WIK-Consult • Report

Report for Spark New Zealand and Vodafone New Zealand

Cross Submission

In response to the submissions to Commerce Commission's "Consultation paper outlining our proposed view on regulatory framework and modelling approach for UBA and UCLL services (06 August 2014)"

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Executive Summary

1. **WIK strongly supports that FTTH is the MEA.** The question, if adaptions to the FTTH service will have to be made for old fashioned copper based services is a question of migration and out of scope of the MEA decision. **Possible adaption costs do not represent TS-LRIC costs of the UCLL service.** These additional services would be produced either by the RSPs or the additional equipment would be purchased by the end users.

2. **WIK recommends that the Commission continues its way of a mixed FTTH/FWA MEA approach** and additionally takes LTE developments into consideration which have the potential of enlarging the FWA area beyond the current RBI area. **WIK does not share Chorus' opinion about exclusion of FWA from MEA**. To interpret the MEA concept just using one single evaluation criterion is not appropriate. Purpose of the MEA concept is to find the state of the art equivalent asset at adequate costs in order to increase welfare, guarantee competition and promote reasonable investor decisions.

3. **WIK recommends that also in New Zealand for optimizing the network of a hypothetical efficient operator, a modified scorched node is used**. Cost models with modified scorched node approaches exist and are used in many best practice regulatory processes (Austria, Germany, Norway, Spain, Switzerland).

4. **WIK advocates that the cost model for New Zealand should be sufficiently flexible to allow applying different rates of aerial deployment**, either per geotype or, more accurately, per MDF area, depending on the degree of detail in which the relevant data is available. We explicitly rebut Chorus' position not to integrate the existing aerial infrastructure of Chorus itself, since the HEO deploying the MEA network is assumed to replace

5. **The 100% demand level must necessarily include all lines of any other service that are provided over the access network, including leased line, bounded line and special data access line services, also lines that are already migrated to fibre.** When Chorus argues that fibre already migrated should not be considered, it neglects to recognize that the hypothetical FTTH MEA network is to be present wherever Chorus was present before the advent of the UFB, independently of whether realized by Chorus or the other LFCs.

6. **The proposal of Chorus is not appropriate for identifying efficient OPEX**. Chorus does not represent the hypothetical efficient operator to be modelled. Also the OPEX of incumbents typically offer a lot of potential for reduction to an efficient level.

1 Introduction

7. WIK-Consult has been appointed by Spark New Zealand ("Spark", formerly Telecom New Zealand) and Vodafone New Zealand ("Vodafone") to support both companies in the course of the further FPP and cost modelling process of the Commerce Commission for UCLL and UBA fees. Nevertheless, this cross-submission focusing on Chorus' submissions dated 6 and 12 August 2014 is brought to the attention of the Commission as an independent expert report.

8. In order to avoid redundancies WIK only gives comments on the more controversial issues in Chorus' submissions. For the rest WIK refers to its own submission of August 6th 2014.

9. For easier reading and comparison, the structure of this submission follows the structure of Chorus' submission of 6 August 2014. If not otherwise stated all references in this text ("***para.***") relate to the corresponding paragraphs of Chorus' text.

2 UCLL model

10. Chorus states, that "to determine the appropriate MEA, the starting point should be the regulated service that is being priced. This is a conventional TSLRIC approach. Pricing should reflect the cost of replicating the services that end users receive today. RSPs enjoy the value the regulatory service delivers and the regulatory bargain is that they pay the efficient costs of providing it" (***para. 15***).

    WIK does not share this opinion. The MEA concept itself allows or even requires to identify modern substitutes instead of relying on services of today. 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 today deploy a new network based on twisted copper pairs. In addition, new technologies will increase welfare for end users. If the MEA would be 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 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 focused on cost efficiency does not fit the MEA concept. The preference of Chorus for modelling a copper MEA (***para. 4.2)***, is not sufficient to meet the MEA interests***.*** A potential higher risk of FTTH data uncertainty, described by Chorus, (***para. 16)*** can be met by also relying on the decision upon benchmark data.

11. One important decision to be taken in the FPP process is if FTTH is the MEA of choice. This we strongly support. The question, if adaptions to the FTTH service will have to be made for old fashioned copper based services is a question of migration and out of scope of the MEA decision. The customers will have the option to migrate to more modern fibre based solutions or to adapt their old solutions to the new transmission medium at the time of enforced migration, when the copper based services will be ceased. The sections to follow cover further arguments being addressed by Chorus regarding the inclusion of service migration aspects into the MEA price decision.

12. In case the Commission will use an FTTH/FWA MEA, Chorus claims, that a FTTH/FWA network will not without additional components support important services that RSPs and end users value highly today (***para. 11***). In addition Chorus claims that a point to point FTTH network can support the services that RSPs and end users today have as long as the model includes additional costs and "fixes". The additional services include EFTPOS terminals in shops, and alarms in homes and businesses for a large number of New Zealanders. In addition, Spark would be unable to buy the network inputs it requires to meet its TSO commitments or to provide its legacy analogue PSTN voice services.(On this topic see Analysys Mason, Response to July Consultation (6 August 2014) at 1.6.) (***para. 13***).

