WIK-Consult • Report

Study for Vodafone NZ and Spark NZ

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

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Executive Summary

1. Whilst the Commission has made many adjustments and some improvements, the TSLRIC cost as calculated by the Commission is still significantly above the true TSLRIC in New Zealand. The benchmarking is deficient and must be rejected. Service transaction charges as calculated by the Commission are too high and do not represent efficient costs. Not to backdate is the right decision.

2. A major part of this report covers the analysis of the revised cost model. We compare the final structure and inputs of the 2015 model and the revisions that have been applied since the 2014 cost model. We identify previously raised modelling critiques which have been addressed by TERA and the Commission but which have not led to appropriate changes in the model. We identify those aspects of the model critique as presented in our February Submission which do not appear to have been considered by TERA (or the Commission). Furthermore, we present some newly occurring modelling errors and inconsistencies that have been introduced into the 2015 model. We also carry out sensitivity testing and find the cost model is extremely sensitive to certain input assumptions and parameters.

Backdating

3. The Commission's majority view – not to backdate – is correct. Our analysis on backdating is based on the assumption that the final FPP price will be determined at a higher price than the prevailing IPP price, as given the further draft determinations this appears to be a likely outcome. Our assessment on TERA's cost modelling and the required amendments to produce a true TSLRIC cost assessment for UCLL and UBA in New Zealand, as presented in our February Submission and re-confirmed in this Submission, leads us to strongly recommend a final FPP price which is below the IPP price. However, we are clear that such an 'opposite' price differential would not affect our advice on the effects and dangers of backdating. Were the FPP price to fall below the current prevailing level, we would also regard backdating as an inappropriate regulatory approach leading to distortions and inefficiencies in the market, to the detriment of competition and consumers.

4. Backdating does not contribute to improve the efficiency of making rational business decisions. Efficiency requires that market players take the relevant prices into account when conducting their business model and investment decisions. Given the uncertainty of the outcome of the FPP pricing determination, rational business decisions in New Zealand (at least to change the current business model) have to wait until the FPP process has come to an end. Backdating leads to a redistribution of revenues and wealth between market players without the opportunity to reflect this at the retail pricing level. At its best, it is neutral with regard to efficiency. In any case it does not contribute to increase efficiency. The more

probable outcome is that backdating distorts business decisions, generates additional uncertainties and therefore has a negative impact on efficiency.

5. Backdating can enhance dynamic efficiency if it generates proper incentives to invest and/or if it is a prerequisite for keeping investment incentives which would be damaged if backdating would not occur. This, however, does not hold in New Zealand. Under the UFB and RBI programmes, the infrastructural investment for the future-proof fibre network infrastructure has been made or is committed. Further investment incentives are not required to enhance basic network infrastructure. Thus we do not agree that Chorus would suffer negative investment incentives if the Commission were not to backdate. There is, however, the strong risk that investment incentives of RSPs are negatively affected by backdating.

6. We identify no arguments why backdating might promote competition. We could, however, identify impacts that will negatively affect competition at the retail level. The direct effect of backdating on competition would depend (at least to some degree) on the payment approach applied for backdating.

Non-recurring charges

7. In our October 2014 Submission we argued that a bottom-up cost modelling approach represents the most appropriate method to determine the TSLRIC for recurring charges as well as for one-off transaction charges. We have shown that this is the first-best approach to directly determine the cost of an efficient operator, while in contrast all potential methodological alternatives may achieve or approximate the same result indirectly and imperfectly.

8. Our analysis and assessment of the Commission's approach towards cost determination of service transaction charges leads to recommendations of ways to make the Commission's approach more robust, accurate and convincing and would lead to a more efficient cost level. All proposals are related to the top-down approach with efficiency adjustments, notwithstanding our assessment that this second best approach to cost estimation is inferior to the first-best approach that is bottom-up cost modelling.

9. The Commission could improve the robustness of its cost (and pricing) approach to generate more efficient costs by implementing the following recommendations. The Commission should:

   (1) develop an efficiency adjustment approach which does not limit the scope of efficiency adjustments to significantly less than 50% of the service transaction cost. Rather, 100% of the relevant cost base should be subject to efficiency adjustments.

(2) include in the international benchmark for efficiency adjustments only countries which have a similar or roughly similar level of labour productivity and labour costs compared to New Zealand in the international benchmark for efficiency adjustments.

(3) update its “old” benchmark figures to make them more reflective to efficiency gains in the benchmark countries. The “raw” benchmark figures should for that purpose be indexed with an annual productivity factor of 5% p.a.

(4) make more efforts to avoid using inflated benchmark numbers by excluding (a) transport times and (b) administrative times from the relevant processing time.

(5) withdraw its national cross-checking approach based on fibre connection costs totally because they are not comparable to copper connection costs.

(6) if does not follow this more far reaching approach it should definitively apply the national cross-checking approach symmetrically. Also in case where it would lead to lower costs it should be applied and not only in case where it would lead to higher prices.

(7) apply a bulk discount scheme which is more cost reflective and is not only defined by a particular threshold.

(8) apply bulk discounts to the UBA-related service transaction charges.

(9) limit the scope of POA based pricing to the absolute necessary minimum. The services 1.48 and 1.50 should not be priced according to POA.

(10) extend the scope of price determination to include the lead-in service and the services “10 GigE handover installation”, “network investigation” and “capacity where customer reconnect to the network”.

(11) “clean” the use of service codes in its mapping approach such that cost and work elements which do not belong to the regulated transaction services are excluded from the relevant cost base.

(12) not accept the direct costs of service companies as given. It should in particular check the appropriateness of the cost allocation within the multi-product relationship between Chorus and the service companies. There is an incentive on Chorus’ side to distort these allocations at the expense of transaction charges.

(13) revise the service company overhead mark-up because it is generally too high and leads in some cases to a double-recovery of costs.

(14) correct Chorus' overheads for efficiency and automation savings.

(15) incorporate foreseeable efficiency improvements in the provision of transaction services within the regulatory period. This could be conducted by implementing a productivity improvement factor as a price path of -3% to -5% p.a. from the calculated cost of the base year.

Model analysis

10. Our model analysis demonstrates that there are many items where the model design and parameter changes are not adequate, sufficient or correct. Improvements that we have proposed, in many cases, have not clearly been addressed by TERA or the Commission. We also describe issues raised in previous submissions that have not generated a response. In addition we highlight new modelling errors and also inconsistencies between the modified model modules.

11. Our sensitivity analysis compares the 2014 model - and even more importantly the major cost categories - with those of the 2015 model. Our analysis demonstrates significant changes in most model inputs. Many of the revisions have not been described or explained in the draft decision or the accompanying model description documents, despite having major impact on the final results. The overall net effect of all changes in the model parameters and the modelling approach results in only minor changes in the final outputs: the new UCLL and UBA charge proposal. The minor overall net effect masks the significant magnitude of the variations in modelling assumptions and inputs that have taken place in the 2015 model revision.

12. For example, non-network related and common costs have changed dramatically since the 2014 model, without an obvious explanation. These changes have also not been checked for efficiency nor are they benchmarked. We therefore strongly recommend the Commission analyse these cost positions and improve the modelling transparency. We expect and strongly recommend significant reductions in non-network and common costs.

13. OPEX levels are still much too high compared to our international experience. OPEX is not modelled using a bottom-up approach but are instead just taken from Chorus' accounts. Moreover, these are not checked for efficiency, nor do they consider efficiency improvements over time as one would reasonably expect from a modern telecommunications operation. Instead, the adopted approach manifests existing inefficiencies. Thus, we recommend the Commission analyse and rework the approach to OPEX completely, either using a bottom-up approach or by at least

including efficiency adjustments to the initial values and their development over time.

14. The consideration of the cost of leased lines relies on one intransparent benchmark approach, which is significantly below the level we wold expect from our experience in other markets. Using national data provided by Chorus would be the most reliable way of appropriate cost allocation between services making use of the access network infrastructure. Therefore we recommend the Commission use its legal power to request the appropriate data from Chorus and so enable a detailed cost allocation approach. We cannot imagine that a modern telecommunications operator does not have a sufficiently detailed database, at least for its network management systems.

15. The geospatial modelling remains critically intransparent, despite the additional documentation which the Commission provided late in this submission period. It has at least revealed that the Voronoii approach chosen is based on a straight line instead of shortest road length allocation of the cabinet respectively MDF areas. Importantly, we have shown that this approach is inefficient. This shortcut in approach by allowing an inefficient geospatial modelling approach appears to have been accepted by the Commission as a means to ensure a faster computation time. It has become clear that the shortest path is not applied in two ways, the access areas for the MDFs and street cabinets are inefficiently delineated and an augmented shortest path for the trench length is not applied. We strongly recommend applying these tools as proposed here.

16. The network model still is not a bottom-cost model to the extent one could and should expect. This includes the modelling of the core network and the street cabinets. Furthermore, the MEA chosen for the UBA should be the same as used for UCLL. These approaches would contribute to efficiency improvements consistent with a proper state-of-the-art network design approach. Thus we recommend the Commission to advise TERA implementing these aspects.

17. The costs of network elements did change between the 2014 and 2015 model versions, however in an erratic manner and these, in general, are overestimated and often inappropriate sizes are used. This holds for the electronic equipment and the passive elements cables, joints, ducts and FWA sites. In general, the equipment prices should be supplier neutral and not only rely on the incumbent's prices and investments that have not been checked by benchmarks. Therefore we strongly recommend the Commission request TERA rework the set of network elements, their sizes and their cost in this regard. This would result in major efficiency improvements, in a real HEO MEA approach, which is state-of-the-art, and by this resulting in an increase in predictability, reliability and investment security for the approach taken for the Commission's decision, to the long term benefit of all stakeholders of the New Zealand telecommunications market.

18. The following table shows how drastic major model parameters and structural cost elements have changed as a result of model revision. These are selected examples which should highlight that such changes would have needed explanation and justification which was mostly not provided. Some of the individual parameter changes (e.g. fibre cables and sub rack prices) each have an (ceteris paribus) impact of around 10% on the UCLL/UBA cost calculation.

Selected parameter changes from the 2014 to the 2015 model		
	Cost elements	**Relative increase 2015/2014**
1.	Sub rack exchange price	617%
2.	CCT/FAT prices	up to 262.30%
3.	Copper cable prices	up to 1,021%
4.	Fibre cable prices	up to 746%
5.	Joints prices	up to 12.08%
6.	Duct prices	up to 62%
7.	Non network costs	78.8%
8.	Common cost share UCLL	116.8%
9.	Common cost UCLL (absolute cost)	120%
10.	CAPEX share UBA	44.1%

International comparison

19. The Commission has found that among the countries whose UCLL cost may be used as a benchmark for the cost of the UCLL in New Zealand, Sweden is the only one that could be considered as comparable to New Zealand. We agree. We are of the opinion that it is good procedure to take a single benchmark that, as in the case of Sweden, is similar to New Zealand and uses a bona-fide TSLRIC bottom-up cost model, and to apply to the resulting benchmark adjustments for those country-specific differences to New Zealand that still exist.

20. We have adjusted the Swedish cost model for New Zealand-specific cost driver differences regarding trench length per line, trenching costs and capital recovery factor. This results in an adjusted value of the Swedish benchmark of 23.09 NZD per month. This value has to be compared with the value of 38.13 NZD that TERA on behalf of the Commission showed to be the relevant cost for New Zealand. The result of this comparison is that the cost in New Zealand based on a properly adjusted benchmark is more than 65% higher than in Sweden.

21. Based on its own identification of an appropriate comparator country, the TSLRIC cost model developed by TERA for the Commission overestimates the relevant costs in New Zealand by 65%. If this factor of cost overestimation is applied to the FPP price proposal, New Zealand consumers would benefit from the effects of a decrease in wholesale UCLL prices from $ 26.74 to $ 16.19.

1 Introduction and acknowledgements

1.1 Introduction

22. WIK-Consult has been appointed by Spark New Zealand ("Spark") and Vodafone New Zealand ("Vodafone") to support both companies in the course of the cost modelling and FPP process of the Commission. Nevertheless, this Submission is brought to the attention of the Commission as an independent expert report.

23. This Submission deals with the Commission's further draft pricing determinations regarding UCLL and UBA and the updated and revised cost model provided by its consultant TERA. This Submission is focussed on the cost modelling and on some selected aspects of TSLRIC where we do not agree with the Commission's positions. We will provide our view on backdating for the first time in this process within this Submission. A new area of decision making and costing is devoted to service transaction charges which we also deal with extensively.

24. This Submission makes a lot of reference to our February Submission which dealt with and analysed extensively the December 2014 cost model of the Commission. Because the overall structure of the cost model did not change much in the revision process most of our previous analysis and critique still holds and has relevance also for the revised model without reservation. Therefore, this Submission has to be read in major parts of the analysis in combination with our previous February Submission. Nevertheless, by extensively cross-referencing we have made clear which parts of our previous submission should be read and used to follow our argumentation and views as expressed in this Submission.

25. In conducting our analysis we had access to the confidential version of the revised cost model and the model documentation. Selectively, we checked some of the information provided by the Commission in the data room as additional material in the meantime.

26. There is a confidential and a non-confidential version of this submission.

1.2 Citation

27. To make citation a bit easier we use a few abbreviations. We refer to the Commission's further draft determination in the following way:

    a) **Commission, UCLL July** stands for: Commerce Commission, Further draft pricing review determination for Chorus' unbundled copper local loop service, Further draft determination, 2 July 2015.

b) **Commission, UBA July** stands for: Commerce Commission, Further draft pricing review determination for Chorus' unbundled bitstream access service, Further draft determination, 2 July 2015.

c) **Commission, Consultation on Transaction Charges** stands for Commerce Commission, Consultation on setting prices for service transaction charges for UBA and UCLL services, Consultation paper, 25 September 2014.

28. The TERA consultant documents related to the cost model and its changes are cited as:

a) **TERA, International Comparison** stands for: TERA Consultants, TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services, International Comparison of TSLRIC UCLL and UBA Costs and Prices, June 2015.

b) **TERA, Industry Comments** stands for: TERA Consultants, TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services, Analysis of the industry comments following the December 2014 draft determination, June 2015.

c) **TERA, Modelling Changes** stands for: TERA Consultants, TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services, Implemented modelling changes, June 2015.

d) **TERA, Model Documentation June** stands for: TERA Consultants, TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services, Model documentation, June 2015.

e) **TERA, Model Reference Paper June** stands for: TERA Consultants, TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services, Model Reference Paper, June 2015.

f) **TERA, Model Specification June** stands for: TERA Consultants, TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services, Model Specification, Confidential Version, June 2015.

g) **TERA, Non-recurring charges** stands for: TERA Consultants, TSLRIC price review determination for the UCLL and UBA services non-recurring charges, Methodology document, Confidential Version, April 2015.

h) **TERA, Model Specification November** stands for: TERA Consultants, TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services, Model Specification, Confidential Version, November 2014.

29. We refer to our own submissions and cross-submissions from previous consultations of the FPP process in the following way:

a) **WIK-Consult, Submission of 8 May 2015** stands for: Submission on the Commerce Commission's analytical frameworks for considering an uplift to the TSLRIC price and/or WACC, 8 May 2015.

b) **WIK-Consult, Submission of 20 February 2015** stands for: 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.

c) **WIK-Consult, Cross-Submission of 19 March 2015** stands for: WIK-Consult, 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, 19 March 2015.

d) **WIK-Consult, Submission of 8 October 2014** stands for: WIK-Consult, 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.

e) **WIK-Consult, Cross-Submission of 15 October 2014** stands for: WIK-Consult, Cross-Submission in response to the Commerce Commission's Consultation on setting prices for service transaction charges for UBA and UCLL services (25 September 2014), 15 October 2014.

30. All other documents which we cite are fully documented wherever we refer to them.

31. If we reference within the text to a "para. #" it means a paragraph in this Submission.

1.3 Issues not addressed in this submission

32. This report does not cover all aspects, topics and documents which the Commission has presented as part of its publication of the further draft determinations. A major

part of this report is dedicated to the analysis of the cost model ("the 2015 model") which TERA presents as a revision of the cost model provided in December 2014 ("the 2014 model").

33. In the modelling context we do not make comments to asset lifetimes, price trends, WACC, taxation, TSO boundaries. This does not mean that we regard the modelling concepts and the parameter choices convincing in all respect. Rather, we did not focus on those aspects of the modelling in detail due to resource constraints, and instead we refer to the detailed work and comments of our colleagues from Network Strategies on these topics in their Submission.[1]

34. We will also not make comments in this Submission on the review of Chorus model as presented by the Commission. We basically share the Commission's analysis and conclusion that this model is simply not reflecting the costs the Commission has to identify as part of its statutory obligations. We will only very briefly touch the Commission's framework for carrying out the UCLL and UBA pricing review determination because that has been exhaustively and extensively done in previous submissions.

1.4 Structure of this report

35. This report is structured in nine sections. The introductory section is followed by Section 2 which discusses backdating. .

36. The further draft determination represents the first time the Commission's approach to (and the results of) developing a costing and pricing approach for service transaction charges. We present our analysis of the Commission's approach and TERA's modelling implementation in detail in Section 3. This includes our final assessment of the Commission's approach and its results.

37. Section 4 responds to selected general principles adopted by the Commission which are important for its determination of TSLRIC prices.

38. In the following two sections service-specific aspects for the modelling of UCLL (Section 5) and UBA (Section 6) are highlighted in a condensed form. Section 7 deals with the analysis of the new model which is no longer service-specific.

39. A major part of this report covers the analysis of the revised cost model. We compare the model changes with the 2014 cost model and assess the model and parameter changes (Section 7.3). We then identify the issues of modelling critique which have been addressed by TERA and the Commission but which have not led

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1 See Network Strategies, Revised draft determination for the UCLL and UBA price review, UCLL and UBA Final Pricing Principle, Report for Spark New Zealand and Vodafone New Zealand, Confidential Version, Network Strategies Report Number 350,13 August 2015.

to appropriate changes in the model. (Section 7.4.1). In Section 7.4.2 we identify those aspects of the model critique as presented in our February Submission which not even have been discussed by TERA (or the Commission) and which seem to be, for whatever reason, ignored. In Section 7.4.3 we present some newly occurring modelling errors and inconsistencies due to model changes to the 2014 model.

