1761 ibid pp. 107-108.

by the WACC. Therefore we agree that a focus on WACC is not needed, as a comparison of depreciation factors encompasses WACC differentials.[1762]

P36.7 In its latest submissions Spark submitted that “no information is provided in Attachment Q, or the TERA report to indicate how network length per line is distributed around TERA’s measure of length. This is significant as the distribution of line lengths has an important impact on costs”.[1763] TERA suggested that the calculation of the distribution of network length per line is ambiguous as it is not clear whether the metric refers to each building’s share of a line or the incremental amount of line needed to connect each building. TERA advised that it is clearer to use average network length per line as this is a simple calculation of total infrastructure costs divided by the number of lines. It also reflects the distribution of network length in a comprehensive manner (weight for remote lines is proportional to the length of line).[1764]

P36.8 WIK carried out further work by inputting New Zealand capital costs into the Swedish TSLRIC model and submitted that this raised significant concerns.[1765]

P36.8.1 WIK claimed that its modelling produces a New Zealand UCLL benchmark price of $23.09, which is 65% lower than the New Zealand national average figure of $38.13 used by TERA in the international comparator report that accompanied the July 2015 further draft determination.[1766,1767,1768]

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[1762] TERA Consultants "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services: International Comparison of TSLIRIC UCLL and UBA costs and prices – Analysis of critiques to the international comparator report" December 2015, p. 12.

[1763] Spark "Further draft pricing review determination for Chorus’ UBA and UCLL services - Public version" 13 August 2015, paragraph [421].

[1764] TERA Consultants "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services: International Comparison of TSLIRIC UCLL and UBA costs and prices – Analysis of critiques to the international comparator report" December 2015, p. 10.

[1765] WIK-Consult "Submission in response to the Commerce Commission’s “Further draft pricing review determination for Chorus’ unbundled bitstream access service” and “Further draft pricing review determination for Chorus’ unbundled copper local loop service” including the revised cost model and its reference documents" 12 August 2015, pp. 123-125.

[1766] Note that the New Zealand national average UCLL cost used by TERA in the international comparator analysis includes infrastructure outside the TSO boundary. This is explained in: TERA Consultants "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services: International Comparison of TSLIRIC UCLL and UBA costs and prices " June 2015, p. 13.

[1767] WIK-Consult "Submission in response to the Commerce Commission’s “Further draft pricing review determination for Chorus’ unbundled bitstream access service” and “Further draft pricing review determination for Chorus’ unbundled copper local loop service” including the revised cost model and its reference documents" 12 August 2015, p. 128.

[1768] TERA Consultants "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services: International Comparison of TSLIRIC UCLL and UBA costs and prices" June 2015, p. 13.

P36.8.2 Analysys Mason's cross submission stated that WIK excluded capital expenditure for lead-in trench and cable assets valued at $3 billion, which are included in TERA's modelling. If these capital items are reintroduced, the benchmark UCLL price increases to $35.[1769]

P36.8.3 TERA also identified the same issue as Analysys Mason; that is, WIK missed capital costs valued at around $4.7 billion which, if reintroduced, raises the UCLL price to between a range of $34 and $39.[1770]

P36.8.4 It appears that once the $4.7 billion of capital costs are reintroduced to the Swedish benchmark, evidence provided by WIK that the TSLRIC-based estimate is unreasonable no longer stands. This also highlights that relying on any single benchmark is more likely to lead to error. In other words, it is risky to adapt a complex model to represent a country it was not originally built for, rather than undertake a new full model build.

**No other evidence indicates that the TSLRIC-based cost estimate is unreasonable**

P37 Chorus has referenced "sense checks" in previous submissions.[1771] In so doing, we believe Chorus is referencing the Telecom accounting separation 2010 data, the valuation of the Telstra network in Australia, and asset valuation of electricity lines businesses.[1772]

P38 One of these cross-checks refers back to the accounting separation data that Telecom provided to the Commission. We note that in our final summary and analysis of this data we stated:[1773]

> The Commission notes that the asset valuation methodologies that Telecom has adopted can materially affect regulatory financial statements for its Services Groups and products. The Commission considers that Telecom's CCA valuation of its passive network appears to be substantially overstated. Further work is necessary before the valuation will be useful for understanding the operations of Telecom's Access Services Group and before it can be used to assess Telecom's behaviour with regard to these services.

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[1769] Analysys Mason "Report for Chorus - UCLL and UBA FPP draft determination cross-submission – Public version" 22 September 2015, section 2.5.

[1770] TERA Consultants "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services: International Comparison of TSLIRIC UCLL and UBA costs and prices – Analysis of critiques to the international comparator report" December 2015, p. 13.