The proposals made by Chorus, to add additional costs to the costs derived from an FTTH cost model for equipment adapting the fibre network to the old services of end users and RSPs to the fibre network to the costs derived from an FTTH cost model, are not convincing. The object of the model is to determine the cost of the Chorus UCLL service by using the MEA approach. The UCLL service provides an access to end users premises without any service layer. The services and equipment and its additional costs to an FTTH access line described by Chorus are not part of the UCLL service. In other words: These costs do not represent TS-LRIC costs of the UCLL service. These additional services would be produced either by the RSPs or the additional equipment would be purchased by the end users.

13. Additionally, such an artificial markup on the fibre cost would raise further questions: Would Chorus pass the extra money on to the RSPs or to their end-customers using the related services? Or would Chorus keep the money? In either case, the inclusion of additional cost for old service adoption to an FTTH network makes no sense. The FTTH MEA price is applied also to the UCLL service. Passing the extra money on to RSPs or end-customers then results in refunding for a service they use without additional cost, because using copper UCLL additional equipment is not needed. If Chorus keeps the money this would lead to an additional income of Chorus without any equivalent benefit for the customers or their RSPs, which pay for services they today can use without additional technical equipment and its related cost.

14. Moreover an inclusion of additional costs to the TS-LRIC, which are not part of the UCLL service, would distort a make or buy decision of an efficient operator. An artificially increased UCLL fee would lead to an inefficient duplication of access infrastructure.

15. The fact that an FTTH based network no longer supports physical characteristics of a copper line, i.e. it does not support the direct transmission of analogue electrical signals, but requires them to be emulated by converting them into digital signals being then transmitted in an optical manner, should not result in allocating these service specific cost to all customers of the FTTH access networks, also to those which are not using these (old) services.

16. All customers benefit from the new options of the FTTH network. Those continuing to use the old analogue services will have to pay for the trade-off caused by the network upgrade, when they become upgraded and the copper will finally be switched off. This gives sufficient time for looking for alternative and modern solutions. The fact that end-customers or service providers will have to pay for upgrades due to technological evolution is permanent practice in the IT and telecommunications markets.

17. An increased UCLL fee assumes a technical solution and related cost, which might not be efficient from the end customer's point of view as to how he will adapt to and use the new access networks and when. Thus the approach of adding a markup onto the FTTH MEA fee incapacitates end-users and RSPs. This thinking conflicts with the concept of free markets in which the players shall decide by themselves, how they will use unbundled services.

18. Furthermore, a new FTTH network should be used to develop new and more efficient services and should not be used to maintain services of the old copper network, where this is not appropriate. So a markup for the old services implies that inefficient solutions would be chosen by end customers and RSPs.

19. Justifying additional costs to TS-LRIC with reference to just one example of the Swedish regulator (***para 303***) falls far short of being sufficient. This holds in particular as Analysys Mason does not describe how the Swedish regulator discussed this issue, how it valued arguments against costs overriding TS-LRIC and how it came to its decision.

20. The history of the technological upgrades required due to the cease of the obligation to provide analogue leased lines in Europe provides a case in point where no additional cost has been included in the regulated fees of the terminating segments of (digital) leased lines. Thus technological improvement must not necessarily generate additional fees to be shared also by users of modern technology. A similar observation could be made regarding the migration from the analogue voice network (PSTN) to the ISDN networks in Europe, where the end customers paid for the additional terminal adapters during a relatively long migration period. These customer dedicated cost had not been included into the regulated voice termination fees.

21. WIK strongly recommends, that the costs of UCLL will be calculated on the basis of TS-LRIC for FTTH/FWA without any markup representing services which are not part of the UCLL service. There is no question that an FTTH model is a suitable approach to calculate the MEA costs of a copper UCLL line, because a naked fibre line is completely capable to substitute a naked copper line. Differences can just result concerning parts further up in the value chain provided by/to end users and/or RSPs, which are not part of the regulated wholesale services.

3 FWA

22. Chorus states, that "FWA should not be included in the Commission's model. FWA cannot be unbundled at layer 1 so it does not replicate the most basic functionality of UCLL, and is not a suitable input for an RSP looking to provide differentiation with its choice of technology and capacity to the end user. FWA can only be unbundled at layer 2, and the overall capacity of an FWA network is controlled by the wholesaler rather than the RSP." (***para 39***)

23. WIK does not share Chorus' opinion. Chorus' conclusion was obviously based on the assumption that there is only one single evaluation criterion and this is the availability to unbundle the wholesale product. To interpret the MEA concept just using one single evaluation criterion is not appropriate. Purpose of the MEA concept is to find the state of the art equivalent asset at adequate costs in order to increase welfare, guarantee competition and promote reasonable investor decisions. From a customer's point of view the Chorus assumption would imply that customers would further rely on copper services, because FWA rollout would not take place. FWA instead allows to serve customers with a fixed (radio) access line: a) in areas where there are no copper access lines, because the distances would have been too long for transmitting a telephone signal, or b) the copper access lines exist but are too long to transmit a sufficiently strong broadband access signal (even with cabinetisation). Thus there are areas in which FWA offers an improved service to the end customers in comparison to what a copper access line can do, and this with lower or equal cost. Covering alternatively New Zealand instead completely with an FTTH access network is an unrealistic MEA due to the enormous costs – and the UFB initiative decided against doing so.