40. In Section 8 we present some model sensitivities. The focus here is to compare the impact of some major model and parameter changes. The results of these sensitivities are a major input in our overall assessment of the model.

41. Although international benchmarking of the UCLL and UBA prices resulting from the current cost modelling exercise has no procedural and legal meaning in a formal sense, the Commission has conducted a benchmarking exercise which is supposed to demonstrate that the outcome of its cost modelling exercise is fully in line with cost model-related benchmarks from other jurisdictions. In contrast, the cost modelling-based price looks well above any benchmark. We present our analysis of the benchmarking approach conducted by TERA on behalf of the Commission in Section 9, and come to quite different conclusions than reached by the Commission.

2 Backdating

2.1 Starting points

42. The Commission has reached a draft determination that the regulatory period should start in December 2015, after the final determination. This draft determination excludes any backdating of FPP prices. In contrast to Commissioners Gale and Welson, Commissioner Duignan prefers a start date of 1 December 2014 for the FPP, and considers that a lump-sum settlement of the difference between the IPP and FPP prices prior to the final determination should apply. If the final determination is that the Commission is to backdate, Commissioners Gale and Welson propose that any backdating should only be implemented by way of a claw-back mechanism.

43. As we are not lawyers we will not comment on the question of whether the Commission is prevented from backdating under the Act as some parties argue, or whether the Commission is required by the Act to backdate as other parties argue. We simply start from the working assumption that the Commission has a discretion to set an earlier start date for the FPPs and therefore may consider backdating.

44. Nevertheless, even though we start from an assumption of discretion of the Commission on backdating, we are firmly of the view that the efficiency implications of backdating which we derive in Section 2.2 have legal implications on whether or not the Commission has in the end discretion to backdate, or whether the implications of backdating also from a legal point of view only allow for one outcome of this discretion.

45. Our analysis on backdating is based on the assumption that the final FPP price will be determined as a higher price than the IPP price, as indicated by the further Draft Determinations. As presented in our February Submission and re-confirmed in this Submission, our assessment of the cost modelling proposed for UCLL and UBA in New Zealand leads to our recommendation that a true TSLRIC cost analysis will result in a final FPP price below the IPP price. Nonetheless we stress that our views regarding backdating stand and are independent of - and would not be influenced by a change in - the relativity of the final FPP price to the current level. Also in this case we would regard backdating not as an appropriate and efficient regulatory approach.

46. Although the draft decision of the Commission is not to backdate, it has developed and presented a calculation model how backdating could be implemented if its decision was to change.[2] As we do not agree backdating should be implemented

2 See Commission, UCLL July, Attachment P.

we focus on the main decision before the Commission and do not comment on potential methods of implementation.

47. A decision to backdate requires multiple elements to be considered. These elements each have their own impact on distortions caused by backdating. A decision to backdate requires a decision on the starting date for FPP prices that will lie prior to date of the final determination decision. Furthermore, the price relevant to the starting date has to be determined, and the approach how to determine that price from a later date. Finally the method of payment of the backdated amounts of money has to be determined.

48. In the case that backdating is to be applied, the Commission has considered two dates for the FPP price, 1 December 2012 and 1 December 2014. The latter is the starting date proposed by Commissioner Duignan. We infer that the Commission is not seriously considering an earlier start date of the FPP. On the basis of our own analysis of the efficiency implications of backdating (as presented in Section 2.2) we conclude that if the Commission is to backdate, a shorter backdating duration time is dominated by a longer backdating duration period.

49. If the Commission were to backdate for one year, it would use the network cost as calculated for year one (2015) of the TSLRIC model.[3] We consider this appropriate because model input parameters were collected in 2014.

2.2 Efficiency aspects of backdating

2.2.1 Backdating, efficiency and uncertainty

50. The Commission argues in favour of an earlier start date for the TSLRIC with the general proposition that '"*the earlier efficient signals take economic effect the better.*"[4] Although this proposition holds in principle, it is not an argument in favour of backdating. Market players can only act efficiently if they know the relevant parameters which are an input to their decision, in advance of making that decision. At the least they must have well-founded expectations on such parameters. The degree of uncertainty about a major decision parameter such as a regulated wholesale price has direct impact on the degree of efficiency which is achievable. Backdating does not decrease uncertainty regarding the final determination of the cost calculation of the regulated service. Backdating therefore does not "*provide better incentives to update retail prices with expected TSLRIC outcomes.*"[5] Rather, agreement that 'the earlier efficient signals take effect the better' does not support backdating but instead supports a faster regulatory decision process. 'Efficient'

3 See Commission, UCLL July, para. 913.
4 Commission, UCLL July, para. 879.
5 Commission, UCLL July, para. 879.

signals would have been in the market earlier if the Commission had organised its FPP processes such that the TSLRIC-based UCLL and UBA prices would have been determined by 1 December 2014 (or even earlier), notwithstanding our position that the currently proposed prices are above an efficient true TSRLIC-reflective level.

51. The ability of market participants to properly anticipate the outcome of a TSLRIC costing exercise has an impact on their ability to make efficient decisions on pricing which are forward looking. The process as emerged so far proves that Chorus and the RSPs as "sophisticated market participants" have not been in a position to estimate the outcome of the TSLRIC modelling appropriately as the Commission seems to suggest.[6] Commissioner Duignan expects that an earlier start of FPP prices would "*promote incentives to get the more accurate FPP prices into the market place as early as possible.*"[7] This argument does not consider the uncertainties regarding the outcome of the final FPP level and the past and current uncertainty over whether backdating will be applied or not. The process so far indicates that the outcome of the cost modelling process is highly uncertain.

52. This view can be supported by our own a priori assessment of the appropriate level of TSLRIC in New Zealand. We advised Vodafone and Spark that the appropriately calculated level of UCLL TSLRIC would be below $ 20 per month and not significantly above the IPP price level as calculated by the Commission's model so far.[8] Chorus was advised by its modeller that the appropriate TSLRIC price would be about three times higher than the IPP price.

53. This is demonstrated by UCLL TSLRIC estimates which are in the range of $ 16.64 as estimated by WIK-Consult[9] and $74.10 as estimated by Analysys Mason on behalf of Chorus.[10] It is clear that even experienced market participants are unable to predict the Commission's final determination. Moreover, RSPs are not able to appropriately consider any expectation held about the final FPP price due to uncertainty on whether backdating will apply and the eventual modalities of backdating. The decision environment generated by the Commission in New Zealand has not and does not allow RSPs to bring "accurate" FPP prices into the marketplace before the final decision date. The Commission has done everything to maximise uncertainty for market participants in this regard.

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6 See Commission, UCLL July, para. 879.1.
7 Commission, UCLL July, para. 899.1.
8 We refer to our model sensitivity calculations in Section 6.1.3 of our February Submission.
9 See WIK-Consult, Submission of 20 February 2015, para. 452.
10 See Analysys Mason, Report for Chorus to provide to the Commerce Commission Model user guide for UCLL hybrid bottom-up model, 28 November 2014, p.2.

2.2.2 Does backdating enhance allocative efficiency?

54. Backdating would not improve the efficiency of rational business decisions. Efficiency requires that market players take the relevant prices and costs into account when conducting their business model and investment decisions. Given the uncertainty of the outcome of the FPP pricing determination, any rational business decisions, or even any change to current business decision planning, will be delayed until the FPP process is finalised. Backdating would lead to a redistribution of revenues between market players without the opportunity to reflect this at the retail pricing level. Under very restrictive conditions, backdating may be neutral with regard to efficiency. There are (however) no conditions in which backdating contributes to increase efficiency for decisions made in the past. The most probable outcome is that backdating would distort business decisions and generate additional uncertainties and therefore has a negative impact on efficiency.

2.2.3 Does backdating enhance dynamic efficiency?

55. Backdating may enhance dynamic efficiency if it generates proper incentives to invest and/or if backdating is a prerequisite for keeping investment incentives that would be damaged if backdating were not to occur. Backdating may also be detrimental to dynamic efficiency when it harms the ability and the incentives of market players to invest. The potential dynamic efficiency effects would be different for Chorus as compared to the RSPs.

56. Backdating via lump-sum payments or by applying a claw-back mechanism would represent a transfer of wealth to Chorus that increases the financial capability of Chorus. Will this automatically increase the level of Chorus' investment? We have analysed this potential chain of impact in our previous Submission on potential uplifts:

> "*The Commission analysis – as well as Chorus' arguments in this context – seem to suggest that increasing the financial capability of an operator by increasing regulated wholesale prices will automatically increase the investment level of that operator. Why should that be the case? Chorus is lucky to face a quasi-monopolistic market position in more than 80% of its business. Any uplift of the WACC and the resulting wholesale price increase will increase profits of the company. Increased profits may increase investment incentives. There is, however, no control by market forces that this will actually be the outcome. There is also no regulatory control mechanism in place which guarantees or controls that the market behaviour intended by the regulatory intervention actually occurs. The monopolistic market position of Chorus enables Chorus' management to discretionary decide how to spend additional profits from increased wholesale prices. The*

management can foster investment – as the regulator intends. The management can also foster the investment in the copper network in those areas where other LFCs than Chorus are active, thus enforcing the copper versus fibre competition to the detriment of the other LFCs. The management may, however, also decide to pay such windfall profits as dividends (or other benefits) to its shareholders. In that case any uplift only becomes a redistribution of wealth from end-users to Chorus' shareholders with no positive efficiency implications."[11]

This argument is relevant and holds in the backdating context.

57. Furthermore, most of the infrastructure investment for the future-proof fibre network infrastructure have been made, or are at least committed, in New Zealand. In addition, the nature of Chorus' infrastructure investment is long-term. Chorus business model and its investment decisions depend on the profitability of the price/cost relationship of the relevant services over a rather long period on a forward-looking basis. By its nature infrastructure investment cannot be and is not affected by one-off events or payments which do not have an impact on the relevant wholesale price path in the future. For this reason we also do not see that there could be negative investment incentives for Chorus if the Commission were not to backdate. Chorus investment decisions – like the ones of any infrastructure investor – are neither determined nor affected by transitory payments which cannot be planned and/or anticipated.

58. In contrast, backdating would impact on the ability of RSPs to invest in innovative services and applications, if they cannot fully pass-through backdating payments to end-users. In the context of price uplifting we have made the following argument:

"*RSPs are in a different position compared to Chorus. They operate in a competitive market environment. If RSPs receive more financial flexibility from regulatory decisions than they had before, competition guarantees users to receive the benefits of this financial flexibility. This can be in the form of lower retail prices. Or it can be in the form of investments in innovative services and applications. The competitive process decides in which form such benefits are passed-through to end-users. The competitive process also guarantees that increased financial flexibility of RSPs cannot be simply passed-through to their shareholders as in the case of Chorus.*"[12]

This argument also has relevance in the backdating context and signals that backdating may have negative investment incentives on RSPs. The risk of RSPs' investment being affected by backdating is therefore higher than the risk of Chorus' investment being affected. This holds in particular for two reasons: Firstly, the time

11 WIK-Consult, Submission of 8 May 2015, para. 62.
12 WIK-Consult, Submission of 8 May 2015, para. 64.

horizon of RSPs' investment is (necessarily) shorter than that of the infrastructure investment. Secondly, Chorus' (future) investment is committed and even contracted. That of RSPs is not and therefore is disposable.

59. Detrimental effects on investments in innovative services will negatively affect dynamic efficiency at a critical and important moment in New Zealand where such investments are also highly relevant and important to incentivise users to migrate to superfast broadband. Therefore the Commission should be more concerned with the impact of a decision to backdate on the investment incentives (and the ability to invest) of RSPs than on the impact of Chorus' investment.

2.2.4 Does backdating promote competition?

60. Our analysis does not identify any arguments that suggest backdating might promote competition. In contrast we identify some impacts which are detrimental to competition. The impacts of backdating on competition depend (at least to some degree) on the implementation approach for backdating.

61. At first glance a lump-sum payment approach may appear to have a neutral effect on competition. It seems neither to promote competition nor does it seem to harm competition. Competition in the retail markets will hinder RSPs' ability to pass-through backdated wholesale cost increases to retail customers. Alternatively, if RSPs had made proper provisions for the exact backdating payments there would not be much impact if backdating actually occurs. However, we have shown in Section 2.2.1 that given the various aspects of uncertainty related to backdating it is impossible for RSPs in New Zealand to predict backdating provisions with accuracy. Or, in other words, only by chance RSPs can calculate the proper amount of provisions.

62. RSPs which are not able to pass-through expected backdating payments to their users, or to make proper provisions (either because of their inability to perfectly predict outcomes or because of the structure of their balance sheet) may face problems of financial stability or even viability if required to pay backdated higher wholesale prices as lump-sum payments. We expect that could be a greater problem for smaller RSPs. Financial viability challenges for (some) competitors may have a detrimental impact on competition. Affected RSPs which can remain in the market become less aggressive competitors. In its Consultation Paper of December 2014 the Commission itself addresses this impact as a potential concern. Here the Commission correctly points out that "*if the amounts involved are substantial enough, they could cause a firm to exit the market, which would likely be detrimental to competition.*"[13] The Commission further notes "*that the larger the sums of*

13 See Commission, Process and issues paper for UCLL and UBA pricing review determinations, Consultation Paper, 19 December 2014, para. 31.

money; and the longer the backdating period, the greater the likely impact."[14] We agree with this general analysis by the Commission.

63. A claw-back payment mechanism which increases future wholesale prices above the calculated TSLRIC level may have a lesser impact on competition. However, we cannot identify applications of this type of backdating that will promote competition. At best, there are no or limited detrimental impacts on competition, if the backdating payments lead to just minor increases of the wholesale prices over the regulatory period. Nevertheless, the relevant economic effects have to be analysed and assessed independent of the degree of price inflation and distortion. Any increase of wholesale prices above the determined FPP level will impact competition in two dimensions: firstly, within market (between RSPs) and secondly across markets (platform competition between the fixed network and other network platforms).

64. The UCLL and UBA prices will represent a key influencing parameter for platform competition between the fixed network platform and cable and mobile. A backdating mechanism that increases UCLL and UBA prices will distort platform competition in favour of cable and mobile at the expense of fixed. This will not only hurt RSPs, it will also hurt in particular Chorus as the dominant provider of the fixed network infrastructure in New Zealand. Although the footprint of cable is limited, it is highly competitive and successful. Therefore even minor UCLL and UBA price increases will have significant impacts. Given the universal availability of mobile broadband, the effects on fixed-mobile migration might even be stronger.

2.2.5 Backdating as a transfer of wealth

65. We have argued in the previous subsections that backdating would create no (at least no positive) effect on allocative and dynamic efficiency. And therefore we consider the question of the economic nature of backdating payments. These payments represent a wealth transfer from the RSPs and their customers to Chorus and its shareholders.

66. Whether backdating payments will be a wealth transfer from the RSPs and their shareholders to Chorus or from the broadband customers to Chorus depends on the form of payment. Given the (high) degree of competition in the retail markets, RSPs are unlikely to pass-through (one-off) lump-sum payments to their customers. This means that the RSPs' shareholders will have to carry all or (at least) major parts of the lump-sum payments. A claw-back mechanisms to transfer the backdating payments on the other hand will be (mainly) passed through to the broadband end-customers. This mechanism would increase the (variable)

14 See Commission, Process and issues paper for UCLL and UBA pricing review determinations, Consultation Paper, 19 December 2014, para. 31.

wholesale costs of RSPs and therefore lead to an increase of the marginal cost faced by RSPs in producing broadband access. In a competitive (end-user) market any increase in marginal costs would lead to a downstream increase in corresponding retail prices.

67. It is obvious that a wealth transfer from end-users to Chorus has implications on allocative efficiency because the broadband end-user prices are directly affected. At first glance a wealth transfer between various firms (or their respective shareholders) does not seem to have (any) efficiency implications. If lump-sum backdating payments generate windfall losses to RSPs, that can affect the financial viability of a firm. In particular smaller RSPs might even be forced to exit the market. Insofar as such impacts occur, a backdating-induced wealth transfer to Chorus will have a negative impact on competition in the broadband market.

2.2.6 Backdating and incentives to delay

68. The Commission presents another argument in favour of backdating which says backdating is necessary to protect against incentives to delay the process which may arise with Chorus or with RSPs.[15] This consideration would be relevant from the point in the regulatory process at which it becomes apparent whether the FPP price will be higher or lower than the IPP price.

69. This argument holds in abstract terms. The reality in New Zealand, however, is quite different according to our observation. The Commission may forgive us that we bring to the table our assessment of the FPP and cost modelling process so far. We could not observe that any action or request of stakeholders has delayed the cost modelling and FPP process. At the opposite, stakeholders have made process related proposals which would have significantly streamlined and shortened the process.

70. The duration of the current regulatory process has made it difficult for RSPs to make rational business decisions with regard to broadband retail pricing. Furthermore, the process has been extended several times. The inevitable uncertainty about the final outcome of the TSLRIC costing exercise has been further increased by the unresolved issue of whether or not backdating of the final FPP prices from the point of decision making will occur.[16] Although the Commission's further Draft Determination includes a majority decision not to backdate, the way in which this topic is discussed in the further Draft Determination leaves open the risk for RSPs (and Chorus) that the Commission comes to a different final conclusion in the final Determination. Therefore, uncertainties caused by the issue of whether or not

15 See Commission, UCLL July, para. 880.

16 See also WIK's statement to the uncertainty caused by backdating in the conference, conference transcript, UCLL and UBA services final pricing principle conference held on 15-17 April 2015, p. 264.

backdating occurs will remain until the very final stage of the FPP process. The Commission should have made a principal decision on backdating at its earliest opportunity. This would have reduced the currently compounded uncertainty of the final FPP prices and the period over which it will apply. The Commission is correct in assuming "*the discretion for the Commission to backdate also remains as a discipline on parties' behaviour*"[17] with regard to delaying the process. Exercising this discretion, however, causes a high price to the New Zealand economy.

2.3 Regulatory practice in other jurisdictions

71. Backdating wholesale pricing decisions is very uncommon in the European regulatory context. Price setting procedures in case of ex ante regulation of wholesale prices are usually finished before new wholesale prices become effective. Backdating wholesale price decisions in an ex ante regulatory environment only occurs in a few exceptional cases in Europe.

72. Many NRAs even decide that newly determined wholesale prices only become effective following an announcement period of several months and up to 6 month. The reason behind this announcement period is to support rational business decisions in case of price changes and to avoid stranded investment.