[1771] Chorus "Cross-submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services" 20 March 2015, paragraph [4].

[1772] Chorus' cross submission is not specific in this respect, however see Chorus "Submission in response to the Commerce Commission's Consultation paper outlining its proposed view on the regulatory framework and modelling approach for UBA and UCLL services (9 July 2014)" 6 August 2014, p. 6. Chorus has also referred to this in other public documents, for example see Chorus investor presentation, Chorus network modelling, 2 December 2014 and Chorus Institutional Investor Briefing, 21 May 2014.

[1773] Commerce Commission "Summary and Analysis of Telecom Corporation of New Zealand Limited's Regulatory Financial Report" May 2011, p. 25.

P39 We also note that the Current Cost Accounts of Telecom may not be representative of the optimised assets used in the FPP TSLRIC model. Consequently, we believe that relying on this evidence has limited value as a cross-check.

P40 The other cross-check relies on the asset valuation of regulated lines companies in New Zealand and of the Telstra telecommunications network in Australia. Given EDBs deploy different assets to telecommunications providers, and the EDBs and Telstra are subject to a different regulatory regime, again we believe these have limited value as a cross-check. [1774]

P41 Chorus previously referred to the entry-level UFB price as a potential cross-check and suggests that the FPP is too low.[1775] Given UFB prices were set by contract, they may not necessarily represent a TSLRIC-based price.[1776] We note that a number of aspects are considered when comparing the UFB and FPP prices. Most notably, the UFB is not a fully-loaded network but has been deployed in parallel to the existing network and shares some of its infrastructure.

P42 Chorus and investors have also queried the reasonableness of specific assumptions in the model and argued that this is not a viable business case.[1777] In our December 2014 draft determination and in the July 2015 further draft determination, we noted that the conventional approach to TSLRIC "is that it is not intended to be a business plan for building and operating a high-speed nationwide network replacement".[1778,1779]

P43 Our TSLRIC model has a fundamentally different starting point to a business plan and makes a number of assumptions that would not apply to a business plan.

P43.1 We are setting the cost based on a national replacement network, not on an expansion of Chorus' network or on a competing network.

P43.2 As Chorus' copper network and the UFB infrastructure do not exist, the network would need to be built from scratch.

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1774 See ACCC, "Inquiry to make final access determinations for the declared fixed line services: Final Report", July 2011. In this inquiry the ACCC set an initial valuation on the Telstra RAB following its decision to move from a TSLRIC based methodology to a building blocks methodology.

1775 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services (2 December 2014)" 20 February 2015, paragraph [11].

1776 Vodafone made a similar point, see Vodafone "Cross-submission to the New Zealand Commerce Commission" 20 March 2015, paragraph [D2.11].

1777 Chorus "Cross-submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services (2 July 2015)" 24 September 2015, p. 2.

1778 Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014, paragraph [156]; and Commerce Commission "Draft pricing review determination for Chorus' unbundled bitstream service" 2 December 2014, paragraph [156].

1779 Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 2 July 2015, paragraph [184]; and Commerce Commission "Draft pricing review determination for Chorus' unbundled bitstream service" 2 December 2014, paragraph [183].

P43.3 Chorus' copper demand and UFB demand are served by a hypothetical efficient operator that does not re-use or share existing assets.

P43.4 Nationwide demand for the hypothetical network is guaranteed and instantaneous.

P44 In reality, the UFB roll-out is supported by public funds and will be provided by four contracted parties (serving different areas of New Zealand) rather than one hypothetically efficient network.

# Attachment Q: Chorus' cost model

### Purpose

Q1 This Attachment sets out our view of Chorus' cost model and how it has been considered as part of the UBA and UCLL final determinations.

### Our final decision

Q2 Our final decision is not to use Chorus' cost model to set the prices of UCLL and UBA services in New Zealand.

Q3 Chorus' cost model has been used to update and inform some aspects of our TSLRIC model, including unit costs and opex allocation.

### Background

Q4 As part of the consultation process, Chorus submitted its own cost model developed by Analysys Mason. The model calculated prices (in constant nominal terms) to be:

Q4.1 $74.10 for UCLL;

Q4.2 $81.43 for sub-loop unbundling (SLU); and

Q4.3 $16.57 for UBA. [1780,1781]

Q5 In addition to the model being subject to submissions and cross submissions, we asked TERA to review the model and compare it to the model developed by TERA.[1782] TERA's review was published along with our July 2015 further draft determination.

Q6 TERA's report and the comparison of the two models were based on the December 2014 version of TERA's model.