24. Due to the technical evolution, it is possible to replace copper lines with FWA solutions less expensively than with newly constructed FTTH lines in the cost intensive sparsely populated rural areas. The technological evolution of mobile solutions, especially 4G and 5G LTE and the use of low frequencies, will have the effect that the FWA footprint is more and more able to substitute copper lines. These considerations show that the assumption of one single evaluation criterion, unbundling, is not adequate to the MEA concept in cost intensive areas, where customers would receive poor or no services otherwise. In other words: Sticking to unbundling would harm customers' interest in preventing them from getting access to broadband solutions with a reasonable cost/benefit ratio. The Commission as well as TERA have judiciously weighed a whole range of criteria in order to identify suitable MEA products. WIK recommends that the Commission continues this way of a mixed FTTH/FWA MEA approach and additionally takes LTE developments into consideration which have the potential of enlarging the FWA area beyond the current RBI area.

25. Additionally, the development of VDSL Vectoring and its regulatory treatment in Europe demonstrate, that NRAs do not in all cases insist on physically unbundling facilities. Vectoring is a crosstalk suppressing DSL technology allowing higher bandwidth for the end customers at the expense that only one operator may get access to the copper pairs of a cable binder[1]. Using Vectoring and its benefits requires abstaining from physical unbundling of copper lines. To the benefit of more bandwidth to the end customers, many European regulators decided to modify the physical unbundling obligations of the incumbent operators. Instead an active bitstream wholesale service like Virtual Unbundled Local Access (VULA) has to be offered, in its characteristics coming as close as possible to the physical unbundled local (sub)loop[2]. This is a compromise and balances a quick and cheaper bandwidth increase against an expensive and late-coming – it at all – FTTH investment. This demonstrates that these NRAs respect customer interests and do not stick to unbundling if that would result in poor services for the next regulatory periods.

26. Moreover Chorus denies FWA as part of an MEA approach in areas where copper/FTTN-access is not offered by Chorus: “As we have previously submitted, in relation to those end users not currently served by fixed line, the scopes of the services being modelled are defined in the UCLL and UBA STDs. Those RBI premises which are not served by Chorus’ copper/FTTN network are beyond the scope of the service being modelled. In short, Sweden and Australia are not.a precedent for replacing fixed line access with FWA.” (***para 39***). Analysys Mason adds on behalf of Chorus: "Accordingly, PTS is ensuring that where “LLUB is offered” FWA is not used; it is only used in the last 50k homes, which is an area in which there is no broadband demand in the model (and comparable to the number of lines with no existing ADSL offer). We have previously documented that TeliaSonera has a plan to use wireless to serve approximately the same number of homes. In New Zealand the equivalent in my opinion would be to exclude lines which are currently served using baseband remote from the geographical scope of UCLL. Other European regulators do not cost FWA as the MEA for LLU.” (chapter 1.9, page 12 of 21 pdf-pages)

27. WIK rebuts Chorus view. Chorus does not only produce UCLL and UBA with its copper/FTTN network, but also other services. Consequently the scopes of the services being modelled cannot only be defined by the UCLL and UBA STDs.[3]

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1 With access to all copper pairs of a cable binder, the transmitted signals are known and the crosstalk of each copper pair into the other copper pairs can be estimated and substracted/corrected. By this the bandwidth decrease can be reduced significantly on short distances.

2 Plückebaum, T.; Jay, S.; Neumann, K.-H.
Benefits and regulatory challenges of VDSL vectoring (and VULA), Florence School of Regulation, Communications Media 2014 Scientific Seminar, March 28 – 29, 2014, Florence, EUI Working Papers RSCAS 2014/ 69,
http://fsr.eui.eu/Publications/WORKINGPAPERS/ComsnMedia/2014/WP201469.aspx

3 See WIK submission of 6th of august, ***para.56***.

Consequently for modelling purposes the whole copper/FTTN network of Chorus has to be taken into account.

28. As regards customers outside the copper/FTTN network of Chorus, we agree with Chorus view. These customer premises are not part of Chorus' services and do not fall under purview of the current regulatory process. Otherwise, areas with very remote customer premises would be included by the model which would likely unduly increase the average costs of UCLL.

29. In order to clarify further remarks of Chorus and Analysys on Sweden: These remarks apply to areas outside the regulated copper/FTTN network[4]. Areas inside the copper/FTTN coverage area have to be regarded differently, as WIK described above. In these areas FWA (instead of FTTH) should be the MEA to substitute copper/FTTN.

4 In Sweden the most sparsely populated geotype 5 is assumed to be only served by FWA. No copper (or Fibre MEA) lines are assumed.

4 Optimisation and scorched node

30. Chorus agrees with the Commission that the scorched node approach is the appropriate approach (***para. 45, 52***). It states that the Commission's cost model is based on reality and the reality is that the nodes of a network cannot be readily altered (***para. 53.2***).

    This statement does not reflect that the TS-LRIC concept regards a hypothetical efficient operator which will construct its network in a state of the art and efficient manner. Even when taking the MDF locations as given (scorched nodes), this approach involves modifying the existing access network with regard to the local access areas and with regard to trench routing and cabinet locations to obtain efficient solutions. Thus, basing the Commission's cost model only on the existing access network topology is not adequate to calculate the costs of a hypothetical efficient operator. Moreover, also in reality operators modify network nodes in order to optimize their networks.