17 Commission, UCLL July, para. 893.

3 Non-recurring charges

3.1 The Commission's approach

73. The Commission has widened the scope of this regulatory review to include all NRCs listed in the current STD. We welcome this decision and approach. In its consultation on transaction charges the Commission still had intended to set prices for only a subset of transaction services.[18] This would have meant that 6 of the 9 transaction charges and all ancillary charges in the UCLL STD, and 13 transaction charges and all ancillary charges related to the UBA STD would not have been subject to the FPP determination. As we have pointed out in our October 2014 Submission, all transaction charges have (at least potential) economic relevance for access seekers in principle and represent access bottlenecks[19] despite the transaction volume of some transaction services being negligible. The further draft determination represents more a principles-based and coherent approach.

74. In its Consultation Paper the Commission expressed its preliminary view that when it sets prices for transaction services in the FPP determinations, it must apply the FPP, which is TSLRIC.[20] The Commission confirmed the general application of TSLRIC also in the case of service transaction charges in its further Draft Determination,[21] which we welcome and support. This is in line with the regulatory practice in Europe, which bases on TSLRIC and eliminates inefficient costs for the activities and resources of an incumbent's NRC services.[22]

75. The Commission has adopted a general top-down costing approach for NRCs. Therefore the Commission has decided not to go for a first best but for a second best modelling approach of relevant NRC costs. We comment this approach in more detail in Section 3.2. One element identified within the top-down approach, the labour costs, is then subject to an efficiency adjustment based on international benchmarks and national cross-checks.

76. Where the approach mentioned above cannot be applied, NRCs are priced either on an hourly rate or on a Price on Application (POA) basis.

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18 See Commission, Consultation on Transaction Charges, para. 12 and 14.
19 See WIK-Consult: Submission of 8 October 2014, para. 9ff.
20 See Commission, Consultation on Transaction Charges, para. 29.
21 See Commission, UCLL July, para. 569.
22 See WIK-Consult, Submission of 8 October 2014, Section 2.

3.2 Efficiency adjustments

3.2.1 Top-down approach and efficiency adjustments

77. In our October Submission we advised that a bottom-up cost modelling approach represents the most appropriate method to determine the TSLRIC for recurring charges as well as for one-off transaction charges.[23] We have shown that bottom-up is the first-best approach to directly determine the NRC costs of an efficient operator, while all potential methodological alternatives only approximate the same result indirectly and imperfectly.

78. The Commission justifies its use of a second best cost determination approach with "*the unavailability of detailed information that we needed to be able to undertake a bottom-up approach ... we were not able to build a model using the bottom-up approach.*"[24] We interpret this statement such that the Commission would have preferred to conduct a bottom-up approach if it would have been able to do so.[25]

79. The Commission has not made clear what the obstacles have been preventing the development and application of a first best bottom up costing model approach. Chorus and other operators in the market, as well as the service companies themselves, will possess the information required to model the transaction processes accurately and to derive an estimate of costs, albeit before efficiency adjustments. The Commission's advisor TERA has conducted similar modelling approaches and should have access to the relevant modelling tools.

80. Although the Commission has not made sufficiently transparent why it could not follow the first best modelling approach, we agree that the top-down approach with efficiency adjustments comes next as a relevant second best costing option. Nevertheless, the limitations and shortcomings of a top-down approach with efficiency adjustments must be understood to assess whether and to what extent the efficiency adjustment can cope with and minimise deviations compared to a first best efficient cost result. Distortions must be evaluated within the context of the relatively long, five year regulatory period, over which NRC costs will be applied.

81. What are the inherent problems and limitations of a top-down approach? A major deficit of the top-down approach is that its starting point is actual transaction processes, which implies an assumption that transaction processes are structured efficiently and represent efficient costs. Similarly to the situation in many other jurisdictions in which regulators are setting efficient transaction charges we will show especially in Section 3.6.6 that also in New Zealand there are lots of

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23 See WIK-Consult, Submission of 8 October 2014, para. 27ff.
24 Commission, UCLL July, para. 588.
25 This also seems to be TERA's assessment. (See TERA, Non-recurring charges, p. 6.)

indications about the inefficiency of current transaction processes. The implicit efficiency assumption is not justified. Further to doubts regarding the efficiency of transaction processes we believe that the actual cost of the incumbent in providing transaction services may, but usually does not, represent efficient cost. Making adjustments to actual costs becomes essential in such circumstances, but the grounds for making such adjustments are weak and it is not obvious how to conduct this in the most targeted way.

82. A major cost component of transaction charges is the rates Chorus pays its service companies for outsourced transaction service provision. Service companies' services correspond to the structure of processes and service provision as defined by Chorus. Given this starting point of charging and costing, the implicit assumption holds that the service provision for transaction services is conducted in the most efficient way. The Commission has not questioned this implicit assumption of its cost determination, despite our having submitted to the Commission that assessing this presumption is the norm across many NRAs in other jurisdictions.[26] We have reported that other NRAs spend a lot of efforts to streamline service provision by direct and indirect means, and also by setting appropriate pricing and efficiency incentives. By defining efficiency targets other NRAs have guaranteed that access seekers get (at least some) benefits of efficiency improvements over time. Whilst the Commission's approach for service transaction charges provides incentives for Chorus to improve efficiency over time, the Commission has neglected to ensure that access seekers will share such efficiency improvement benefits: Chorus is entitled to keep all such future benefits itself.

3.2.2 Scope of efficiency adjustments limited

83. The efficient provision of transaction services requires efficiency in all components which make up the costs of a transaction service. The Commission has only applied a limited efficiency adjustment to a single element of the costs, namely time budgeted to complete the task.

84. Information provided by Chorus was used by TERA to separate transaction services into 7 cost components which are used from service companies to charge Chorus.[27] TERA made efficiency adjustments for just one of the seven cost components, namely the time budgeted to complete tasks. The implicit assumption is that six components reflect efficient costs and efficient processes. TERA does not provide evidence that this assumption is justified. Rather, TERA justifies the very limited efficiency adjustment with the argument that the un-adjusted six components (like transport cost and labour rates) are specific to each country and can therefore not be subject to international benchmarking. This may be true for the

26 See See WIK-Consult, Submission of 8 October 2014, Section 2.
27 See TERA, Non-recurring charges, p. 13.

specific method which TERA has chosen for its efficiency adjustment. If TERA had chosen more aggregated approaches, efficiency adjustments on total service provision would have been feasible.

85. There is no doubt that time budgeted for a transaction service (combined with the corresponding labour rate) represents an important cost component within the (total) cost structure of transaction service provision. However an assessment of the cost distribution of the service codes (as shown in Table 3-1), later mapped to NRC services, illustrates, that also the other cost components play an important role:

Table 3-1: Cost distribution by component and service code for core transaction charges

[

] **CNZCI**

Source: WIK calculation based on TERA model, CI-Non recurring charges v6.0.xlsx, sheet “Results”, cell D25 to J34.

86. Table 3-1 shows that labour costs represent between [ ] **CNZCI** of the total direct cost of service companies’ service provision. This demonstrates that between [ ] **CNZCI** of the total direct costs of core NRCs have not been checked for efficiency. If we also consider that further cost categories - of indirect costs, service company overhead costs and the share of Chorus company overhead costs allocated to NRCs - have not been checked for efficiency, then the share of costs without efficiency assessments further increases. As a result, significantly less than 50% of the service transactions costs have been checked for efficiency in the adjustment approach of the Commission.

87. The transaction charge comparison which we present in Section 3.3.2 demonstrates that transaction charges for New Zealand as calculated by the Commission are positioned at the high end compared to European charges. This indicates that the costs as calculated by TERA have not yet included the potentially available efficiency improvements.

88. TERA adopts and generally applies a service company overhead mark-up on direct cost of [ ] **CNZCI**. This mark-up is regarded as a competitive market outcome

which is generally applied in New Zealand. This mark-up is not tested for efficiency. In principle this mark-up would also be suitable for an international efficiency adjustment. In any case it could have been cross-checked nationally. We further assess this cost component in Section 3.6.3.

89. TERA allocates Chorus' common costs to transaction services on the basis of their revenue share.[28] This approach is appropriate in principle. However, it is not appropriate that the underlying cost base for common cost is inflated because it is not tested and adjusted for efficiency, but just taken from Chorus' accounts.[29]

3.3 International benchmarking

3.3.1 TERA's efficiency adjustment benchmark

90. TERA has selected 7 countries for its international benchmark. The main criterion to select countries for the benchmark has been that information on transaction service completion time has been available. Whilst this is a relevant comparability criterion it should not have been the only one. Comparability of service provision, degree of process-automation, use of IT systems, labour productivity and the NRA's regulatory approach should have been additional criteria relevant to the efficiency adjustment.

91. TERA has reported that information has been difficult to obtain, and so data sources that were published more than 10 years ago (and might report data that is even older) were used.[30] TERA justifies the relevance of outdated data by explaining "*the time required to complete a given activity is not a data subject to significant variation over this period.*"[31] We do not agree with this assessment. Our October 2014 Submission to the Commission contained descriptions of how European NRAs have regulated transaction charges downwards such that actual significant efficiency gains, including gains driven by reduced service delivery time, have been realised over time.[32] This development is relevant and should be reflected in the efficiency adjustments of the Commission. One easy, but nevertheless comprehensive, approach of ensuring the benchmark better reflects such efficiency gains is to index the service's delivery minutes identified in the "raw" benchmark with an annual productivity factor. We propose and recommend a moderate factor of 5% p.a. In our October Submission on transaction charges we have shown some examples of efficiency adjustments as conducted by European NRAs which are in

28 See TERA, Non-recurring charges, p. 17f.
29 We have criticised that in Section 7.2.17 of this Submission.
30 See TERA, Non-recurring charges, p. 13f.
31 See TERA, Non-recurring charges, p. 14.
32 See WIK-Consult, Submission of 8 October 2014, Section 2.

that range or even higher.[33] For practicality reasons we recommend a uniform factor to be applied for each country although there will be reasons for a country-specific analysis.

92. Although labour cost comprises a relatively larger share of the production cost of transaction services than the capital cost incorporated in IT and provisioning systems, labour and IT costs are not independent: labour inputs depend on the degree of process automation. The efficient labour/IT capital cost ratio depends on the price of labour (and IT) in the respective countries. We therefore recommend that the Commission only includes countries into its efficiency adjustment benchmark which have a similar or roughly similar level of labour productivity and labour costs compared to New Zealand. From that perspective we would not regard it as appropriate to include countries like Spain or Romania into the benchmark. Because of the unknown identify of country A we cannot provide feedback on the appropriateness of including country A.

93. To conduct the international benchmark on transaction service process times TERA had to identify the corresponding relevant labour time for identical (or at least comparable) transaction service elements. This was not possible in each case. The data used by TERA included transport time for some countries in addition to effective required labour time. This clearly demonstrates that the resulting process times are upwardly biased. Therefore the extent by which the resulting benchmark underestimates the relevant efficiency adjustment cannot be assessed. Further, as transport cost plays an important role within the service codes with an end-customer site visit, the effect on the cost of these activities can be more than [ ] **CNZCI.** The comparison becomes weaker still when recognising that vehicle costs can be included in transport costs (see para. 85). It is important to recognise that service codes with end-customer site visit include activities, which are not included in the corresponding NRC services (see Section 3.6.1). Eliminating these non-relevant activities and their costs from the total costs of the corresponding service codes leads to a higher share of transport costs and underlines the significance of transport cost. Increasing efficiency of transport costs can reduce service transaction charges significantly, in particular for those charges which require end-customer premises visits which are the most expensive transaction services.

94. A further underestimate of the appropriate efficiency adjustment arises due to differences in data across countries on the types of labour duties linked to a given activity - some countries have provided both technician and administrative task times for a given activity.[34] For these dual-activity data points, TERA includes both roles in the time total. However, TERA already applied (1) a (significant) service company overhead cost on direct cost, and (2) another Chorus overhead cost

33 See WIK-Consult, Submission of 8 October 2014, Section 2 and Annex.
34 See TERA, Non-recurring charges, p. 23.

component, both of which should already include administrative task times. We conclude that TERA should not have included administrative time in the benchmark countries comparators. The approach used represents double-recovery of costs, which must be avoided.

3.3.2 A price benchmark

95. The Commission's international benchmark-based efficiency adjustment rests on the assumption that transaction services are comparable across countries. Therefore it makes sense to compare the outcome of the transaction services cost assessment as conducted by TERA with regulated transaction charges in other jurisdictions. The Commission followed a similar approach when it determined the price of transaction services via an international benchmarking exercise in its previous IPP.[35]

96. We have compared the UCLL-related connection charges with the LLU connection charges that the European Commission regularly publishes for all EU Member States.[36] Table 3-2 shows the individual connection and transfer charges related to UCLL in New Zealand as proposed by the Commission (including services which require site visits and those which do not).

Table 3-2: Individual UCLL connection charges in New Zealand

Transaction Charge	Access type	Rate	Port change at DSLAM	STD Price	Proposed price
1.1 MPF new connection - individual new connection where site visit required	UCLL	individual	NA	$155	$122.16
1.1 MDF new connection – individual new connection where no site visit required	UCLL	individual	NA	$70	$45.00
1.2 MDF transfer – individual transfer	UCLL	individual	NA	$70	$51.24
1.3 Other service to MPF transfer – individual transfer	UCLL	individual	NA	$70	$51.24

Source: Commission, UCLL July, para. 634, 637, 643, 649.

35 See Commission, Final determination on the benchmarking review for the unbundled copper local loop service, 3 December 2012, p. 69ff. and Unbundled Bitstream Access Service Price Review, Decision [2013] NZCC 20, p. 64 ff.

36 See Financial indicators, fixed and mobile telephony, broadcasting and bundled services indicators – 2014, sheet "8) LLU pricing", rows 226 – 259, http://ec.europa.eu/newsroom/dae/document.cfm?action=display&doc_id=9976 .

Figure 3-1 shows the corresponding ULL connection charges which the EU Commission uses for its price comparison. We carried out an assessment of the four NZ connection charges with the uniform charges of the EU benchmark. To do this we weighted the four UCLL transaction services in New Zealand with the transaction volumes of these services as presented by the Commission. The weighted average price amounts to $ 75.40 or € 45.32.[37] This result shows, that the UCLL connection charges in New Zealand are 22.4% higher and so significantly higher than the EU average of € 37.

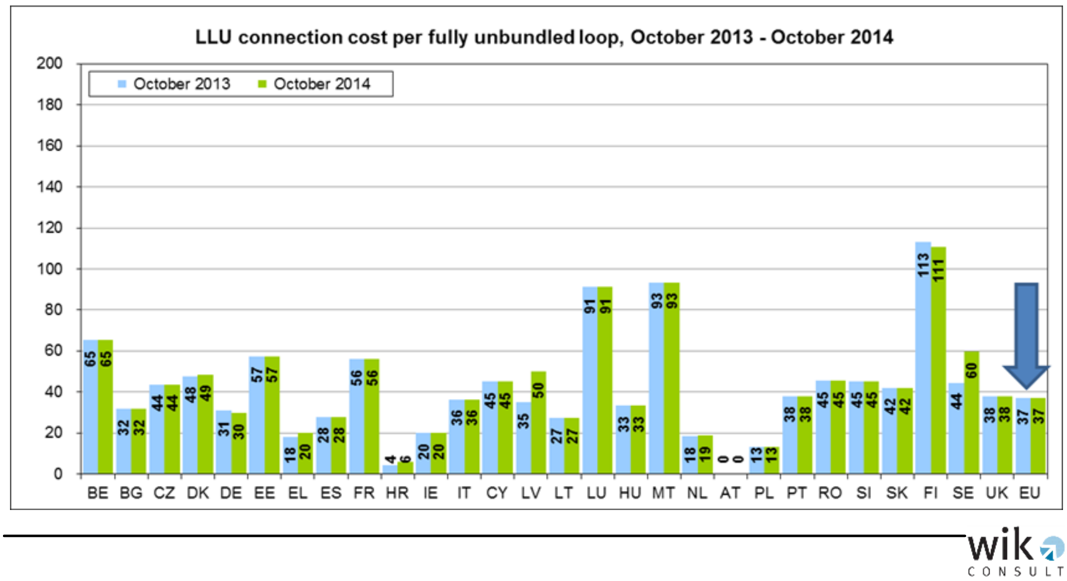
Table 3-3: Transaction volume of UCLL connection services in New Zealand

[

] CNZCI

Source: Commission, UCLL July, para. 839.

Figure 3-1: LLU connection cost per fully unbundled loop in the EU



Source: EU Financial indicators, fixed and mobile telephony, broadcasting and bundled services indicators – 2014, sheet "8) LLU pricing", rows 226 – 259 and WIK calculations for NZ.

37 We used an exchange rate of 1.6635 NZD/Euro.

97. We have doubts about the appropriateness of the UCLL connection volumes as presented by the Commission. We have considered whether UBA volumes have been added to the UCLL volumes by the Commission. Inspecting the data presented by the Commission, delivers the transaction volumes as presented in Table 3-4.

Table 3-4: Transaction volume of UCLL and UBA connection services in New Zealand

[

] **CNZCI**

Source: Commission, UCLL July, para. 839 and UBA July, para. 703

[ ], **CNZCI** that there are, in contrast to the presentation of the Commission, significant volumes of UBA services with a cabinet or exchange visit or port change at DSLAM in the bills from Chorus. A correction of this error significantly increases the average UCLL NRC connection price. With the help of the figures [ ] **CNZCI**. This results in an weighted average price of € 54 in comparison to the EU 28 average of € 37. This means, transaction charges in New Zealand exceed those in the EU by 46%

98. The price benchmark presented above indicates that the costs for transaction services as calculated by TERA and the Commission contain deficiencies in their method of estimation and remain overestimated. To enable a closer inspection of the reasons that the currently proposed rates for New Zealand are higher than many European benchmarks we carried out an assessment and comparison of the Commission's specified rates to those in Germany.

99. Table 3-5 compares the UCLL connection charges as proposed by the Commission with corresponding ULL connections charges in Germany (DE).