### Submissions

Q7 Spark submitted that Chorus' cost model diverges materially from the requirements of a TSLRIC cost model as required under the Act.[1783] This was because Chorus' model largely reflects the current network and the legacy choices that shaped it. According to Spark, the Chorus model "is instructive in demonstrating the embedded effect of historic decisions in the construction of the existing UCLL local access

[1780] Analysys Mason "Model user guide for UCLL hybrid bottom-up model" Public Version 28 November 2014, paragraph [2.1].

[1781] Analysys Mason "Model user guide for UBA model" Public Version 28 November 2014, paragraph [2.1].

[1782] TERA Consultants "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services: - Analysis of Chorus cost model" March 2015.

[1783] Spark "Submission on UBA and UCLL FPP pricing review determination" CONFIDENTIAL, 20 February 2015, paragraph [114].

network", but it does not provide the economic value of the UCLL and UBA networks.[1784]

Q8 Vodafone similarly submitted that Chorus' cost model is not suitable for the TSLRIC modelling required and should be disregarded.[1785] It argued that Chorus' cost model reflects Chorus' actual network and therefore does not reflect an economically efficient operator utilising modern equivalent assets (MEA) and as a result does not adhere to the our TSLRIC modelling criteria and principles.[1786]

Q9 Network Strategies carried out a review of Chorus' cost model, against our TSLRIC criteria, for Spark and Vodafone. Network Strategies concluded that there are substantive differences, some of which relate to alternative values of inputs and assumptions, while others are contrary to the fundamental principles of TSLRIC modelling and as such fail to comply with the requirements of the final pricing principle process.[1787]

Q10 Network Strategies highlighted five areas where Chorus' cost model is not consistent with the principles of TSLRIC or the requirements of the final pricing principle (FPP) process – the model includes:

Q10.1 potentially inefficient historic network design;

Q10.2 no efficiency adjustments for operating costs;

Q10.3 increasing asset counts with constant service demand;

Q10.4 declining service demand for UBA; and

Q10.5 annuities that are not tax adjusted.[1788]

Q11 As a consequence of its review, Network Strategies recommended that we disregard Chorus' cost model as it does not reflect the efficient deployment of a hypothetical efficient operator's MEA network.[1789]

Q12 WIK also carried out a review of Chorus' cost model for Spark and Vodafone. WIK submitted that the model does not estimate the cost of an efficiently engineered

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1784 Spark "Submission on UBA and UCLL FPP pricing review determination" CONFIDENTIAL, 20 February 2015, paragraphs [114, 177].

1785 Vodafone "Submission on process paper and draft pricing review determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and comments on Analysys Mason's TSLRIC models" 20 February 2015, paragraph [O4.5].

1786 Vodafone "Submission on process paper and draft pricing review determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and comments on Analysys Mason's TSLRIC models" 20 February 2015, paragraph [O2.2].

1787 Network Strategies "Final report for Spark New Zealand and Vodafone New Zealand - Commerce Commission draft determination for UCLL and UBA" CONFIDENTIAL, 20 February 2015, p. 73.

1788 Network Strategies "Final report for Spark New Zealand and Vodafone New Zealand - Commerce Commission draft determination for UCLL and UBA" CONFIDENTIAL, 20 February 2015, p. 75-78.

1789 Network Strategies "Final report for Spark New Zealand and Vodafone New Zealand - Commerce Commission draft determination for UCLL and UBA" CONFIDENTIAL, 20 February 2015, p. 92.

copper network and does not derive efficient costs. Instead, WIK argued, the model is valuing an inefficient network.[1790] WIK considered a number of factors in Chorus' cost model.

Q12.1 Adjustments made to account for network optimisation, infrastructure sharing and aerial deployment are too low.[1791]

Q12.2 Opex has not been adjusted to account for a new fibre network.[1792]

Q12.3 The model does not consider a fibre MEA.[1793]

Q12.4 Using Chorus' asset counts as a starting point means that it reflects legacy choices which are not necessarily efficient.[1794]

Q12.5 Some input parameters inflate the resulting prices because they do not reflect our decisions and do not necessarily reflect a new network build.[1795]

Q13 In cross submissions, Analysys Mason agreed that bottom-up models can lead to "more robust" estimates of a hypothetical efficient operator's required assets compared to estimates from top-down models.[1796] While it did note that some of Network Strategies' and WIK's specific points were incorrect it did not disagree with their substantive points.

**TERA's review of Chorus' cost model**

Q14 TERA's review of Chorus' cost model shows that while there are many similarities between TERA's model and Chorus' model, there are also very significant differences. We have summarised some of TERA's main observations below. Please refer to TERA's full report for further discussion.

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1790 WIK-Consult "Submission in response to the Commerce Commission's Draft pricing review determination for Chorus' unbundled bitstream access and unbundled copper local loop services including the cost model and its reference documents" CONFIDENTIAL, 20 February 2015, paragraph [458].