    This is also supported by regulatory practice. Cost models with modified scorched node approaches exist and are used in regulatory processes. For example, the German regulatory authority, BNetzA, has since 1999 been using such a cost model with the possibility of optimizing number and locations of cabinets and trenches. Just the MDF locations are scorched.[5] The Swiss and the Austrian NRA use models of the same family.

31. Furthermore, a modified scorched node approach is international best practice for identifying the potential for cost efficiency. In Norway a modified scorched node approach was chosen. All passive nodes can be optimized:

    > *"Principle 24. A modified scorched-node principle will be used, in which the level of scorching is clearly defined as an a priori assumption at the building locations of the MDF in the network. Consequently, in the current network deployment, all of the concentrators and switching elements in such accommodation are assumed to be deployed in efficient locations.*
    >
    > *Nodes below the level of RSX will not be retained for scorching, i.e. actual locations of MF/HF/EF in Telenor's network will not be retained. In addition, any RSXs that are not field deployed will also not be retained. Instead, during the offline calculations for the access network, the network design algorithms will derive locations for any intermediary nodes, as described in Section 5.2.3."*[6]

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5 Bundesnetzagentur has only published early versions of the model documentation on its website. http://www.bundesnetzagentur.de/SharedDocs/Downloads/DE/Sachgebiete/Telekommunikation/Unternehmen_Institutionen/Marktregulierung/Massstaebe_Methoden/Kostenmodelle/Anschlussnetz/AnalytischesKostenmodellAnId264pdf.pdf?__blob=publicationFile&v=3

6 Conceptual approach for the LRIC model for fixed networks, Final model specification, Norwegian Post and Telecommunications Authority, 11 February 2010 S.44.

For the illustration of the passive nodes[7]:

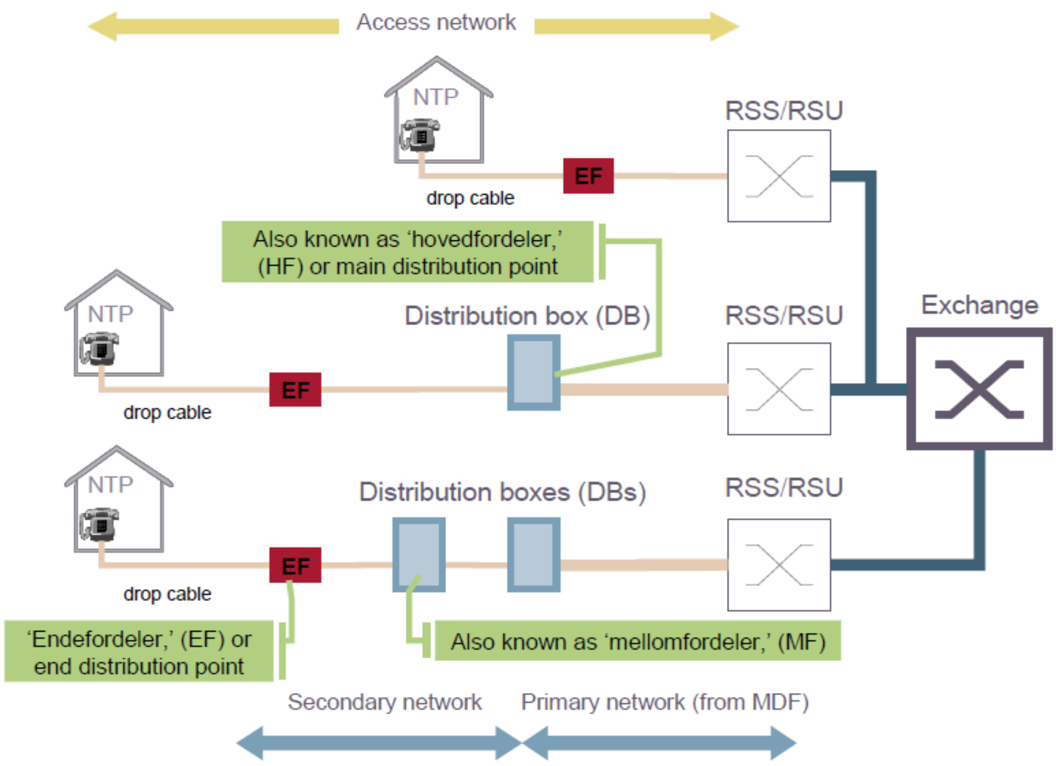

Figure 5.1: Topology of the copper access network [Source: Telenor, Analysys Mason]

32. Spain also uses a modified scorched node approach. Just the MDF locations are scorched nodes, the rest of the access network is optimized:

> *"The model will have to take the existing MDF (Main Distribution Frame) locations of Telefónica's access network, i.e. the existing local exchange locations, into account as so called scorched nodes, which we do not change. The access areas covered by such MDF locations shall be optimized by efficiency criteria, thus the existing MDF borders are not taken into account."*[8]

33. WIK recommends that also in New Zealand for optimizing the network of a hypothetical efficient operator, a modified scorched node is used.

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7 Conceptual approach for the LRIC model for fixed networks, Final model specification, Norwegian Post and Telecommunications Authority, 11 February 2010 S.31.