Table 3-5: Comparison of UCLL connection charges in New Zealand and Germany

Services New Zealand	Proposed price NZ (NZD)	German rate (NZD)	German rate (€)	Comparable Service Germany
1.1 MPF new connection - individual new connection where site visit required	$122.16	88.82	53.68	Neuschaltung ohne Arbeiten am KVz mit Arbeiten beim Endkunden
1.1 MDF new connection – individual new connection where no site visit required	$45.00	44.72	27.03	Neuschaltung ohne Arbeiten am KVz ohne Arbeiten beim Endkunden
1.2 MDF transfer – individual transfer	$51.24	49.27	29.78	Übernahme ohne Arbeiten beim Endkunden
1.3 Other service to MPF transfer – individual transfer	$51.24	49.27	29.78	Übernahme ohne Arbeiten beim Endkunden

Source: Commission, UCLL July, para. 634, 637, 643, 649 and Bundenetzagentur, decision, BK3-14-001, http://www.bundesnetzagentur.de/cln_1411/DE/Service-Funktionen/Beschlusskammern/1BK-Geschaeftszeichen-Datenbank/BK3-GZ/2014/2014_001bis099/BK3-14-001/BK3_14_001_Tenor.html?nn=350442

100. There is minor difference between charges levied when the activity does not involve visiting customer premises. However, charges for activities including site visits differ significantly. One reason for this is the double counting of activities (see Section 3.6.1), which especially affects the cost of transaction charges including visits to customers premises. In this case, the double counting of costs relevant to actions at end-customer premises appears to upwardly influence costs.

3.4 National benchmarking

101. Following the initial step of applying efficiency adjustments based on international benchmark information, the Commission has then undertaken a (so-called) cross-check against New Zealand costs. However , the national benchmark information is used asymmetrically to determine final costs and prices: if the calculated costs are lower than the corresponding 'national cross-check price', the higher (national) cross-check price is adopted as the final pricing outcome. And yet if the calculated costs are higher than the 'national cross-check price', the higher calculated costs determine the final pricing outcome.

102. The applied cross-check exhibits the following results:

(a) For two (from a total of six) service codes [ ] **CNZCI** the adjusted costs (after the international benchmarking) were (in TERA's words) "significantly lower" than the corresponding national benchmark. This difference is more than $10.

(b) For two other service codes [ ] **CNZCI** the national benchmarks were also higher, but the difference was less than $3.

(c) For two service codes the national benchmarks [ ] **CNZCI** were lower than the corresponding international benchmarks.

We judge TERA's approach and assessment as quite arbitrary. TERA concludes (a) that their international benchmark approach has led to costs which are too low, and so proposed to make use of the higher national benchmarks. And yet TERA ignored the findings for (c) which would have resulted in lower costs and prices. Lower costs were only adopted for the two service codes described by (b).

103. Table 3-6 summarises the outcome of TERA's arbitrary use of its findings.

Table 3-6: Comparison of adjusted Chorus costs after international benchmark and national cross-check

[

] **CNZCI**

Source: WIK illustration basing on TERA model, CI-Non recurring charges v6.0.xlsx, Sheet "Results", rows 64 to 68.

It appears evident that the use of the national benchmarking findings was less driven by an objective of identifying efficient costs and instead serves to limit cost reductions: it cannot be ignored that in the two cases with minor cost difference TERA chose the more efficient costs, and in the other four cases, TERA chose the significantly higher inefficient costs.

104. We have two serious reservations against the use of a national benchmark for cross-checking as applied by the Commission:

(a) The asymmetric use of the national benchmark information is methodologically incorrect.

(b) The use of a single-sourced benchmark in general, and the chosen benchmark in particular, is inappropriate and misleading.

105. The asymmetric use of the national benchmark information – using the information if it leads to higher prices and ignoring them if it leads to lower prices – is methodologically highly questionable. Why would a national benchmark be relevant enough to determine a change in a cost arrived at via an international benchmark in one case (an increase) and not in the other (a decrease)?

106. When compiling evidence for its national benchmarking exercise on Chorus' transaction services costs the Commission did not take relevant data from all LFCs but just from one of them.[38] The Commission does not give an explanation of why it chose not to make use of available and highly relevant data. A 'benchmark' is not acceptable if it is 'derived' from a single –source. The exercise carried out by the Commission was a direct comparison with one other firm, rather than benchmarking. It is a *defining* criterion for a relevant benchmark to make use of a variety of data points to avoid the bias and coincidence of single-sourced benchmarks.

107. We also have significant reservations regarding the particular LFC the Commission has chosen for its single comparator. The Commission has used [ ] **CNZCI** for its LFC comparison. The Commission argues that the network is similar to its hypothetical efficient operator as it is recently constructed. We do not see that this is different to all other LFCs who have also recently constructed networks and note the Commission did not present reasons for the exclusion of other LFCs. The Commission further argues [

] **CNZCI** According to usual benchmark standards, the reasoning of the Commission provides more arguments that weight towards this LFC being excluded from a benchmarking sample, than arguments to support the Commission using this LFC as its single comparator.

38 See Commission, UCLL July, para. 609ff.

3.5 Price structure

3.5.1 Bulk discounts

108. The price structure for UCLL transaction services contains discounted fees in the event of bulk provision of transaction services as presented in Table 3-7. The price structure foresees a uniform bulk discount up to 46.5% in comparison to the individual charges.

Table 3-7: Proposed bulk UCLL transaction charges

Transaction Charge	Ref	Access type	Rates	Port change at DSLAM	
1.1 MPF new connection - where no site visit required	1.1	UCLL	Bulk	NA	27,43
1.2 MPF transfer	1.2	UCLL	Bulk	NA	27,43
1.3 Other service to MPF transfer	1.3	UCLL	Bulk	NA	27,43

Source: TERA model, CI-Non recurring charges v6.0.xlsx, sheet “Core price assessment”

109. This price structure for bulk provision does not accurately reflect the economies of scale, which are depending on the number of provisions. Instead, bulk provision is only applied for 20 or more provisions.[39] By calculating a total averaged price two issues occur which do not reflect appropriately the relevant cost:

    a. The calculation of a total averaged price depends on the assumption of the average number of provisions over all bulk orders. Generally such discount structures are conservative because if purchasers exceed the threshold then further cost advantages of the incumbent are not passed through to the purchasers (as would ordinarily be expected).

    b. Purchasers with purchase volumes larger than the average value cross-subsidize the purchasers with smaller than average volumes.

110. In order to improve the accuracy of cost calculation the cost should be derived as the function of the number of provisions in a bulk:

Bulk Price = f (number of provisions).

This is standard practice to price bulks purchases. For example, in Germany a similar price structure is adopted (in a simplified manner) for the UCLL connection

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39 See Commerce Commission, STANDARD TERMS DETERMINATION FOR CHORUS’ UNBUNDLED COPPER LOCAL LOOP NETWORK SERVICE, SCHEDULE 2 UCLL PRICE LIST PUBLIC VERSION, Updated to incorporate Commerce Commission decisions, amendments, and clarifications through 30 November 2011, p.3.

service in a special time slot.[40] With increasing number of provisions the price per unit decreases reflecting economies of scale in clusters.

Table 3-8: Bulk pricing structure for ULL connection services in Germany

Number of provisions per time slot	Price per provision
1 to 3	88.09 EUR
4 to 12	57.79 EUR
13 to 52	29.80 EUR
> 53	26.67 EUR

Source http://www.bundesnetzagentur.de/cln_1422/DE/Service-Funktionen/Beschlusskammern/1BK-Geschaeftszeichen-Datenbank/BK3-GZ/2014/2014_001bis099/BK3-14-001/BK3_14_001_Tenor.html?nn=350442

111. As a further example, the Spanish regulator[41] applies a nonlinear pricing structure for transaction services including a fixed and a variable price component, as follows:

$$p = A + B \times N,$$

A is the fixed price component, B the variable component and N the number of transactions. Such pricing structures better reflect the cost savings due to bundling and economies of scale than a threshold value upon which a reduced charge is being applied.

112. Additionally, the proposed price structure does not reflect bulk provisions of UBA services. Cost savings due to bundling of transactions can also occur for the UBA service, in a similar way as they occur for UCLL services. There is no reason to exclude the UBA service from applying bulk rates for transaction charges as is currently foreseen in the Commission's Draft Decision.

40 See decision Bundesnetzagentur, BK3-14-001.

41 Source: Oferta de Acceso al Bucle de Abonado, Febrero 2014, page 396, http://www.cnmc.es/Portals/0/Ficheros/Telecomunicaciones/Regulacion_sector/ofertas_mayoristas/OBA/201402_OBA_.pdf; Source: Oferta de Acceso al Bucle de Abonado, Febrero 2014, page 401, http://www.cnmc.es/Portals/0/Ficheros/Telecomunicaciones/Regulacion_sector/ofertas_mayoristas/OBA/201402_OBA_.pdf; Source: Resolución por la que se acuerda notificar a la Comisión Europea, a las Autoridades Nacionales de Reglamentación, al Organismo de Reguladores Europeos de Comunicaciones Electrónicas, al Ministerio de Industria, Energía y Turismo y al Ministerio de Economía y Competitividad un proyecto de medida sobre los precios de los servicios GigADSL, ADSL-IP y NEBA, pages 88, 89, http://www.cmt.es/c/document_library/get_file?uuid=24d216a0-deb2-4407-bb19-c60a2d0143e4&groupId=10138.

113. In Germany for instance, the incumbent Deutsche Telekom offers bulk migration products for UBA with reduced prices in comparison to individual connections, for example:

   a. Transition from ULL to UBA-ADSL: 29.51 Euro instead of 47.68 Euro per provision[42];

   b. Transition from ULL to UBA-VDSL: 29.51 EURO instead of 46.43 Euro per provision.

   These discounts are given in case that at the minimum 10 or at the maximum 40 connections are changed in the same exchange area on the same day (i.e., they represent a bulk discount for mass migrations).

114. There is no reason why these economies of scale in case of UBA bulk connections would not be available in New Zealand. As such, they should be included in the pricing regime.

3.5.2 POA based pricing

115. The Commission still retains a number of NRCs as prices on application (POA). Utilising POA prices for non-recurring charges reduces the effort required in cost modelling to account for efficiency checks and cost calculations.

116. To promote the long-term benefit of end-users, however, it is critical that the regulator determines a fixed price or at least a price formula, (which contains fixed and variable components, in a manner that permits the variable components to be checked for efficiency) where possible. Otherwise, the lack of competition (see below service "Re-Mapping Design") faced by the incumbent means there is no incentive to offer cost efficient services. Instead, these costs are simply passed on to access seekers (and ultimately end-users). Or in the case of additional services at customers premises, alternative offers are theoretically available, but due to transaction costs caused by searching for alternative offers and/or cost for an additional second truck roll (see below service "Wiring and modem installation"), lead again to a quasi-monopolistic position for Chorus in practice. This not only leads to invoice disputes, but also harms competition and end-users.

117. In the following we will focus on some UBA products proposed for POA pricing which are commercially important for RSPs in New Zealand:

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42 See NGA Migrationsvertrag, Zusatzvereinbarung zur " Zusatzvereinbarung zum IP-BSA 2010-Vertrag über die Inanspruchnahme des Kontingentmodell VDSL" (Classic-Variante) über die Migration von TAL/IP-BSA-ADSL zu IP-BSA-VDSL, page 5f**,** http://www.bundesnetzagentur.de/DE/Service-Funktionen/Beschlusskammern/1BK-Geschaeftszeichen-Datenbank/BK3-GZ/2013/2013_001bis099/BK3-13-045bis047/NGA-Migration_%20IP-BSA-Classic_bf.pdf?__blob=publicationFile&v=2

a. 1.50: Wiring and modem installation,

b. 1.48: Re-Mapping Design Charge.

118. The Commission proposes, that the service 1.50 Wiring and modem installation shall be priced according to POA for the wiring component and $ 38.01 for the modem installation component. The current charge for wiring is also POA. The Commission bases this on the assumption that it would not have data identifying the proportions of connection only compared with connection and wiring. This would be a bespoke activity with unknown volumes and a range of complexity.[43]

119. It remains unclear why the Commission has no reliable data if all possible data sources have been checked. Similarly, it is not certain, which kind of complexity would exist here. For example [

] **CNZCI** This illustrates the economic relevance and the importance of adequate price determination of this service and shows, that wiring and modem installation services are mass market services. Therefore a sufficient data sample should be available to determine fixed prices here instead of POA. For example, Spark has indicated to us, that Chorus offers schedule prices for in-home work for its next generation home networking services. Under these services, Chorus offers to undertake in-home work at scheduled rates. There appears to be no reason why a similar approach could not apply to premises wiring.

120. Alternatively, a variable price approach could be a preliminary solution. This approach was noted by TERA in its report for Ireland, where a labour plus materials pricing approach is used. We recommend, that this preliminary approach will apply for one year, giving the Commission and the involved parties time to collect the necessary data in order to determine fixed prices.

121. Moreover the Commission should set this price for premises wiring and modem installation in two variants: a) where the technician is already on site and b) where a separate truck roll is required. In case a) the truck roll costs are already covered in the UBA connection variants “site visit required”. So far the incremental costs for premises wiring and/or modem installation are lower than in case b) due to already paid truck roll.

122. The position 1.48 Re-Mapping Design Charge was now proposed as POA but is currently charged with a fixed fee of $ 1,989.29. In this context the Commission refers to a comment of Telecom from 2007: “*Where an Access Seeker requests changes to the mapping of the UBA Service, charges will apply for re-mapping design and a per End User access re-mapping fee. These charges reflect the*

43 See Commission, UBA July, para. 640.

underlying time and costs incurred in network rebuild designing, system changes and implementation."[44] Therefore the Commission concludes that the bespoke nature of re-mapping, as described by Telecom, would lend itself to a POA charge and not to a fixed fee. It is not clear why the Commission bases this decision on an eight year old comment of former Telecom to change this fee to a POA basis. In our view, a variance in the cost itself does not justify a charge on a POA basis. Only significant variances, which cannot be forecasted sufficiently, should necessitate POA pricing. Consequently a charge with a fixed sum is further justified. Additionally, we suggest a modification. As these costs correlate with the number of DSLAM locations affected a fee with a fixed sum per DSLAM location is appropriate.

3.5.3 Product scope

123. A number of important services (relating to the NRC services) are missing in the FPP price draft. These include:

- 10 GigE handover installation,
- Network investigation (where a Chorus service company will undertake a site visit to determine network availability at a site),
- Capacity where customers re-connect to the network.

124. Due to the permanently increasing usage of UBA services, the majority of hand over points are ordered in the 10 GigE version from Chorus. Vodafone has currently realised [ ] **CNZCI** of its UBA handover point capacity with 10 GigE. An increase to [ ] **CNZCI** is planned in the next 12 months. Spark has currently realised [ ] **CNZCI** of its UBA handover point capacity with 10 GigE. An increase to [ ] **CNZCI** is planned in the next 6 months.

125. Handover points represent a monopolistic bottleneck as the core UBA service itself. It can only be ordered from Chorus, and without purchasing handover points, the core UBA service cannot be used. As such, a price for this handover point service should be regulated in the FPP process. Otherwise Chorus has the incentive to receive the economies of scale benefits, which occur between 1 GigE and 10 GigE handover points, without the possibility of those being shared with end-users through more accurate and efficient pricing.

126. Moreover, as we have shown in our February Submission, the prices themselves for handover points are significantly inflated.[45] We could not find any discussion by TERA to this issue in the documents Industry Comments and Modelling Changes.

44 See Commission, UBA July, para. 628.
45 See WIK-Consult, Submission of 20 February 2015, para. 375.

The same calculations holds for the 10 GigE handover points. Assuming that on average a FDS is linked to around 68 DSLAMs and every FDS provides two 10 GigE links to the REN, the following calculation can be derived from the TERA input data:

1. [

2.

3.] **CNZCI**

127. This leads to an incremental CAPEX of [ ] **CNZCI** per 10 GigE plus an (by 1 GigE equivalents) allocated CAPEX for the positions 2. and 3. of [ ] **CNZCI** per 10 GigE. The result is a total CAPEX of [ ] **CNZCI** per 10 GigE handover point. Taking the asset life time of 5 years and a WACC of 8.38 % of the TERA model into account, monthly CAPEX costs of around [ ] **CNZCI** result. Comparing this result with the monthly price of 10 GigE of $1,444 which was unilaterally increased by Chorus in its commercial offer in December 2014 by 53%[46], shows that the costs of 10 GigE are significantly inflated. Hereby it may not be forgotten, that our calculation already includes installation costs while the UBA STD provides an extra NRC charge for installation of $ 543.26.[47] Ultimately, it is clear that, the prices for 1 GigE and 10 GigE handover points are significantly and unjustifiably inflated. Only totally inflated mark-ups for OPEX and non-network costs of several 100% could lead to the current prices of Chorus of recurring and non-recurring charges of 1 and 10 GigE handover points. This would be plausible. In any case, it would not be justified.

128. Further, Chorus has implemented a charge for the service Network Site Investigations. Spark indicates to us, that this service is necessary to confirm that network capacity will be available to meet the due date and time committed to connect an end-user. Offering such a service for payment does not represent an efficient process of an HEO. An HEO has a complete and working line data information system making extra investigations redundant in order to meet the agreed standard SLAs. As a general rule, neither such a service is offered as a regulated service with payment nor corresponding costs are considered as efficient costs of other regulated products in EU countries. Therefore where such a service charge relates to investigations of network capacity, it should be set to zero. Otherwise, inconsistent with the fundamentals of TSLRIC, Chorus would be permitted to recover to a fundamental inefficient activity.

46 Wigley+Company solicitors, Submission as to consultation on possible s30R review of the UBA STD General Terms and Service Description, 27 January 2015, para 1.13.

47 STANDARD TERMS DETERMINATION FOR CHORUS' UNBUNDLED BITSTREAM ACCESS SERVICE, SCHEDULE 1 UBA SERVICE DESCRIPTION PUBLIC VERSION, Updated to incorporate Commerce Commission decisions, amendments, and clarifications through 5 November 2013, p 9f.

129. The same holds for the service “Capacity where customers re-connect to the network”. An access network of an HEO holds enough capacity to satisfy demand in the future. This has been considered by the Commission and TERA by corresponding spare capacities in the cost models reflecting necessary capacities until 2020. A further fee for the service “Capacity where customers re-connect to the network” would lead to double recovery of costs. For this reason, the service fee should be set to zero.