1791 WIK-Consult "Submission in response to the Commerce Commission's Draft pricing review determination for Chorus' unbundled bitstream access and unbundled copper local loop services including the cost model and its reference documents" CONFIDENTIAL, 20 February 2015, paragraph [148].

1792 WIK-Consult "Submission in response to the Commerce Commission's Draft pricing review determination for Chorus' unbundled bitstream access and unbundled copper local loop services including the cost model and its reference documents" CONFIDENTIAL, 20 February 2015, paragraph [466].

1793 WIK-Consult "Submission in response to the Commerce Commission's Draft pricing review determination for Chorus' unbundled bitstream access and unbundled copper local loop services including the cost model and its reference documents" CONFIDENTIAL, 20 February 2015, paragraph [469].

1794 WIK-Consult "Submission in response to the Commerce Commission's Draft pricing review determination for Chorus' unbundled bitstream access and unbundled copper local loop services including the cost model and its reference documents" CONFIDENTIAL, 20 February 2015, paragraph [471].

1795 WIK-Consult "Submission in response to the Commerce Commission's Draft pricing review determination for Chorus' unbundled bitstream access and unbundled copper local loop services including the cost model and its reference documents" CONFIDENTIAL, 20 February 2015, paragraph [479, 481-482].

1796 Analysys Mason "Report for Chorus - UCLL and UBA FPP draft determination cross-submission" CONFIDENTIAL, 20 March 2015, paragraph [2.13.1].

Q15 For the calculation of opex, both models are based on Chorus' accounts, but no efficiency adjustment is applied in Chorus' model. Compared to Chorus' model, opex for UCLL was [ ]**CCNZCI** lower in the December 2014 version of TERA's model and [ ]**CCNZCI** lower for UBA.[1797]

Q16 The core network in both models is based on a bottom-up approach, but while TERA has modelled each node in the network, Chorus has used a geotyping approach and is therefore less precise. Combined with a different scope of the modelled networks, higher weighted average cost of capital (WACC) and unit costs, this results in Chorus' costs for UBA being 51% higher than in TERA's model from December 2014.[1798]

Q17 According to TERA's review, the biggest difference between the two cost models is the approach to the modelling of the access network. Chorus' model for the access network is a top-down model based on Chorus' copper network and inventory where adjustments have been made to take into account a higher degree of aerial deployment and some degree of optimisation applied to the inventory. In contrast, TERA has modelled an optimally-structured access network based on a bottom-up approach informed by the existing number of nodes and their existing locations.

Q18 In addition, Chorus' model has not taken into account capital contributions relating to rural broadband initiative (RBI) funding or those received outside the telecommunications service obligations (TSO)-derived boundary. TERA's model does take these into account, as discussed in Attachment K.

Q19 Furthermore, Chorus has used a higher WACC, higher unit costs, shorter asset lives and lower price trends. All these differences results in the annuity for the access network being 274% higher in Chorus' model than in TERA's model from December 2014.[1799]

**Analysis**

Q20 We generally agree with submitters that Chorus' cost model does not reflect the costs of an efficiently built network. It is primarily a top-down model based on Chorus' copper network with some minor efficiency adjustments, rather than a bottom-up model based on an optimised MEA network with significant efficiency adjustments applied where needed.

Q21 Chorus' cost model is not consistent with our framework. While some of the differences between the output of Chorus' and TERA's cost models relate to the use of different input parameters which can be changed like WACC and asset lifetimes, they are also the result of fundamental methodological differences like the choice of MEA, the degree of optimisation and most importantly, the starting point of the cost

[1797] TERA Consultants "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services: - Analysis of Chorus cost model" March 2015, p. 4.

[1798] TERA Consultants "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services: - Analysis of Chorus cost model" March 2015, p. 5.

[1799] TERA Consultants "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services: - Analysis of Chorus cost model" March 2015, p. 5.

calculations (top-down or bottom-up). In addition, Chorus' cost model does not estimate costs for non-recurring charges.

Q22 However, we have considered how aspects of Chorus' cost model can inform our modelling. Chorus' cost model has been used to update some aspects of our model, including unit costs and opex allocation. These are outlined in TERA's changes to modelling document.[1800] In addition, we have reviewed the trenching component of Chorus' cost model to assess whether our costs are reasonable. We discuss Chorus' trenching costs in more detail in Attachment J.

Q23 For the above reasons we find that Chorus has not presented us with an appropriate TSLRIC model that can be used to set the prices of the UCLL and UBA services in New Zealand.

1800 TERA Consultants "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services: - Implemented Changes" June 2015, p. 8, 14.