8 http://www.cmt.es/ver-documento?&articleId=3175085: Bottom-up cost model for the fixed access network in Spain - Reference document, WIK-Consult GmbH, 15. March 2012, S. 1.

5 Deployment/Aerial

34. We recommend that the cost model for New Zealand should be sufficiently flexible to allow applying different rates of aerial deployment, either per geotype or, more accurately, per MDF area, depending on the degree of detail in which the relevant data is available. We have observed degrees of aerial deployment in rural geotypes larger than 60%[9], and as far as we can see the Norwegian model calculates an aerial degree of 21% for the most rural geotype 15[10]. Especially this model demonstrates a high degree of flexibility in applying aerial, ducted and directly buried cabling, which supports our recommendation not to apply ex ante caps for any deployment form, but allowing a differentiated consideration at least at the level of geotypes (see ***para 45***).

35. Besides the degree of aerial deployment in the incumbent's copper access network, which can be assumed to be used for fibre cabling also, there are additional forms of sharing aerial cabling with third party networks (e.g. power utilities, traffic control, etc.). This may increase the degree of aerial deployment in total above the level so far used already. Even in areas where so far no aerial cabling is used for telecommunication or power distribution networks it may be efficient for an HEOhypothetical efficient operator (HEO) to deploy aerial instead of buried infrastructure. Which forms of aerial deployment make sense for New Zealand depend strongly on the country's circumstances.

36. We explicitly rebut Chorus' position not to integrate the existing aerial infrastructure of Chorus itself (***para 76***), since the HEO deploying the MEA network is assumed to replace Chorus and its existing infrastructure, thus also the pole infrastructure and the sharing options[11]. Therefore it is irrelevant whether Chorus has a duct/ trench/ pole sharing obligation or not. The figures from other LFCs show that higher aerial rates are possible in New Zealand (***para 65***). Chorus just insists that other LFCs are not representative for an HEO and that Chorus is the better reference, however, it does not provide the evidence for that (***para 64***). May it not be that LFCs with higher aerial rates are more relevant for an HEO for state of the art aerial deployment, because they produce more efficiently? Moreover, also the rates of other operators than Chorus need not to be at their end, as these figures have probably not been checked for efficiency (***para 65***). Furthermore we want to point out that international benchmarks on aerial rates give no hint as to what a HEO will be able to realize in New Zealand: The figures referred to neither show whether the situation in other countries is comparable to New Zealand, nor do they inform, whether other NRAs have the necessary methods enabling them to prescribe efficient rates of aerial deployment (***para 66***).

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9 http://www.wik.org/uploads/media/ECTA_NGA_masterfile_2008_09_15_V1.pdf, country reports for Italy (pp 147) and Portugal (pp 162).

10 http://www.npt.no/marked/markedsregulering-smp/kostnadsmodeller/lric-fastnett-aksess, the relevant model: LRIC-modell aksessnett versjon 1.7 - Network Design, sheet A5NwDsG15, lines 271/ 272

11 See also WIK submission of August 5th, 2014, p4, ***para 19*.**

6 Demand

37. Demand is a key variable in a bottom-up TSLRIC model. All stakeholders have extensively commented on the importance of this variable. Here we set out to clarify what the role of demand plays in the context of a bottom-up TSLRIC model and in the process rebut Chorus' misguided assertions on this issue.

38. Demand actually has two roles, first as the most basic determinant of the size of the network, second as the bearer of the cost that has been caused by that network. In order to appropriately appreciate these two roles, it is worthwhile to look more closely at what a bottom-up TSLRIC model accomplishes.

39. As the "C" in its name indicates, a TSLRIC model is a cost model, so what it accomplishes is the determination of the cost of services provided by a network. That network is first simulated on a computer based on information about the demand to be met, the inputs needed to construct the relevant network, and the relevant engineering know-how. In this part of the modelling process, demand plays the role mentioned first above. For simplicity, we restrict ourselves here to the demand for and the provision of only one service, access over FTTH lines, that, again for simplicity, needs only one input, let us call it an access network. Then the cost of an access line can be presented to equal:

$$c = \alpha * C \qquad (1)$$

where c stands for the cost of the access line, C for the total cost of the input and α for the share of that total cost that is to be attributed to the access line in question.[12] Here the second role of demand comes in, in that α stands for the reciprocal of the volume of demand, so that if there are Q access lines demanded and supplied, α = 1/Q, and this share of total cost is allocated to that access line.

Turning to C, we assume that the only input causing it is a long-lived facility, the cost of which consists primarily of the cost of and on the capital invested into it, the cost of operating the facility, and a mark-up for common cost. The discussion here will focus on the derivation of the capital cost, since in the process of this discussion the role of demand in cost determination can best be demonstrated.