3.6 Conceptual shortcomings in detail

3.6.1 Content of service codes do not adequately reflect NRC services

130. TERA determines cost of NRC services by mapping service codes to the NRC services. Therefore the activities of service codes have to be congruent with the activities of each particular NRC service.

131. The current NRC price proposals match four service codes with 21 different NRC core charges. 3 of the 7 service code charges have obviously not been mapped with NRC core charges. That means that on average more than five NRC core charges have been mapped with one service code. Service code [ ] **CNZCI** is by far the mostly mapped one. It covers 11 NRC core charges.

132. This demonstrates, that each service code covers a broad range of different NRC services. As a result, different NRC services will get the same price, even so these services differ in their activities (and therefore their cost). This mapping can, therefore, only represent a rough cost estimation, opening the door for cross-subsidies between NRC services. This does not reflect an accurate cost calculation.

133. In the same light, estimation of costs (as opposed to determining them accurately), can be seen, in the Commission’s draft decision. In particular, some service codes have not been used, even they have been built and benchmarked both internationally and nationally. In the case of the code [ ] **CNZCI** TERA had to accept, that this service code is not adequate to reflect costs of NRC charges appropriately. TERA concedes that as activities of NRC charges only correspond to some part of the code [ ] **CNZCI** and not to the whole activities that may be achieved in the code. Furthermore, we cannot identify in TERA’s model documentation that the codes [ ] **CNZCI** have been used to draft NRC charges.

134. Going a level deeper into the content of the service codes, we found activities, which are not related to the mapped NRC core services. For example:

a. [

b.] **CNZCI**

135. The installation of premises wiring and of the jack point are not activities, which are contained by the NRC service with end-customer site visit, for example “UCLL 1.1 MPF new connection - individual new connection where site visit required” or “UBA 1.1 New connection - site visit required”. Premises wiring work is provided as a separate NRC service for UCLL (1.50 of the UCLL price list) and for UBA (“*Where requested by the Access Seeker, Chorus will provide wiring at the End User’s site beyond the ETP to a single jackpoint and install a service compatible modem provided by the Access Seeker from the Approved Modem List.*”[48])

136. This is confirmed by the regulated UCLL and UBA STDs, which explicitly separate this service from the connection services

For UCLL:

“*3.2 The MPF Service excludes premises wiring. The Access Seeker or the End User will be responsible for customer premises equipment (CPE) and wiring at the End User’s site beyond the ETP.”*[49]

And for UBA:

“*3.22 The Access Seeker or the End User is responsible for providing and installing all required CPE and wiring at the End User’s site beyond the ETP, including a service compatible modem. The Access Seeker will ensure that TelePermit and premises wiring requirements are adhered to.*” [50]

This indicates, that some of the service codes and the corresponding NRC services include efforts for premises wiring, although it is not part of the UCLL and UBA connection services and offered and paid separately by Chorus to interested parties.

137. Consequently premises wiring activities and its relating costs must to be removed from the service code. Otherwise such costs would be double counted. Moreover, in the case where these costs have been just partly considered in the service codes, so far customers order such activities not separately, these costs must be removed.

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48 STANDARD TERMS DETERMINATION FOR CHORUS’ UNBUNDLED BITSTREAM ACCESS SERVICE, SCHEDULE 1 UBA SERVICE DESCRIPTION PUBLIC VERSION, Updated to incorporate Commerce Commission decisions, amendments, and clarifications through 30 November 2011, page 10.

49 STANDARD TERMS DETERMINATION FOR CHORUS’ UNBUNDLED COPPER LOCAL LOOP NETWORK SERVICE, SCHEDULE 1 UCLL SERVICE DESCRIPTION PUBLIC VERSION, Updated to incorporate Commerce Commission decisions, amendments, and clarifications through 30 November 2011, page 3.

50 STANDARD TERMS DETERMINATION FOR CHORUS’ UNBUNDLED BITSTREAM ACCESS SERVICE, SCHEDULE 1 UBA SERVICE DESCRIPTION PUBLIC VERSION, Updated to incorporate Commerce Commission decisions, amendments, and clarifications through 30 November 2011, page 10.

Otherwise customers, who already have intact premises wiring would cross-subsidise customers without.

138. The installation of ETP and connect wiring are activities, which are contained by UCLL and UBA NRC services mapped with the service code [ ] **CNZCI**. The regulated UCLL and UBA STDs explicitly exclude the connect wiring:

For UCLL:

"*The MPF Service excludes premises wiring. The Access Seeker or the End User will be responsible for customer premises equipment (CPE) and wiring at the End User's site beyond the ETP.*"[51]

For UBA:

"*The Access Seeker or the End User is responsible for providing and installing all required CPE and wiring at the End User's site beyond the ETP, including a service compatible modem.*"[52]

Moreover, the additional Lead-In service of Chorus already includes the installation of the ETP: "Install an External Termination Point (ETP)"[53]

139. This clearly indicates, that the service code [ ] **CNZCI** and the corresponding NRC services include work for installation of ETP and connect wiring, although they are not part of the UCLL and UBA services and are offered and paid separately by Chorus to interested parties.

140. Consequently, the installation of ETP and connect wiring and its relating costs must be removed from the service code, otherwise such costs would be double counted. Moreover, in the case where these costs have been just partly considered in the service codes, so far customer orders such activities not separately, these cost have also to be removed. Otherwise customers, who already have intact premises wiring would cross-subsidize customers without.

51 STANDARD TERMS DETERMINATION FOR CHORUS' UNBUNDLED COPPER LOCAL LOOP NETWORK SERVICE, SCHEDULE 1 UCLL SERVICE DESCRIPTION PUBLIC VERSION, Updated to incorporate Commerce Commission decisions, amendments, and clarifications through 30 November 2011, page 3.

52 STANDARD TERMS DETERMINATION FOR CHORUS' UNBUNDLED BITSTREAM ACCESS SERVICE, SCHEDULE 1 UBA SERVICE DESCRIPTION PUBLIC VERSION, Updated to incorporate Commerce Commission decisions, amendments, and clarifications through 30 November 2011, p. 6.

53 Copper Service Lead-In, Version '140625120933', printed from http://customer.chorus.co.nz/copperserviceleadin on December 05 2014, page 1.

3.6.2 Service companies' direct costs

141. The Commission appears to start from the axiom that the service companies' contract charges reflect a competitive and therefore efficient market outcome (on the basis that Chorus' choice among service companies is made through a tender process). Whether or not that is the case depends first of all on the competiveness of the service company market and the competitiveness of the tendering process itself. We do not have the information to assess either. Even if one assumes that the tendering process generates a competitive outcome, this only holds for the whole package of the service contract and not necessarily for the part which is most relevant for (regulated) transaction services.

142. This "total package character" of a service company's contract is clearly demonstrated by the service company contract which has been provided to us by Spark. For example [ ] **CNZCI** is a service company operating in different fields such as telecommunications, facilities management, electrical services, roading and water infrastructures:

Spark [

] **CNZCI**

143. One major problem of starting from the service companies costs results from the fact that service companies provide a variety of services to Chorus. These include besides (regulated) transaction services, transaction services for Chorus

unregulated services as well as network maintenance and engineering activities for Chorus.

144. It is convincing to us that Chorus has an incentive to keep the level of service companies charges that impact Chorus value at a low level. Chorus, however, also has an incentive to allocate service companies costs such that its competitive services and perhaps its maintenance services get less burdened with costs than those services where costs can be shifted directly to users which demand those services. In a complex service relationship there are many possibilities for managing the allocation of costs. This issue is not addressed in the Commission's further draft determination to show that they have taken care of potential distortions at the expense of (regulated) transaction services.

145. Another problem of the services companies costs as a starting point results from the fact that contracts with service companies entail a pricing structure towards Chorus that is built at a higher level of aggregation as compared to the transaction services pricing list.[54] As a consequence a lot of assumptions are required to map the contract charges to the components of the (regulated) transaction services.

3.6.3 Service companies' overheads

146. TERA sets the service companies' overhead costs to [ ] **CNZCI** of their direct costs. TERA states, that this does not require further analysis as it has been part of the competitive process and therefore Chorus' contract rates could be taken. As we have shown in Section 3.6.2 it is doubtful that Chorus' contracts (necessarily) contain conditions which an HEO would agree with service companies.

147. Moreover, in other parts of the cost model lower overhead mark-ups of service companies are being used by TERA. This indicates that a [ ] **CNZCI** mark-up represents a value in the upper range. In the case of services related to street cabinets the service company overhead mark-up in the model was assumed to be [ ] **CNZCI**.[55] In the case of FAT/CCT differentiated mark-ups of [ ] **CNZCI** and [ ] **CNZCI** respectively are being used.[56]

148. It becomes obvious that even Chorus is able to agree service company overhead mark-ups lower than [ ] **CNZCI** for some part of the services.

149. Additionally TERA states, that contracts between LFCs and service companies also include this concept of service companies overheads with similar mark-ups. We cannot confirm this to be reprehensive for the New Zealand market. [

54 See TERA, Non-recurring charges, p. 7.
55 CI-ComCom - Inputs - v8.0.xlsx, sheet "Unit costs calculation", cells K777 to K 780.
56 CI-ComCom - Inputs - v8.0.xlsx, sheet "Unit costs calculation", cells N790 to N 794.

[57]

] **CNZCI**.

150. The Commission should recognise that even Chorus seems to be able to negotiate lower service companies' overhead charges than reflected in the general mark-up of [ ] **CNZCI**. This is further supported by the experience of other market players in New Zealand. The Commission should therefore lower this overhead mark-up so that it does not exceed a level of 20%.

3.6.4 Chorus overheads

151. TERA derived costs of Chorus overheads for NRC from its OPEX model. From a total overhead cost of [ ] **CNZCI** TERA allocated [ ] **CNZCI** to the NRC services based on the revenue share of NRC services.

152. These overhead costs shall represent Chorus' activities, which have not been outsourced to the service companies. That means all processes which are not done in the field. As such, these are activities mainly covering order management with wholesale customers and with the service companies and other administrative issues.

153. We know from our experience in Germany, that such activities offer a lot of opportunities for efficiency improvement and cost reductions. These are mainly driven by two factors:

    a. **IT automation:** A lot of processes in an incumbent's environment still need manual activities, due to the fact, that IT systems are not implemented yet or do not work properly or because the IT infrastructure grew historically but are not (yet) integrated; and

    b. **IT integration:** Incumbents' IT infrastructure grew historically and different systems are used for wholesale regulated products, wholesale unregulated products and business retail products, producing fixed costs several times and therefore inflating costs.

That was the reason in Germany, why the incumbent, Deutsche Telekom, completely reorganised its IT infrastructure with almost full automation in order to

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57 [ ] **CNZCI**

reduce manual activities to a minimum and to save IT costs. This was a major reason and justification of several rounds of reductions of ULL connection charges.

154. We can neither observe in TERA's documentation nor in the OPEX model, that such a systematic IT system analysis has been conducted by TERA. It seems to be that values of Chorus' accounts have been taken and, if not completely implausible, maintained. Instead, TERA focussed its efficiency checks on maintenance and labour activities by adjusting the LFI. This had no impact on NRC cost efficiency (at least as we could identify).[58]

155. This approach is not adequate to determine efficient overhead costs of an HEO producing NRC services. Furthermore, TERA follows a static approach and assumes constant overhead costs for the whole regulatory period of 5 years. This neither reflects achieving cost savings by further possible IT automation nor does it reflect further savings from IT integration.

156. These findings are supported by observations of Vodafone New Zealand. Chorus is undertaking a steady stream of improvements with its IT systems. For example, Chorus launched the 'Chorus portal' (online system, access via web browser) for fibre OSS (operating and support system). This system will shortly go live with a B2B portal, which means systems of wholesale customers will plug directly into Chorus' portal. So Chorus is permanently working on more IT automation which saves time, speeds up service provisioning, reduces manual operation work time and cost and improve process quality by reducing failures and related repair time and cost. Especially relating to the UFB roll-out Chorus heavily invests into IT improvement. This improvement should also hold for the copper network, which still offers the majority of access lines to customers.[59] Thus, the process of efficiency improvements on the provision of transaction services has not yet achieved its end in New Zealand. Therefore the steady state efficiency assumption of the Commission is incorrect.

157. In this context it is relevant, that IT costs taken from Chorus is one year older than the other costs and in the meantime two years old:[60]

> "*All inputs provided by Chorus and used in the model are gathered in the "INPUT" sections. Chorus' accounts used in the OPEX model are accounts for the year to June 2014 except for IT costs that are derived from the accounts for the year to June 2013 (as 2014 figures have not been provided). Inputs from the Analysys Mason / Chorus model have been used as well in order to allocate IT costs.*"

58 See TERA, Model Documentation June, p. 18, Figure 7.
59 See https://www.chorus.co.nz/file/62254/fibre-update-final.pdf, slide 7ff.
60 See TERA, Model Documentation June, p. 18, Section 3.1.

158. This approach is concerning: Why are current IT costs not available? Why is a forecast of IT costs for the whole regulatory period not available? Generally companies have an accurate and forward-looking IT master plan for the upcoming years, knowing, that the IT development and the situation of their own IT infrastructure offers significant opportunities for cost savings. The 2013 input data approach used in the model is far away from an efficient HEO looking forward until (at least) 2020.

159. As importantly, it should be noted that, extrapolating the incumbent's IT cost is dealing with its historic IT development path and all the high cost of changing an existing IT landscape. An HEO, however, is starting greenfield and benefitting from a new and state-of-the-art IT-platform, without all old release change dependencies an existing operator experiences. Thus, the extrapolation approach chosen by TERA in any case results in a significant IT cost overestimation.

3.6.5 Price trends, productivity gains and approval period

160. The analysis in the revised draft determination on price-trends, productivity gains and the approval period is not consistent. The Commission assumes that service contracts will include periodic reviews.[61] Such reviews accommodate both cost reductions from efficiency improvements and increases due to labour rates and other external influences. We have provided the Commission with relevant examples of the charge control conducted by NRAs in other jurisdictions, which assume a downwards price trend due to significant productivity improvements in the context of service transaction charges.[62]

161. The price proposal of the Commission foresees an approval period of five years. Five years offers a lot of opportunities to realize further cost optimization and efficiency improvements. Even in developed European markets still significant price reductions averaged over all ULL connection services can be observed. This holds even after several years of regulation of service transaction charges.

61 See Commission, UCLL July, para. 596.
62 See WIK-Consult, Submission of 8 October 2014, Section 2 and Annex.

Table 3-9: Development of ULL connection charges in selected European countries and EU average

Country	2011 to 2012	2012 to 2013	2013 to 2014
CZ	11,8%	-14,9%	0,0%
DE	0,6%	0,0%	-4,0%
EL	-17,7%	-17,4%	11,3%
IE	0,0%	-31,7%	0,0%
LT	-43,5%	-37,0%	0,0%
PL	0,0%	-3,0%	0,0%
SE	-17,0%	-72,4%	34,2%
UK	-15,7%	-10,0%	0,6%
EU	-1,8%	-5,9%	0,6%

Source: WIK calculations basing on European Commission, Telecommunications data files, Digital Agenda Scoreboard, Financial indicators, fixed and mobile telephony, broadcasting and bundled services indicators (xls), sheet "8) LLU pricing", rows 221 - 253[63] and Financial indicators, fixed and mobile telephony, broadcasting and bundled services indicators – 2014, sheet "8) LLU pricing", rows 226 - 259[64].

162. We will show in Section 3.6.6 that there are well-founded doubts on the efficiency of the current service provision regarding transaction services in New Zealand. If the Commission does not foresee a downwards price path for transaction services it does not set proper incentives to improve efficiency and to let access seekers and users participate in these improvements. In our October Cross-Submission we have made the following argument:

> "*In a competitive market a firm operates at efficient costs. Furthermore, competition forces a firm to realise productivity gains, and to pass those gains on to its customers by lower prices after accounting for unavoidable changes in input prices and compensation for input price volatility risk. Due to its market position Chorus is not under pressure to operate at efficient cost and to pass over productivity gains to access seekers. Regulation has to take care for both aspects of efficiency improvements. In a pragmatic approach the Commission may set an efficiency improvement factor X which should take care of the need to bring down transactions charges to their efficient level and to pass over future productivity gains to access seekers.*"[65]

This statement and the implicit recommendation still holds. We recommend that the Commission foresees a productivity improvement factor for transaction services and sets a price path of -3% to -5% p.a. of the price level it is

63 http://ec.europa.eu/information_society/newsroom/cf/dae/document.cfm?doc_id=2374.
64 http://ec.europa.eu/newsroom/dae/document.cfm?action=display&doc_id=9976.
65 WIK-Consult, Cross-Submission of 15 October 2015, para. 26.

determining for the cost of its base year. Such a level of productivity improvement is supported by the regulatory practice in the EU.[66]

3.6.6 Process efficiency

163. As we have shown in Section 150, cost of IT systems of Chorus offer obviously a great opportunity for cost reductions. Additionally, transport times have not been checked by TERA for efficiency. TERA argued, that this would not be necessary due to its national speciality without clarifying and justifying this. While the particular geographical situation has an impact on transport costs, this plays a minor role in comparison to the major cost driver of transport costs: The optimisation and bundling of truck rolls. The more field activities are bundled, transport costs sink per unit due to economies of scale. So far this has not been examined for individual services, if service companies make use of these bundles effects and if they are optimized. Hereby it may not be forgotten, that the service companies do not only organise truck rolls for UCLL and UBA connection activities but also for other field works relating to other products or other UCLL and UBA services (for example fault repair).

164. Furthermore, Spark and Vodafone indicated more opportunities for improvement caused by their operational experience to us. We could not observe in the confidential cost models and documentations of TERA, that the issues in the following paragraphs have been examined and corrected for efficiency. It seems more, that this should be considered by the international benchmark proceeded by TERA and its corresponding knockout argument, that everything has to be efficient what has been regulated by other regulatory authorities. The same holds for the LFC benchmark: A tender offers the possibility to get efficient results but this corresponds with the current and inefficient framework conditions set by Chorus. In other words: This does not reflect an HEO, which would set efficient framework conditions for a tender. Service companies do not care about such inefficient framework conditions as they are paid for working with such inefficiencies.

165. We cannot observe, that the international and LFC benchmark data was analysed in the light shown above. Instead, it appears to have been assumed as efficient data without detailed checks. This especially applies for the following examples identified by Spark and Vodafone. Current process times relating to field work are inefficiently high because copper network records are in a poor shape in New Zealand. The service companies are responsible for searching copper records and corresponding inaccuracies inflate process times. If record problems cannot be solved, the service companies have to identify working cable segments in the field, causing there further increase of labour and transport times by several truck rolls.

66 See para. 161 and WIK-Consult, Submission of 8 October 2014, Section 2 and Annex.

Additionally more manual interventions and staff are required to manage connection services. This relates to both, Chorus and its service companies. In the worst case, orders have to be placed several times due to the bad condition of Chorus network records and these have all to be paid with the NRC charges, because every successful order process bears proportionally the inefficient costs of the not successful orders.

166. Moreover current network spare capacities, suffering from an amount of defect lines not repaired, does not permit copper lines to be left intact after customer's line cancelation. So often such lines are broken down in order to meet new demand or resolve faults. This has the consequence, that the more expensive product variant with additional truck roll to the end-customer and or cabinet can be regarded,

167. These observations of inefficiencies are not compatible with an efficient HEO. The new modern network modelled by the Commission would be better able than Chorus' inefficient legacy network to meet customer demand in an efficient way without high volumes of inefficient network investigations, redundant truck rolls and redundant network re-arrangements. However, by simply adopting Chorus current NRC volumes, the Commission is building on this inefficiency.

168. Germany is an example for an efficient framework achieved by the incumbent Deutsche Telekom. Deutsche Telekom was motivated by increasing complaints of competitors and consumer protection associations, and the corresponding pressure of BNetzA to introduce a full integrated IT platform with the name WITA (= Wholesale-IT-Architecture) which reduced inefficiencies, especially manual exceptions and workarounds, repeating order processes and inflating connecting services in the field to a disappearing rest amount concerning UCLL.[67] Even for SLU-NRCs the BNetzA assumed the use of WITA and reduced cost by giving Deutsche Telekom the incentive to optimise also the costs of the SLU product variant. [68]

169. Therefore it is necessary, that the proposed NRCs will be further reduced to reflect more efficient processes, otherwise resources are wasted and Chorus has no incentive for improving the efficiency for the administrative process for the provision of NRC services.

3.7 What needs to be done and changed regarding transaction charges

170. Our analysis and assessment of the Commission's approach towards cost determination of service transaction charges leads to the following proposals and recommendations. If implemented, these would make the Commission's approach

67 See decisions of BNetzA, BK3-10-087, p. 20f, 23f; BK3-12-070, p. 30 – 33.
68 See decision BNetzA, BK3-12-070, p. 56f.

more robust and more accurate. More importantly, they would lead to a more efficient cost level (to the benefit, ultimately, of end-user of telecommunications services). All of our proposals are related to the top-down approach with efficiency adjustments, not withstanding our assessment that this is the second best approach of costing (and that bottom-up cost modelling remains the more appropriate first best choice).

171. The Commission could make its own costing (and pricing) approach more robust and generate more efficient costs if it would accept and implement the following proposals and recommendations. We recommend, that the Commission should:

(1) develop an efficiency adjustment approach which would not limit the scope of efficiency adjustments to significantly less than 50% of the service transaction cost. 100% of the relevant cost base should be subject to efficiency adjustments.

(2) include in the international benchmark for efficiency adjustments only countries which have a similar or roughly similar level of labour productivity and labour costs compared to New Zealand.

(3) update its “old” benchmark figures to make them more reflective to efficiency gains in the benchmark countries. The “raw” benchmark figures should for that purpose be indexed with an annual productivity factor of 5% p.a.

(4) make more efforts to avoid using inflated benchmark numbers by excluding (a) transport times and (b) administrative times from the relevant processing time.

(5) withdraw its national cross-checking approach based on fibre connection costs totally because they are not comparable to copper connection costs.

(6) if does not follow this more far reaching approach, definitively apply the national cross-checking approach symmetrically. Also in case where it would lead to lower costs it should be applied and not only in case where it would lead to higher prices.

(7) apply a bulk discount scheme which is more cost reflective and not only be defined by a particular threshold.

(8) apply bulk discounts to the UBA-related service transaction charges.

(9) limit the scope of POA based pricing to the absolute necessary minimum. The services 1.48 and 1.50 should not be priced according to POA.

(10) extend the scope of price determination to include the services “10 GigE handover installation”, “network investigation” and “capacity where customers re-connect to the network”.

(11) “clean” the use of service codes in its mapping approach such that cost and work elements which do not belong to the regulated transaction services are excluded from the relevant cost base.

(12) not accept the direct cost of service companies as given. It should in particular check the appropriateness of the cost allocation within the multi-product relationship between Chorus and the service companies. There is an incentive on Chorus’ side to distort these allocations at the expense of transaction charges.

(13) revise the service company overhead mark-up because it is generally too high and leads in some cases to a double-recovery of costs.

(14) correct Chorus’ overheads for efficiency and automation savings.

(15) foresee efficiency improvements in the provision of transaction services within the regulatory period. This could be conducted by implementing a productivity improvement factor as a price path of -3% to -5% p.a. from the calculated cost of the base year.

4 General principles of the Commission for determining TSLRIC prices

4.1 The TSLRIC approach of the Commission

4.1.1 General aspects

172. The Commission has re-confirmed in its further draft determinations its conceptual framework that the HEO would operate a newly built network providing the relevant regulated services. Conceptually the Commission does not regard the HEO to be constrained by the legacy network and technology decisions of the regulated firm in the past. Conceptually, this is the appropriate starting point for technology choice, network design and dimensioning assets as well as for optimising the cost structure. We have extensively elaborated in our previous submissions and cross-submissions that we fully support these conceptual starting points and principles.

173. The practical implementation of these principles in the modelling approach, however, faces two fundamental deviations which lead to conceptual shortcomings and inefficient outcomes which the Commission has not corrected in the further draft determinations. The first deviation relates to the network MEA approach for the modelling and the second deviation relates to the re-use of assets. The dual MEA approach of the Commission represents a far reaching adoption of the Chorus' legacy infrastructure. An efficient operator making its network technology would under (nearly) no circumstances decide in favour of a dual MEA approach.

174. In the network modelling in detail the Commission makes a lot of network architecture and dimensioning choices which are informed by Chorus' actual network and not by efficient network deployment decisions an HEO would make today. The rational of such assumptions is based on the re-use of certain assets. The re-use of asset is not compatible with the general asset valuation approach of optimised replacement cost.

175. Both fundamental deviations from the network efficiency principles as applied by the Commission lead to inefficient outcomes and inflated costs and cannot be accepted.

4.1.2 Re-use of assets still not considered

176. We have shown in our previous and the current model analysis that the Commission built the "efficient" network of its HEO not on the basis of a greenfield network deployment but used the architecture, the nodes and also major engineering principles of Chorus' existing network. The purpose of that approach is to bring the

modelled network closer to the "real world" network environment. This means that 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. This holds in particular for (certain) legacy civil engineering assets. Chorus and any other incumbent operator build their new fibre network on such a brownfield deployment approach. 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.

177. By not accepting and implementing this link the Commission is generating costs which are distorted and inflated twofold. Firstly, access seekers and end-users are burdened by the Commission's approach with fibre costs which are too high because they do not represent the efficient greenfield deployment architecture. Secondly, the Commission models a fibre architecture which is in line with and only makes sense in the context of asset re-use without letting end-users participate in these benefits. This approach effectively generates economic rents for Chorus and burdens end-users twofold without any benefits to them and without any justification. We have extensively analysed this context in our February Submission (Section 1.1.2) and in our March Cross-Submission (Section 2.6.3).

178. The European Commission has recognised this context when it made its recommendations on the proper costing approach for European NRAs to apply in the transition from copper to fibre networks. It will become a reality in Europe in the next few years that this will be the understanding of a proper implementation of TSLRIC in Europe.

179. Clearer than before we conclude that the general use of ORC by the Commission is a conceptual error in its modelling. Replacement costs are not applied to the efficient network asset structure but to one which is influenced and distorted by the re-use of assets. At the same time the Commission is not compensating that by an asset valuation approach which reflects their re-use and which represents actual operators' behaviour. The result are inflated cost.

4.2 Still a uniform MEA for ULL and UBA

180. The Commission has decided for a FTTH Point-to-Point access network architecture without intermediate street cabinets as the Modern Equivalent Asset for UCLL a Hypothetic Efficient Operator would deploy. This is complemented by

the deployment of Fixed Wireless Access in the remote and most expensive areas. We fully support this approach.

181. For UBA the Commission applies the existing copper access network architecture. This includes intermediate street cabinets, different trenches, different endpoints of the network (790 MDF in case of UCLL, 92 FDS locations in case of UBA) and no FWA. We disagree with this approach and strongly recommend to use the same MEA in both applications.

182. No HEO would deploy two different physical access network topologies for the two services he wants to produce. In any case he would use the same trenches and transmission media in order to benefit from the synergies achievable.

183. While the transparent fibre towards the end-customers in case of FTTH allow transmitting nearly unlimited bandwidth (Tbps are state-of-the-art today), the bandwidth of the UBA infrastructure is strongly limited and in addition is copper loop length dependant (the typical bandwidth is below 50 Mbps without vectoring). While FTTH Point-to-Point is future-proof, FTTC (Fibre to the Curb/Cabinet) is an intermediate technology only used, where copper already exists. Thus it is inappropriate for a HEO deploying a new and efficient infrastructure.

184. We therefore repeat our conviction that a uniform MEA would be the only appropriate MEA approach in the New Zealand case (see also WIK-Consult, Submission of 20 February 2015, Sections 1.2, 2.2, and 5.6.2, para. 302, and Section 6.2 below).

4.3 Uplifting

4.3.1 Uplifting the WACC

185. In its further draft determination the Commission comes to the conclusion that there is no strong justification for departing from the mid-point WACC.[69] Thus, the Commission rejects any WACC uplift as considered in its April Consultation Paper.[70]

186. In coming to this conclusion the Commission found there is no need to incentivise further investments triggered by an WACC uplift. Firstly, the Commission recognises that there is no compelling reason for further investments in the copper network which need to be specifically incentivised. This is in line with the arguments

69 See Commission, UCLL July, para. 503.
70 See Commission, Agenda and topics for the conference on the UCLL and UBA pricing reviews, 2 April 2015.

which we proposed in this context.[71] We have even warned that any artificial incentivising of further copper network innovation may jeopardise the migration of customers to the fibre network which would be counterproductive for the broadly accepted policy objectives in New Zealand.

187. Although we welcome the conclusion and decision of the Commission not to uplift the WACC, we are surprised that the Commission did not discuss (and take up) the argument that also the investment in innovative services, as conducted by RSPs, are indirectly affected.[72] The analysis of the Commission remains constrained to network investments – which represents only part of the relevant investment and investment incentives at stake.

4.3.2 Uplifting the TSLRIC prices

188. On the basis of its quantitative welfare analysis and the submissions received the Commission has developed the view that no adjustment should be made to its central estimate of the TSLRIC-based price for the UCLL service. This central estimate of the TSLRIC price is – according to the Commission – likely to best give effect to the section 18 purpose statement. The Commission came to this conclusion when it found that such an uplift would not promote competition for the long-term benefit of end-users.

189. We welcome and support this finding and conclusion of the Commission. We have made and highlighted right from the beginning that a TSLRIC-based wholesale price rather perfectly balances several potentially conflicting interests of economic agents which makes it a very powerful and attractive regulatory concept. We also always have stressed that the concept of TSLRIC loses these credentials and economic distortions will occur if deviations from the central estimate of the TSLRIC-based price are considered or even conducted.

190. We have pointed out in our May Submission on the Commission's Consultation Paper that an (undistorted and uninflated) TSLRIC price level is already more than is required to secure the necessary investment incentives to maintain the copper access network. We also have shown there that a TSLRIC-based price is not migration neutral with regard to migration to the fibre networks but includes already a significant price component as a contribution to incentivising migration to UFB. This view is also supported by the Commission's advisor Ingo Vogelsang.[73]

71 See WIK-Consult, Submission of 8 May 2015, Section 3.2.
72 See WIK-Consult, Submission of 8 May 2015, para. 57f.
73 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 implications for pricing UCLL in New Zealand, Paper prepared for the New Zealand Commerce Commission, June 23, 2015.

191. The results of the welfare analysis which the Commission conducted impressively demonstrates that significant amounts of money in terms of welfare losses are at stake if an uplift of the UCLL TSLRIC price would be considered.[74] These net effects of around minus $ 100 million for an uplift of $ 1 represent the lower bound of the relevant welfare effects. The Commission also accepts some additional effects which it could not quantify but which are relevant. Those factors include impacts on the fibre retail price, switching costs and the impact of an price uplift on broadband penetration. All these factors have been presented in our May Submission.[75] All these factors would make the welfare effects of any price uplift even more negative.

192. These results of its own welfare analysis on a TSLRIC price uplift should worry the Commission in a different direction. If the TSLRIC cost estimate of the Commission's model due to model errors, an inefficient network architecture or inflated input parameters overstates the relevant TSLRIC by a few dollars the New Zealand economy would be burdened with welfare losses of several $ 100 million. We made the point in our February Submission and come to similar conclusions regarding the 2015 cost model that the calculated UCLL cost are significantly overstated and should in the end not exceed the IPP prices but should fall significantly below that price level. If the Commission overstates the relevant TSLRIC cost, the same welfare effects as it has discussed in the context of an price uplift occur but in a reversed form. The difference between the "true" TSLRIC and those calculated by the Commission represent an uplift to the appropriate TSLRIC price in New Zealand.

74 See Commission, UCLL, para. 491ff.
75 See WIK-Consult, Submission of 8 May 2015, Section 4.2.5.

5 ULL specific aspects

5.1 TSLRIC for UCLL

193. The Commission considered in its December 2014 Draft Determination to set a constant levelised (nominal) UCLL (and UBA) price over the regulatory period. The main reason for this pricing approach was price stability. In our February Submission we made the Commission aware of intertemporal competition effects and potential disruptive effects to the market at the beginning and the end of the regulatory period following from the implementation of this pricing approach.[76] For those reasons we recommended to set nominal prices for each year over the regulatory period instead of a constant nominal price.

194. We welcome the further draft decision of the Commission now to set nominal prices for each year over the regulatory period. Although we agree that both approaches are equivalent in net present value terms. Nevertheless, the price path approach comes closer to cost/price efficiency and avoids (potential) detrimental effects on competition.

5.2 MEA for UCLL

195. We totally agree with the Commission that the MEA for the access network a HEO would deploy in a future oriented manner would be a FTTH Point-to-Point fibre network, complemented in areas in which fibre becomes more expensive than a fixed wireless access network by such a FWA.

196. A HEO deploying a new network should take into account sharing with already existing infrastructure of other owners, being them utilities, telecommunication operators, traffic organisations or public authorities. This sharing, though generally accepted by the Commission, only is to a small extent reflected in TERA's cost model. The general underground share with other infrastructure owners is now set to only 5% (see Section 7.2.15). There is also no sharing with the utility overhead installations for the lead-in, without any rationale (see Section 7.2.5).

5.3 Network optimisation

197. In our February Submission, Section 3.3, we described the most relevant network optimization approaches we would expect to be reflected in a state-of-the-art modelling approach. We assume, an HEO would first optimize the MDF locations and the core network above that level, but also the network nodes in the access

76 See WIK-Consult, Submission of 20 February 2015, para. 91 and 110.

network. The model which underpins the revised draft determination, however, still takes the MDF and FDS locations as scorched nodes, as it also does for the street cabinet locations. While the MDF areas now, according to the model description, have been delineated in a new and efficient manner, the arguments for using an augmented shortest path algorithm for calculating lowest construction cost instead of a simple shortest path per individual fibre connection has been neglected, without clear and substantive reasoning in the revised draft determination. As such, there remains a significant area of network and cost optimization which is not reflected in the model. We will give examples in Section 231 and para. 199 and 200 below.

198. The Commission states that it has "*adopted an optimally-structured network approach which is constrained only by the existing number of nodes and there existing locations, and follows the road network. All other aspects are open to optimisation.*"[77] The actual degree and approach of optimisation in the model implementation, however is not coherent with these principles and this statement.

199. In its description of the GIS modelling environment (para. 21.c)[78] the Commission reveals that the model takes a straight line road segment allocation to the street cabinets and MDF (in case of fibre) instead of the concatenated road length or road distance, which we have proposed several times as the only really efficient methodology.[79]

200. The weights chosen by the Commission for private roads and motorways in order to increase cost of its use compared to public roads (GIS modelling environment, para. 13) is inherently arbitrary, without a clear or substantive reason provided for the approach adopted. In any case it results in more expensive solutions than would be efficient.

5.4 Network deployment

201. In Section 3.4 of our recent February Submission we listed a number of means for improving network deployment towards more cost efficiency. This includes sharing, which we already mentioned in Section 193 above, and trenching. It also refers to a number of state-of-the-art engineering rules detailed in Section 7 of this Submission. While we recognize that the cable dimensioning achieved some improvement in the model in aggregating single pairs or strands into one larger cable, we also have to state that this has only be realized half way. MDU lead-in cable aggregation is neglected, SLUBH and FWA cables are aggregated, but only in 12 F cables. If the 12 F cables have been exceeded, the 12 F cables will be multiplied instead of choosing a 24 F or even larger cable, once again requiring only

77 Commission, UCLL July, para. 322.
78 See Commission, The Geographic Information System modelling environment for the Unbundled Copper Local Loop and Unbundled Bitstream Access services final pricing principle, 24.07.2015.
79 See WIK-Consult, Submission of 20 February 2015, para. 300.

one subduct instead of two or more. Similarly, the largest fibre cable chosen in the model has 312 fibres, while we know about 592 F cables in use – and even more. So there are still a lot of network deployment options in the passive access network which could have increased efficiency and reduced costs. We will list some of them in Sections 231 and 7.3.1.7 below.

5.5 Exclusion of certain capital costs

202. The Commission has formulated in principle a transparent and logical approach to consider capital contributions from third parties (e.g. end-users) in the UCLL TSLRIC modelling. Nevertheless, two issues remain treated inappropriately or unresolved at all: (1) The treatment of aerial lead-ins and (2) the consideration of UFB and RBI subsidies. We also have some reservations regarding how the exclusion of lead-in costs are modelled, as we explain in Section 7.2.7.