The Commission has stated that it considers applying the tilted annuity approach. Both Spark and Vodafone as well as WIK have proposed to use the tilted annuity with an additional adjustment for demand changes. The formula for the annuity has then besides a tilt for anticipated future changes in the price of the facility also a tilt for expected changes in the level of demand. In the following we concentrate on the tilt due to demand changes, assuming for the moment that expected future changes

12 Obviously, in an actual model there are many inputs, and equation (1) contains then many components like $\alpha_i * C_i$

in the price of the facility is zero so that no price tilt becomes relevant. The simple annuity formula (assumed to be known) then becomes

$$I_0 = \frac{A_1}{(1+WACC)} + \frac{A_2}{(1+WACC)^2} + \cdots + \frac{A_n}{(1+WACC)^n} \quad (2)$$

In (2), I_0 stands for the investment at time 0 and the A_t stand for the amounts of amortisation to be earned (or covered by cross subsidisation[13]) during the n periods of the economic life of the facility. Different from the simple formula, the A_t may differ in value from period to period, since it is expected that demand for active connections will change from period to period and therefore the contributions to the amortisation of the invested capital also changes in step with these demand changes. To make this more transparent, the expression for amortisation in period t, A_t, is split into two components, i.e.

$$I_0 = \frac{c_1 Q_1}{(1+WACC)} + \frac{c_2 Q_2}{(1+WACC)^2} + \cdots + \frac{c_n Q_n}{(1+WACC)^n} \quad (3)$$

where the Q_t represent the volumes of services demanded and supplied in the various years, here the number of access lines, and c_t the amount of required amortisation per access line (for which we use the letter c in recognition of the fact that the required amortisation is a cost). Since there are no expected changes in the price of the input, we can let c_t be a constant value. It is then equivalent to the c of equation (1), since there it was said that c equals total cost of all access lines divided by the total number Q of those access lines; here, when c is multiplied with Q, the result is equal to total cost during year 1, which is the equivalent of C in equation (1).

Coming back to the first role of demand as determinant of the size of the infrastructure, we observe that this infrastructure should be modelled to be large enough to accommodate the largest number of active access lines that may be demanded during any of the n years of its economic lifetime. Since the FTTH MEA network is to be modelled for the whole territory of New Zealand, equivalent to the one that in the final state will be covered by a network providing a new set of services with a technology that is better performing than the current one (either UFB or FWA), one should expect that there will be growth. It follows that the infrastructure, in terms of premises passed, should have the capacity to provide the number of access lines demanded in the period when this growth has materialized.

40. Before interpreting above results, we need to make a point regarding the size of the network we looked at and the implications that follow from it. While the discussion in the proceedings so far has mostly been in terms of a nationwide MEA network that is to be modelled to replace the current copper network, the argument in the preceding paragraph, without saying so explicitly, has been in terms of one local

13 This observation recognizes the corresponding requirement under the TSO.

access area. Therefore, when it is the question of a nationwide network, this will be the network of all such local networks looked at together. In other words, the nationwide network is a collection of many such local access networks that hang together by the switched trunk network, but are otherwise independent of each other. The first implication of this is that the modelling task consists in fact in determining the costs for many individual access areas and that the final result will be the average of the average costs per line for all access areas in the country. The other implication concerns the economies of scale that can be realised. Given that each access area is a network of its own, independent of any of the other access areas, economies of scale are completely realised at the level of each access area and the fact that there are other access areas does not influence the cost in any particular one. The point is that the modelling exercise should endeavour to determine a nationwide average cost per access line that in terms of realised economies of scale is representative for all the access areas in the country.

41. Interpreting the result of the preceding paragraphs in terms of the FTTH MEA network to be modelled, the modeller should determine (in principle for each individual access area) the period 1 + k at which the maximum number of access lines will be reached. Ideally that would be the number of premises passed by the trenches and cables. While in the periods up to 1 + k the number of access lines increase continuously – possibly quite slowly – toward that maximum, this level would stay constant from that period on. According to this view, the number of access lines in period 1 + k represents 100 % of demand for which the model would install in each access area a network with the corresponding capacity.

42. The 100% demand level referred to above must necessarily include all lines of any other service that are provided over the access network, including leased line, bounded line and special data access line services, also lines that are already migrated to fibre. When Chorus argues that fibre already migrated should not be considered, it neglects to recognize that the hypothetical FTTH MEA network is to be present wherever Chorus was present before the advent of the UFB, independently of whether realized by Chorus or the other LFCs. The reason is that the reference price for UCLL must be based on the average cost of access lines that is representative for the whole country. If as Chorus argues (paras 82, 84 and 85) only active copper lines in areas where now the LFCs provide services and where users have already migrated from copper to fibre, should be included, this would substantially raise the cost per line in these areas, and since the average cost figures of these areas would enter the national average, increase the latter one, too. This would lead to distorted prices not providing the right signals to both users and investors. The access lines of Chorus' UFB networks should be included in any case, since the reference network operator operating the FTTH MEA access network is the surrogate for Chorus, and the underlying infrastructure of the FTTH MEA access network is equivalent to that underlying Chorus' UFB network. The fact

that the LFCs other than Chorus are now rolling out their UFB networks in three regions of New Zealand is essentially the outcome of a political process (which we are far from critizising); if, however, these operators had had to make a choice at the time between offering service on the basis of unbundled loops or erecting local networks using their own resources, they could have weighed this on the basis of prices for the UCLL calculated on the basis of the then 100% of demand. Requiring current and future investors to weigh similar decisions on the basis of a price for the UCLL that is upward biased would not only be discriminating but also inefficient.

43. While it follows from equations (2) and (3) that the revenues obtained on the basis of corresponding prices will cover the initial investment, the time profile of the revenues will involve lower levels during the early periods, thereby not making contributions towards that part of capacity that will lead to connections only at a later period. This would be different if there were declining demand. Chorus also supports a tilted annuity approach, where this support is motivated by its claim that demand will in fact be declining. While again revenues to be realized over the relevant period would cover the investment, the time profile would involve higher levels in early periods and lower ones in later periods. The consequence of Chorus' declining demand scenario would likely be that the total number of lines over which total cost is to be spread would be lower so that the cost (following equation (1)) and the price based on it would be higher. The underlying premise of a declining demand, however, is, as argued above, not warranted given that the hypothetical FTTH MEA network will cover the same area as its copper and UFB footprint together and therefore is expected to rather generate an increasing demand.

Implementing the model by recognizing for each access area the peak of expected demand and the future period in which this happens, and determining the annuities according to equation (3), may be considered too complex. The alternative is to construct the network for each access area on the basis of all premises passed and make an assessment of the development of connections in the form of an initial start value and an average growth rate. Using this approach, one would replace the concrete Q_t in equation (3) by terms that are a function of the initial number of connections, i.e. Q_1, and the estimated average growth rate, i.e.

$$I_0 = \frac{p_1 Q_1}{(1+WACC)} + \frac{p_1 Q_1 (1+g)}{(1+WACC)^2} + \frac{p_1 Q_1 (1+g)^2}{(1+WACC)^3} + \cdots + \frac{p_1 Q_1 (1+g)^{n-1}}{(1+WACC)^n} \quad (4)$$

The value of g would have to be selected to approximate the same total number of access lines as in the more complex approach. One obtains then a formula for a factor with which the value of the initial investment is to be multiplied to give the amount of the amortisation for the first year, i.e. $p_1 Q_1 = f_1 \, I_0$. The formula is shown below:

$$f_1 = \frac{WACC - g}{1 - \left[\frac{(1+g)}{1+WACC}\right]^n} \quad (5)$$

In order to determine the annuities for the following years, one multiplies f_1 by (1+g) to obtain f_2, then f_2 again by (1+g) to obtain f_3 and so forth. Determining the annuities in the framework of a bottom-up cost model on the basis of (5) is more convenient and less error prone.[14]

14 In the WIK-Consult 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'", a more complete discussion is found regarding the determination of annuities, including the version based on expected future price changes.

7 Asset Sharing

44. We totally support Chorus' opinion (Para 107) that the hypothetical efficient operator (HEO) should share network infrastructure with third party networks. As we have described in our submission[15], these third party networks should not only include telecommunication network operators but all operators with line infrastructure also usable for fibre cables, like ducts, poles, sewers, or even gas and water tubes. We expect that the costs and the extent up to which the sharing is to be applied are in accordance with the state of the art practice in modern network construction and are not in accordance with the costs and the extent of application that correspond with the past practice in New Zealand. Nevertheless, this sharing has to be realistically achievable today under the New Zealand circumstances. According to the TSLRIC approach, the HEO will start its network roll out under today's conditions.

45. We also want to keep in mind (see 15) that sharing of network assets should also take place between the different network levels of the access network (feeder, distribution segments) and between the access and the higher level networks (aggregation and core), where the sharing can be calculated endogenously by the model. Thus no separate trenches for the different levels should be allowed but the common use of trenches, ducts and poles be assured.

46. Sharing to the utmost extent which is technically and operationally feasible meets the investor's expectations of using all options for lower investment and cost.

47. If it is argued (Para 64) that the HEO cannot realize sharing due to the fact that it is not owning appropriate infrastructure (as North Power does). One can use the assumption that an HEO will outsource some trenching to the utility[16] owning the infrastructure that are suitable for sharing, since it is in the economic interest of both to reduce cost. It is not required that the infrastructure to be shared is owned by the telecommunications operator.

48. We propose to also consider an additional wholesale income due to sharing of passive infrastructures like ducts and poles, even giving the fact that Chorus is not required to share its infrastructure (Para 76). An HEO, which is not identical to Chorus, meeting its investor's expectations, will maximize its income by additional wholesale business, even if not obligated to do so, as many competitive infrastructure providers in Europe do on a voluntary basis[17]. In this sense Chorus' reference to the Swedish example is misleading: An efficient operator will try to increase sharing by itself; it does not need local regulations encouraging or obligating it in order to realize economies of scales and scope and thus cost savings (Para 108).

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15 WIK submission of August 5th, 2014, pp.28
16 WIK submission of August 5th, 2014, pp.30
17 See Wingas, Ruhrgas in Germany, Versatel in Germany or Iliad (Dark fibre) in France.

8 Operational expenditure

49. Chorus states, that the use of the incumbents' operating expenditure in informing the modelled operating expenditure is common practice in bottom-up models (***para. 116)***. WIK cannot confirm this. The German NRA has since 2007 been using the IPRI[18] model to determine common costs including operational expenditure in order to compare the cost documents of incumbent Telekom Deutschland with regard to efficiency.[19]

50. In addition Chorus claims that Chorus' costs are likely to be informative as to the cost of an HEO (***para. 117)***. Chorus proposes that the Commission should exercise caution in utilising operating cost data from other LFCs and applying those to the modelled operator. The Commission has already proposed that the HEO will have the same service profile as Chorus, in the sense that the HEO's non-regulated services will be based on the services offered by Chorus in the market at the time that the final price is determined (***para. 119)***.