203. While the Commission now excludes the cost of trenching for all lead-ins from the property boundary to the building within the TSO boundary, the full cost of aerial network deployment is included in the TSLRIC cost.[80] There is no convincing reason for the different treatment of the two different types of deployment. The Commission points out that Chorus charges users $195 for the installation of aerial lead-ins.[81] Chorus' relevant document which describes the conditions of the lead-in service[82] requires that users provide the open trench for the provision of an underground service lead-in and/or also a pillar for the provision of four span of overhead service lead-in. The Commission is arguing that contributions received by Chorus that do not result in the creation of identifiable assets like the contributions for aerial lead-ins have not to be taken into account. This argument is misleading and incorrect because aerial lead-ins need assets like poles on the estate of the customers and/or on the rooftop of the building or at its wall. Also the Model Specification confirms that poles are part of the aerial lead-ins.[83] Furthermore, labour and design efforts are required which are capitalised in the model.[84]

204. Furthermore, the Commission has included the aerial lead-in cost because the link between the dollar amount collected by Chorus and the TSLRIC cost was not clear to the Commission.[85] This argument also is misleading. The task of the Commission is not to consider whether the $ 195 lead-in service charge is covering the relevant TSLRIC. As we have pointed out in our February Submission, the

80 See Commission, UCLL July, Attachment K.
81 See Commission, UCLL July, para. 1625.
82 See Chorus: Copper Service Lead-In, printed from http://customer.chorus.co.nz/copperserviceleadin on December 05 2014.
83 See TERA, Model Specification June, p. 42.
84 See TERA model, CI-ComCom - Inputs - v8.0.xlsx, sheet "Unit costs calculation", cells L10 to M21.
85 See Commission, UCLL July, para. 1626.

connection fee represents an average cost which may be cost covering or even profitable.[86] What is important in the TSLRIC context is only which network deployment costs are already covered by the connection charge (intentionally) and therefore do not need to be covered by the recurring UCLL charges once more.

205. In our February Submission we have claimed that the Commission has not considered capital contributions which have been provided by the Government to build the fibre network in the UFB program.[87] The Commission justifies its approach with the argument that to its "*knowledge the UFB network has not benefited the network we are modelling*"[88] We do not share this argument. It is the appropriate understanding that the Governmental UFB contribution motivates a profit-maximising operator to deploy FTTH beyond the coverage area it would deploy without the subsidy. Without the UFB program the market-based activities of operators would lead to a FTTH coverage which would be less than 75%. Therefore (at least part of) the UFB subsidy leads to cost savings for Chorus for exactly the reference network for calculating the TSLRIC costs for UCLL.

86 See WIK-Consult, Submission of 20 February 2015, para. 253.
87 See WIK-Consult, Submission of 20 February 2015, Section 3.5.
88 Commission, UCLL July, para. 1624.

6 UBA specific aspects

6.1 TSLRIC for UBA

6.1.1 Cost differentiation between different UBA variants

206. We have already pointed out in our February Submission (para. 85ff.), that a price gradient approach is not appropriate for pricing different bandwidth and quality services in bitstream broadband networks. These arguments, which were advanced in earlier submissions, have been rejected by TERA in their answer to the industry comments (p. 12), on the assertion that speed has very little impact on costs (because the DSLAM use 1 GigE links). Despite this, TERA has accepted on the other hand that there is a significant growing bandwidth demand per end-customer, and that the model has to be designed according to network capacity also. As such, the prerequisite of the old decision of a constant bandwidth consumption of 300 kbps over 5 years no longer holds. We have estimated a bandwidth of more than 1.5 Mbps in year 3 of the regulatory period.[89] With a maximum of 768 users per DSLAM the total capacity required would exceed the available capacity of 1 Gbps. Thus, capacity is becoming a scarce resource and should be priced according to capacity consumption. Otherwise, the approach taken could result in an inappropriate cost allocation.

207. The Commission's cost model generates a uniform TSLRIC figure for the additional cost of the UBA increment independent of the type of the UBA service. Thus, there is no cost differentiation between the different variants of the UBA service.[90] The price differentiation applied to the uniform price is achieved by applying a price gradient, thus by the observed price differences in the market instead of different resource consumption.

208. This model outcome is justified with the argument that speed has very little impact on costs.[91] This is true in case of TERA's model. It is, however, not true in reality and in other cost models. This outcome just follows from the flawed modelling approach of TERA. If the Commissions had modelled traffic dimensioning appropriately costs would differentiate according to bandwidth.

209. A fair and efficient cost distribution would be based on the relation of resource consumption the different services generate. Instead of stating all users of a 1 Gbps line pay the same (TERA) the model should let them bear cost according to the relation of usage intensity, i.e. by the relation of average volume per user and month

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89 See WIK-Consult, Submission of 20 February 2015, para. 206, footnote 93.
90 See WIK-Consult, Submission of 20 February 2015, para. 85.
91 See TERA, Industry Comments, p. 12.

or, even more exact in case of sometimes fully loading the line, by the relation of the average capacity required/used during the busy hours.

6.1.2 Geographic variation of UBA costs

210. In our February Submission[92] we have proposed that the cost model also generates outputs on urban and non-urban UBA TSLRIC values despite the fact that the Commission has to set a geographically averaged price for UBA.

211. TERA admits that UBA costs vary geographically, but they state that the model is unable to generate UBA costs by region. That is not comprehensible to us. Either the model has a major deficiency or TERA is not able to operate its own model appropriately. Regional costs are a usual output of models which serve the same purpose.

212. In case of New Zealand one should at least be able to differentiate the cost according to the 92 FDS locations. An even finer granularity could be achieved by combining a local cost component per MDF location with a regional per Parent FDS averaged cost component for the MDF – FDS segment. These cost then could be averaged in urban or rural according to the MDF classification.

6.2 MEA for UBA

213. We repeat our conviction that no HEO would deploy a new copper telecommunication access network today. An investor willing to build new trenches will in any case invest in a most future proof technology, especially, since there is no significant cost difference between copper and fibre cable installation. FTTH Point-to-Point topology is the most future proof access network topology, which does not restrict bandwidth for future use at all. Since that MEA is already decided for UCLL, it makes no sense to decide for a bandwidth restricted copper transmission medium in case of UBA.

214. While this is accepted by the Commission for UCLL, it is not accepted for UBA. For UBA the Commission applies a copper MEA with a quite different access network topology, using different trenches, using street cabinets as scorched nodes and terminating the network in 92 FDS locations instead of 790 MDF locations like in the FTTH UCLL approach. This leads to significant inconsistencies between the UCLL and UBA access network topologies and potential cross subsidies between the services.

92 See WIK-Consult, Submission of 20 February 2015, para. 9.

215. Only a uniform MEA would be a rational decision of a HEO offering both services, UCLL and UBA – and additional services on top of it. The HEO would make utmost account of access network synergies by using the same transmission medium, the same cables and most importantly, the same trenches and network node locations.

216. Therefore, we are convinced that the different dual MEA approach chosen by the Commission is wrong. The arguments presented in our February Submission, still hold (see i.a. Sections 1.2, 2.2, and 5.6.2, para. 302) without reservation.

217. We welcome that the Commission now accepted the view that it is no longer restricted by presupposing that the underlying network is Chorus' copper network[93], but also included a uniform MEA consideration, where the UBA is produced over an optimized access network that replaces the existing copper network[94] (FTTH).

218. Therefore the Commission has amended the UBA model by allowing to select the underlying infrastructure between two solutions: Option 1 (HEO providing UBA over an optimized network) and Option 2 (HEO uses Chorus' copper network for UBA)[95].

219. The Commission states that the UBA cost difference between the two approaches is "minimal"[96], but does not present any quantification of the difference. This result (or assessment) must include faults in the model implementation as we show in the following paragraphs.

220. Option 1 aggregates the fibre access lines at the MDF location in an Ethernet switch, which is then backhauled over a single fibre up to the FDS handover switch.[97] Option 2 aggregates the copper access lines at DSLAMs located in active cabinets and the MDFs, backhauls the DSLAMs from the cabinet to the MDF locations by SLUBH, and then per individual fibres per DSLAM from the MDF location to the aggregation and handover switch at the FDS locations.[98]

221. The components listed within Option 2 lack the active street cabinets for the DSLAMs incl. the power supply and ventilation, plus all cabinet sited DSLAMs. If they lack in the model also the lack of a significant difference is already explained.

222. Nevertheless, the difference must be significant because all relevant components of Option 1 (FTTH MEA) are less expensive than the comparable components of Option 2 (Chorus' copper):

- The DSLAMs of Option 2 are more expensive than the aggregating switches in the MDF of Option 1.

93 See Commission, UBA July , Attachment B, para. 745.
94 See Commission, UBA July , para. 746.
95 See Commission, UBA July , para. 763.1 and 763.2.
96 See Commission, UBA July , para. 778.
97 See Commission, UBA July , para. 767. The Ethernet switch is called "optical network terminal".
98 See Commission, UBA July , para. 769.

- The core network connections of Option 1 require significantly less fibres than Option 2: Option 1 needs one fibre per MDF location, Option 2 needs individual fibres for each of the various DSLAMs in the MDF access area. This reduces the core network cost in case of Option 1.
- In addition, if the core network cost are allocated according to the infrastructure underground space consumption (per fibre used), Option 1 should carry significantly less core network trench cost because of the significant less fibres backhauling the MDF Ethernet switches (compared to the many DSLAM backhauling fibres of Option 2).
- The Option 1 FDS handover switches are significantly smaller with regard to the interfaces required since they only aggregate the MDF location Ethernet switches instead of the large amount of DSLAMs in Option 2. Also this component is cheaper in total comparing Option 1 with 2.

Therefore we clearly expect Option 1 to be significantly cheaper than Option 2. Therefore we assume either a fault in the model implementation or a wrong interpretation of the model outcome by the Commission.

223. Unfortunately, the Commission does not reveal how Option 1 is modelled in detail, nor does TERA explain it in their documents (e.g. the new switch set required, its configuration and prices are missing). This remains intransparent. Considering our arguments above we strongly doubt the Commission's remark of minimal differences in its July 2015 draft UBA determination, para. 778. We expect a significant impact, which has to guide the future make-or-buy decisions of the New Zealand operators.

224. We expect a make-or-buy decision to be determined by the efficiency of cost and the appropriate price differences between the alternatives (UCLL and UBA). Therefore we cannot follow the Commission's view that "*an underlying copper access network will better allow for competition through unbundling [...] because access seeker decisions regarding unbundling are made in respect of the existing copper access network*"[99], because the access seeker decision is just based on the cost difference between UBA and UCLL. Nor can we follow that the Commission continues their judgement: "*…on balance, our view is that section 18, and the requirement to consider relativity between the UCLL and the UBA services (…), lead us to prefer a MEA for the UBA increment that utilizes a copper based access network*"[100], despite having declared that they are free to decide for the contrary.

99 See Commission, UBA July, para. 747.
100 See Commission, UBA July, para. 748, similar also para. 776.

6.3 Network optimisation

225. The wholesale bitstream access only is one product besides others being produced on the same platform. Thus, from an efficiency point of view it is not admitted to neglect these additional services but just model a stand-alone bitstream network not taking into account the synergies with the other services.[101] We would expect the synergies realized in an efficient manner by producing all services on the same (IP/Ethernet) platform to be also taken into account when determining the cost of the regulated bitstream service. Otherwise the regulated service would cross-subsidize the unregulated services, enabling Chorus a better competitive position by a lower price than the other competing operators could offer. Thus, we would have expected an all traffic network node and topology optimization in order to determine the new FDS locations instead of treating them as scorched nodes. We will mention additional aspects in Sections 231 and 7.3.1.7 below.

226. The Commission claims that it has "*adopted an optimally structured core network approach which is constrained only by the existing number of FDS and there existing locations ...*"[102] We will show in Section 7.2.3 of this Submission that the actual model implementation does not meet this claim. The core network is missing major optimisation and efficiency improvement opportunities.

6.4 Network dimensioning

227. TERA restricts its efficient modelling to the types and equipment sizes Chorus has listed in its data room and determines a most representative configuration to be used in the cost model. That is not modelling efficiency, but inefficient incumbent operator imitation or replication. For UBA we at least miss smaller (and more efficient) DSLAM sizes (and cost) for the large number of small cabinets, and we miss larger FDS in the larger switching locations. For more details see Sections 7.2.3 and 7.3.1.8 below.

6.5 Exclusion of certain capital costs

228. We have criticised the approach of excluding certain capital costs regarding UBA in our February Submission because it considers only a small fraction of RBI subsidies which Chorus receives to enhance broadband availability in those areas.[103] Network Strategies has calculated that the capital contributions

101 See WIK-Consult, Submission of 20 February 2015, Section 2.2.
102 Commission, UBA July, para. 300.
103 See WIK-Consult, Submission of 20 February 2015, Section 2.7.

considered in the model amount to less than 10% per year which Chorus actually receives as RBI subsidy.[104]

229. Although the Commission refers to the general intention of the Act that Chorus should not over-recover its costs,[105] the Commission is "*mindful of the impact that would occur if we deducted, in full, the RBI subsidy from the TSLRIC of UBA. Doing so would in effect negate the government subsidy, clawing it back from Chorus.*"[106] We fully disagree with this assessment. Considering the Chorus' RBI subsidy as a capital contribution is by no means a claw-back of these contributions. It is only a mechanism that ensures that double-recovery of the same costs will be avoided. In the Commission's approach users will pay for network infrastructure as part of their UBA charges which have already been paid by the Government. That is like double- or over-recovery is defined.

230. The double-recovery becomes obvious when the Commission reports how Chorus uses the RBI subsidy:

> "*We are aware that much of the RBI subsidy received by Chorus was applied to upgrading the network to be capable of offering broadband to end-users by providing fibre optic feeders to the cabinets (or to the sites of new cabinets). Since the cost of the trench over these routes is already included in our TSLRIC model, this upgrade has had no (or very low) impact on the TSLRIC cost of the UBA network.*"[107]

Chorus uses RBI contributions to provide fibre in the feeder segment. This is a relevant cost under the ORC asset valuation approach of the Commission. As we have pointed out in our February Submission, only when the Commission would have applied the concept of re-use of assets in its model it could have limited the consideration of network elements which are effectively upgraded.[108] Under an ORC approach all relevant network assets have to be treated as capital contributions and not only a subset.

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104 See Network Strategies, Commerce Commission Draft Determination for UCLL and UBA, A review of key issues. Report for Spark New Zealand and Vodafone New Zealand, February 2015, Section 3.1.
105 See Commission, UBA July, para. 1031.
106 Commission, UBA July, para. 1032.
107 Commission, UBA July, para. 1034.
108 See WIK-Consult, Submission of 20 February 2015, para. 108.

7 Model changes and final assessment of the TSLRIC model

7.1 General aspects

231. We have observed that the Commission has significantly revised the overall structure of the model and its modules. At the second layer of modelling we identified major structural changes of the model reflecting comments, proposals and critique made in submissions regarding the 2014 model. Furthermore, major cost elements were added in the 2015 model which are classified by TERA as missing mostly on top of material costs of infrastructure. A lot of further cost parameters like equipment or other asset costs were increased, in some cases by multiples of 100%. These parameter changes mostly reflect proposals made by Chorus and its advisor.

232. We will show in this section that many proposals and critique made in submissions by us and others have not been reflected in the Commission's further draft determinations or in TERA's document which lists their assessment of industry comments and model changes. We do not regard that as a prudent approach of process fairness and efficiency.

233. It is not only the case that all model errors and deficiencies have not been corrected. It is also the case that new model errors and inconsistencies have occurred in the revised model. We will list those in Section 7.4.

234. We recognise that the Commission and TERA have done some work to improve model transparency and transparency in the parameter choice and selection. This has, however, only been conducted halfway. Major areas, like geospatial modelling, remain intransparent to an external analyst of the model.

7.2 Model and parameter changes and our assessment

7.2.1 Increase of equipment costs not justified

235. TERA has significantly increased the cost of active equipment by including – upon request of Chorus – indirect installation costs and even more significantly by increasing equipment prices ("material"). These additional costs shall represent a service company overhead fee of [ ] **CNZCI** and a Chorus' project management fee of [ ] **CNZCI**.[109]

236. If the model did not include relevant indirect capital cost for active equipment it has been appropriate to correct this omission. The nature of the service company

109 See TERA, Modelling Changes, p. 1.

management overhead fee, however, remains intransparent and dubious to us. The same holds for Chorus project management mark-up. We have recognised in our February Submission that overheads on Chorus' maintenance contracts are not justified because they represent double-counting with OPEX.[110] These arguments are also relevant in the present context of overheads on installation contracts.

237. TERA updated its Model Specification and Documentation and added the cost groups labour, design, project management and service company overheads to the cost group material.[111] The benchmark for efficiency checks are stated by TERA in the former Model Specification and Documentation for the material costs only. No further explanation can be found how these new cost groups have been checked for efficiency. It seems to be the case that the added cost groups have not been checked for efficiency and double-recovery of cost. This is not appropriate.

238. These model and parameter changes represent a further example of just implementing Chorus' cost figures into the model without any reflection of whether or not the resulting equipment cost level is in line with relevant benchmarks and represents the efficient cost of the HEO. We have shown in our February Submission that the input parameters of active equipment overestimate relevant benchmarks significantly.[112] In the comparisons which we presented there indirect capital costs have been included already. When TERA now further inflated the cost of active equipment the gap between the cost parameters in the model for active equipment and relevant benchmarks further increases and the relevant costs are overestimated even more.

239. In Table 7-1 we show the deviation of the costs of the various active network elements between the 2014 and the 2015 cost models. Cost changes look erratic. Several asset prices did not change. The "Sub Rack Exchange" price was reduced by 40%. The costs for "Rack Cabinet" increased by 617%. The resulting cost of [ ] **CNZCI** exceeds the relevant cost by a factor of two to three according to our knowledge and comparable numbers from other cost models.

110 See WIK-Consult, Submission of 20 February 2015, Section 4.2.2.2.1.
111 See TERA, Model Documentation June, p. 105f and TERA, Model Specification June, p. 71.
112 See WIK-Consult, Submission of 20 February 2015, para. 363-374.