    The proposal of Chorus is not appropriate for identifying efficient OPEX. Chorus does not represent the hypothetical efficient operator to be modelled. Also the OPEX of incumbents typically offer a lot of potential for reduction to an efficient level. For example, in Germany the use of the IPRI model led and leads to a significant reduction of the mark-up applied for these costs.[20] For the IPRI model, the German regulator collected data from competitors in order to be able to identify best practice and efficiency potentials.[21] In order to properly assess the different service portfolios, sizes of operators and thereby the ability to realize scale effects etc., the IPRI model chose a cost driver approach in order to reflect this. This practice shows that it is also necessary, possible and worthwhile to use the data of other carriers, even in the case that the cost documents were made more transparent by the incumbent. The IPRI model, filled also with data from other market players, is still being used by the German NRA for the purpose of achieving OPEX reductions to an efficient level.[22]

51. In addition, Chorus mentions that it is notable that the recent Ernst & Young review of operating costs identified savings that might come from lowering service levels

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18 IPRI stands for International Performance Research Institute (http://ipri-institute.com). IPRI is an economic research institute specialized on performance management of organizations, companies and company networks. On behalf of German BNetzA, IPRI developed a model to calculate common/operational costs and processed regularly its data collection of competitors in Germany.

19 http://beschlussdatenbank.bundesnetzagentur.de/index.php?lr=view_bk_overview&getfile=1&file =1411, Bundesnetzagentur, BK4-07-001, S. 38 – 42.

20 http://beschlussdatenbank.bundesnetzagentur.de/index.php?lr=view_bk_overview&getfile=1&file =1411, Bundesnetzagentur , BK4-07-001, S. 38, 4.3.1.7.

21 http://beschlussdatenbank.bundesnetzagentur.de/index.php?lr=view_bk_overview&getfile=1&file =1411, Bundesnetzagentur, BK4-07-001, S. 39.

22 http://beschlussdatenbank.bundesnetzagentur.de/index.php?lr=view_bk_overview&getfile=1&file =5929, Bundesnetzagentur, BK3-13-002, S.65/66.

and increasing lead times for fault repairs. Ernst & Young did not find that operating cost levels in Chorus were out of line with Chorus' peers. Ernst & Young also identified potential increases in operation expenditures from delaying capital expenditure[23] in proactive network maintenance facilities, and delaying investment in new IT systems (***para. 118)***.

52. Having a look at Appendix 5, page 17 shows, that obviously in the peer group are companies acting in other markets than Chorus' (for example Auckland Airport, APA Group (Energy). Ernst & Young just states, that operating cost levels in Chorus were out of line with Chorus' peers. Neither Chorus nor Ernst & Young explain, why these members of the peer group are comparable to Chorus concerning OPEX costs nor do they explain, if a comparison was valid and why all the individual OPEX costs of the peer group members each represent efficient costs. Instead, it is more likely, that different industries of the infrastructure sector differ in the particular industries' efficient OPEX rates. In other words: It is theoretically possible, that Chorus is highly inefficient while for example Auckland Airport is highly efficient.

53. Ernst & Young states on page 12, that "the separation from TNZ covering activities and IT systems may be delayed or investment in those systems deferred leading to increased OPEX and/or provisioning lead times." In this context Ernst & Young does not state if separation from TNZ justifies inefficiencies. Especially the question is not answered by Ernst & Young, if other options for avoiding OPEX increase have been checked. And even if the split justifies some inefficiency, this doesn't justify all potential inefficiencies. Without having all necessary information about this split, the statement of Chorus has no value. Besides this separation driven argumentation one has to keep in mind that a HEO does not suffer from historic separation burdens but is a new operator.

54. Generally it has to be stated in this context, that in any case, politically driven decisions by Chorus management between CAPEX and OPEX would not necessarily reflect cost efficiency. Such CAPEX/OPEX decisions are often driven by company political decisions (for example fulfilling expectations of rating agencies in order to influence the share value on a short term basis), which do not necessarily reflect cost efficiency. Therefore, for the purpose of TSLRIC modelling, WIK recommends to take into account exclusively rational cost efficiency analysis rather than such investor related political factors. If CAPEX delays were to be accepted by the Commission, in any case these CAPEX assets would have to be regarded as reuseable assets, which are already depreciated.[24] Furthermore it would have to be checked, as to which extent CAPEX/OPEX swaps occured in order to prevent double counting of cost in CAPEX and OPEX.

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23 We understand capital delay as not reinvesting in new assets after the end of the book asset lifetime but using it longer.

24 See also WIK submission of August 6th 2014, ***para. 16-19***.

55. Chorus states, that in addition to establishing appropriate operating costs for the HEO, the Commission is required to form a view on how these costs might change during the regulatory period (***para. 122)***. In particular, the base level of operating costs needs to take into account the lifetime level of the assets and the related operating expenditure. A new network, such as the one to be modelled by the Commission, is likely to initially have a relatively low level of network maintenance costs. However, these costs will rise over time (***para. 124).***

According to WIK's experience: when using OPEX mark-ups derived from data of the incumbent and its competitors reflecting efficient OPEX, the resulting OPEX are not related to the age structure of the (new) asset of the HEO, but reflect an industry's best practice value of the OPEX for the typical asset age structure in the industry.