Table 7-1: Change of active equipment prices in the 2014 and 2015 models

Assets		Dimensioning driver	Deviation %
DSLAM Cabinet			
DSLAM	xDSL card Cabinet	Port	10.86%
DSLAM	SHDSL card Cabinet	Port	3.11%
	SFP Cabinet	Mbps	
DSLAM	SubRack Cabinet	Card	0.79%
DSLAM	Rack Cabinet	SubRack	617.15%
DSLAM Exchange			
DSLAM	xDSL card Exchange	Port	9.79%
DSLAM	SHDSL card Exchange	Port	3.11%
	FTTH P2P card Exchange	Port	
	FTTH PON card Exchange	Port	
	FTTH P2P SFP	Port	
	FTTH PON SFP	Port	
	FTTH PON Splitter	Port	
	SFP Exchange	Mbps	
DSLAM	SubRack Exchange	Card	-39.95%
DSLAM	Rack Exchange	SubRack	0.00%
First Data Switch (EAS)			
EAS	SFP 1G	Mbps	0.00%
EAS	SFP 10G	Mbps	0.00%
EAS	Card-1G	SFP 1G	0.00%
EAS	Card-10G	SFP 10G	0.00%
EAS	Subrack-7	Card	7.17%
EAS	Subrack-12	Card	4.44%
EAS	Rack	SubRack	0.00%

Source: WIK-Consult calculation on the basis of the TERA cost models

240. It is in particular remarkable that this major parameter change regarding Cabinets was not mentioned in TERA's new model documents. We do not understand why TERA has extensively commented on issues which were not changed, and has not provided an explanation of this major change.

241. Especially the dramatic increase of price for DSLAM rack cabinets by more than 600% is not comprehensible. Obviously this increase was caused following

suggestions made by Chorus and Analysis Mason in their February Submissions: Chorus calls for increasing the size and dimensioning of facilities at active cabinets and so related incremental costs to support the UBA service.[113] Probably the significant increase was influenced by the Analysis Mason UBA model which includes as additional costs:[114]

- direct cost for shell, battery, heat exchanger, and noise reduction,
- the indirect cost for planning, installation and fibre leads.

As far as these incremental costs have not been considered in the 2014 model, what we question on the basis of our benchmark calculations of our February Submission,[115] they do not explain a cost increase of more than 600% [ ] **CNZCI** in absolute terms as WIK experienced in its cost models works for regulators. Moreover asset plus installation costs for power and cooling services at DSLAM cabinet sites were already considered in the TERA 2014 model and cannot be considered twice.

242. We have calculated the impact of the price changes of active equipment on the incremental UBA costs. Table 7-2 presents the results of this model sensitivity. For that purpose we calculated the model outcome on UBA costs by running the 2015 cost model with the equipment cost prices of the 2014 model. Table 7-2 shows that these price changes had a major impact on inflating the cost of UBA by around $2 per month or about 20%.

Table 7-2: Model sensitivity with new equipment costs

		2016	2017	2018	2019	2020
UBA costs with new cost input active equipment	NZD/month	11.15	10.97	10.8	10.65	10.52
UBA costs with old cost input active equipment	NZD/month	9.1	9.02	8.95	8.89	8.85
Absolute deviation of UBA cost, new/old input	NZD/month	2.05	1.95	1.85	1.76	1.67
Relative deviation new/old input	NZD/month	22.5%	21.6%	20.7%	19.8%	18.9%

113 See Submission of Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services (2 December 2014), p. 66f, para. 213 to 215.

114 See Analysys Mason, Report for Chorus, UCLL and UBA FPP draft determination submission – PUBLIC, 20 February 2015, p. 37, Section 4.3.

115 See WIK-Consult, Submission of 20 February 2015, para. 363-374.

Source: WIK-Consult calculation on the basis of the TERA cost models

7.2.2 Modelling of leased lines still inappropriate

243. Leased lines can absorb a relevant part of the capacity of an efficient fibre network, in the access part of the network and even more so in the core network. As we have demonstrated in our February Submission modelling the impact of leased lines on the UCLL and UBA costs appropriately and efficiently requires to include the relevant demand for leased lines into the model and the use of geo-spatial locations of the end-points and the destinations of leased lines.[116]

244. We recognise that TERA has integrated leased line demand more coherently into the model by eliminating its fibre based cost allocation in the feeder network segment and instead overall applying the same macro-parameter. The model is, however, not integrating actual leased line demand, because Chorus still does not seem to have provided such data. TERA, therefore, makes use of a macro-parameter which should represent the level of cost of network infrastructure allocated to leased lines.[117]

245. We did not find any explanation, neither in TERA's Model Documentation nor in the Commission's further Draft Determinations why the relevant data were not available for TERA. Chorus should possess such data. Why did the Commission not make efforts to make them available to its modeller and forced him to follow a second-best or perhaps even third-best modelling approach?

246. TERA claims to have determined a value for the cost saving macro-parameter of [ ] **CNZCI**[118] from models which TERA has conducted in other countries.[119] TERA does not reveal the countries and the models so that this value cannot be checked and verified. From our own modelling experience we cannot confirm TERA's value. We are aware of cost savings due to the proper inclusion of leased line data which are significantly larger. The overall cost saving due to the inclusion of leased lines can be in the range of 10% to 20%.

7.2.3 New FDS dimensioning not efficient

247. In case where more than one FDS is required in an FDS location these switches would have to be interconnected underneath each other in order to provide full routing flexibility within each individual FDS location. We doubt this to be efficient. There are two alternatives which are more appropriate. First, as proposed in our

116 See WIK-Consult, Submission of 20 February 2015, Section 5.14.4.
117 See TERA, Model Specification June, p. 43f.
118 See TERA model, CI-ComCom - Access network cost model - v8.0.xlsb, sheet "MDF data", rows 11 and 22.
119 See TERA, Model Specification June, p. 44.

February Submission, Section 5.8.11, one could choose a next higher switch capacity in order to combine all ports in a single switch. Another approach is to route the interswitch traffic through a next higher level switch. TERA gives no indication that their solution is more efficient, but simply relies on the switch data provided by Chorus.[120]

7.2.4 Change of OPEX efficiency adjustment not appropriate

248. The Commission has ceteris paribus increased the level of OPEX for UCLL by scaling down the efficiency adjustments of the OPEX calculated from Chorus' accounts.

249. We have provided international benchmarks in our March Cross-Submission on the cost share of OPEX in cost models from other jurisdictions.[121] Although the OPEX cost share has been reduced in the current model to 10.9% (from 12.2% in the December 2014 model), this OPEX cost share still exceeds the relevant benchmarks significantly.

250. In response to a Chorus' claim the Commission has changed the calculation logic of the efficiency adjustment for OPEX.[122] The Commission now is applying the copper to fibre network adjustment first and then applies the LFI adjustment which adjusts for the higher line faults of an old (copper) network compared to a new copper network. The new Commission's approach is conceptually misleading to us. Applying the fibre adjustment on the cost to the actual OPEX of an old copper network conceptually generates the OPEX of an old fibre network. The LFI values which are used in the model are, however, generated for a copper and not for a fibre network. Only this makes sense conceptually. Adjusting OPEX of a fibre network with an adjustment factor derived from a copper network environment does not make sense. We therefore clearly recommend that the Commission restates its previous approach where the LFI adjustment adjusts for the OPEX of an "old" copper network and is applied on the actual OPEX of Chorus. The resulting OPEX should then be adjusted to the OPEX of a new fibre network.

251. In addition to the change of the calculation logic, the Commission reduced the fibre OPEX adjustment from 50% to 40% according to new sources brought to the table by TERA. We are convinced that this reduction is not justified. We want to bring to the attention of the Commission most recent data provided by Verizon which have been ignored by TERA.[123] According to Verizon fibre is overall 60% cheaper than copper. Verizon provides the following detailed examples:

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120 See also Section 7.3.1.8 of this Submission.
121 See WIK-Consult, Cross-Submission of 19 March 2015, para. 95.
122 See Commission, UCLL July, para. 1697ff.
123 See http://www.theregister.co.uk/2015/05/20/verizon_fibre_is_so_much_cheaper_than_copper_were_going_allfttp/.

- Real estate: Savings are in the order of 60-80%, since instead of 13 floors for a big exchange, a fibre-to-the-premises area need just two.
- Energy savings: Between 40-60%.
- Reliability: Fibre is 70-80% more reliable than copper. Users no longer face the rain-driven outages of DSL. This results in 60% fewer costly truck rolls and savings of 40-60% on maintenance.

These (new) data are more compatible with a 50% fibre adjustment factor than with a factor of 40%. We strongly recommend that the Commission restates its 50% fibre OPEX adjustment factor.

7.2.5 Increase in the number of poles not justified

252. In its answer to the industry comments[124] and implemented modelling changes[125] TERA explained that they have added poles on both sides of a road[126] (see also TERA, Model Documentation, Section 4.3.4.7) and have increased the poles on both sides in height in case of aerial lead-ins in order to meet the road clearance condition. This decision does not take into account WIK's arguments of its Cross-Submission of March 2015, para. 135, which explains that a height increase would not be justified because the height also has to be observed for the electricity poles and that an additional pole on the opposite side of the street is not required since the ETPs at the top side of a building could also serve this function.

253. Furthermore, the argument for reducing aerial lead-in poles in case of buildings behind buildings has not been taken into account, which would result in a reduction and not an increase in the number of poles required.

254. TERA explains in its document about implemented model changes and in the new Model Documentation, Sections 4.3.5.8 and 5.3.2.3, that they decided to use electricity poles on the main side of the street but neither on the minor side nor for the lead-in. This looks quite strange. Why should the telecommunication network in areas, where the electricity distribution network is deployed aerially, not use these electricity poles for the house access lines, the electricity lead-ins, also. No document explains a rationale for this behavior, but in effect the trenching and lead-in cost are increased. We regard this approach as an inconsistent and inefficient network deployment which should be corrected in the model.

124 See TERA, Industry Comments, p. 6f.
125 See TERA, Model Changes, p. 5.
126 See TERA, Model Changes, p. 5.

7.2.6 Inclusion of design cost not justified

255. Upon request from Chorus TERA now has added design costs in the unit cost calculation of joints and poles.[127] There is no indication that TERA has checked the efficiency of those additional costs.

256. We are more concerned with the question whether the inclusion of these additional costs is justified at all. Equipment design costs are part of the network planning activities of operators. TERA claims that these costs are "*not taken into account in the OPEX modelling*" and treated installation costs as CAPEX[128] which is correct if conducted properly. From the observation that TERA did not separate out design costs from the OPEX accounts follows that these costs are still part of the OPEX accounts. Adding design costs to poles and joints therefore results in double-counting of the same costs. This is incorrect.

7.2.7 Exclusion of lead-in cost not properly modelled

257. The Commission has changed its view on whether lead-in cost should be included in the UCLL cost base or whether they should be excluded because the users have already contributed and covered such costs to some extent. We welcome this change as a step into a more consistent consideration of relevant costs. The relevant user contributions were, however, excluded only partially. This was not possible to check in the model. Furthermore, we have identified a reaction of the model which is not coherent with the description of modelling changes which should have been conducted.

258. The Commission has decided in its further Draft Determination that the cost of trenching for all lead-ins (from the property boundary to the building) is to be excluded from the UCLL TSLRIC cost.[129] This is coherent and mandatory because the user has to provide an open trench to install the lead-in.[130]

259. TERA has stated in the Model Specification[131] that not only the trench but also the ducts of the vertical part of the lead-in are not taken into account in the modelling as they are charged to the end-user as part of the connection fee. Also this exclusion of costs is coherent and corresponds to the proposal we have made in our February Submission.[132]

127 See TERA, Model Changes, p. 6.
128 See TERA, Model Documentation June, p. 28.
129 See Commission, UCLL July, para. 1594.1.1.
130 See Chorus: Copper Service Lead-In, printed from http://customer.chorus.co.nz/copperserviceleadin on December 05 2014.
131 See TERA, Model Specification July, p. 54.
132 See WIK-Consult, Submission of 20 February 2015, Section 5.3.1.

260. We could not verify whether also the copper cable and the installation costs have been excluded from the relevant cost base as they should be because this part of the model is hard coded and cannot be checked. Those costs should also be excluded because they are also covered by the connection fees.

261. According to a sensitivity made by TERA "most of the lead-in cost have been removed." Including all lead-in cost would have increased UCLL cost by 10.7% compared to the base case.[133]

262. Although the Commission recognises that Chorus imposes fees for the installation of aerial lead-ins and for reticulating subdivisions[134], it did not consider these payments as capital contributions made by users and did not exclude them from the relevant cost base. This is not coherent with the principles of proper cost recovery as formulated by the Commission itself. The Commission rightly states: "*We do not consider that it would promote competition for the long-term benefit of end-users, to permit Chorus to recover a cost that would be, or is in actual fact borne by end-users or third parities.*"[135] Chorus' activities and the corresponding fees for its lead-in service also cover the installation costs for aerial lead-ins. The Chorus service conditions read as follows: "*Provision an underground service lead (in a 20mm pipe) and/or four span of overhead service lead between the Network Access Point and ETP*."[136] In applying these principles the Commission also should have excluded costs for reticulating subdivisions and areal lead-ins from the UCLL cost base. The Commission's argument for not excluding them because those contributions "*do not result in the creation of identifiable assets*"[137] does not hold. We have shown in para. 203 that also in the case of aerial lead-ins relevant assets are identifiable. Furthermore, the relevant installation work is capitalised as an asset. We therefore recommend that the Commission makes its approach more coherent by also excluding those capital contributions.

263. The Commission is considering again to take Chorus' lead-in connection charge of $ 195 into consideration and to deduct these amounts from the cost base.[138] As we have pointed out in our March Cross-Submission it would be more coherent in our view to exclude all costs of the vertical lead-in and all the cost of non-standard lead-ins from the modelled costs to avoid double-recovery of the same costs.[139] In principle it would be possible to deduct from the TSLRIC cost the amount of money Chorus receives for the installation of aerial lead-ins and for reticulating subdivisions. From a pragmatic point of view it might be difficult to identify such

133 See TERA, Sensitivity Analyses, p. 11.
134 See Commission, UCLL July, para. 1616.
135 Commission, UCLL July, para. 1618.
136 Chorus, Copper Service Lead-In, version '140625120933', printed from http://customer.chorus.co.nz/copperserviceleadin on December 05 2014.
137 Commission, UCLL July, para. 1623.
138 See Commission, UCLL July, para. 1625.
139 See WIK-Consult, Cross-Submission of 19 March 2015, para. 126.

payments over a long period of time. Therefore, the more pragmatic and coherent approach would be to directly exclude the corresponding cost from the relevant cost base.

264. The cost model still entails a specific modelling of lead-ins above 100 m.[140] The default value of the parameter "ActivateLeadInThreshold" in the MS Access model is 0. When we activated the threshold and set the parameter to 1 we could observe an unexpected reaction of the model: UCLL cost went down. We expected the opposite reaction of the model. This means, the UCLL cost calculation of the Commission has included the cost of lead-ins above 100 m. This is not in line with the model description of the Commission. Lead-in cost for non-standard lead-ins are fully covered and contributed by users as we have shown in Section 5.3.1 of our February Submission. Such cost should be excluded from the UCLL cost calculation.

7.2.8 CCT and FAT unit cost updating not appropriate

265. Unit costs of CCTs and FATs have been updated by TERA on the basis of a file provided by Chorus.[141] Comparing the unit costs of 2014 with the updated unit costs of 2015 leads to the results in the following table. Three of four unit cost positions have been significantly increased.

[

] **CNZCI**

266. A look to the updated TERA model software[142] and taking samples from it and the corresponding and confidential data of Chorus (CI dataroom) shows the following weaknesses which all lead to an overestimation of the relevant cost:

   a. The total unit costs have been derived by summing up material costs and installation costs. Hereby both cost elements have been marked-up with service company overheads [ ] **CNZCI**. It is not appropriate to mark-up material costs with service company overheads. This seems to be double-

140 See TERA, Model Documentation June, p. 72, Section 4.3.4.1.
141 See TERA, Modelling Changes, p. 6f.
142 See TERA, CI-ComCom – Inputs – v8.0.xlsx, sheet "Unit costs calculation", cells E789:V812.

counting of costs. According to our understanding service companies provide the installation of CCT/FAT as a service to Chorus. These costs are capitalised as installation cost. They cannot be added once more as service company overheads.

b. Installation cost include pit digging. As pit costs are already part of the averaged manhole cost input, costs have been double counted.

c. Updated data have been taken without change or corrections from information provided by Chorus to the Commission. We cannot find any checks for efficiency.

267. Moreover, the whole cost calculation is doubtful: In the 2014 model CCT/FAT unit cost calculation was derived from a benchmark not specified in detail.[143] TERA provides no information, why the cost data of Chorus (without efficiency check) better fit to the TSLRIC approach than the formerly benchmark figures of 2014. Furthermore, the Chorus input data was already delivered in August 2014 to the Commission which means three months before the first release of the model. Why is input parameter information rejected for the 2014 model version now included in the 2015 version?

7.2.9 Change of sub-duct costs not justified

268. WIK welcomes TERA's model change to allow for smaller sub-ducts and to take WIK's proposed benchmark value for duct material costs from Denmark. But there are still significant weaknesses newly introduced into the TERA model relating to sub-ducts which lead to inflated costs:

a. The special fibre duct sizes in the Denmark cost model relate to fibre ducts and not sub-ducts. Using these sizes in the New Zealand model as sub-ducts has the consequence, that smaller and cheaper sub-ducts for the FTTH network are used, but that still the same oversized, the sub-ducts encapsulating ducts are used. This has not only the effect of inflating duct costs but also of inflating trenching costs, because trench sizes are driven by the duct sizes. Trenching cost are lower if an efficient duct/sub-duct structure is implemented.

b. Moreover, TERA assumes additional installation costs of 4 NZD/m sub-duct, based on the assumption that they would not be included in BECA's trenching costs. It is doubtful that these costs are not already included in the BECA trenching cost model. In the TERA model of 2014, TERA did not add installation costs to the material costs of sub-ducts. This was because the

143 See TERA, CI-ComCom – Inputs – v7.3.xlsx, sheet "Unit costs calculation", cells E356:K360.

installation costs of sub-duct are also included in the BECA trenching costs. We did not observe, that BECA changed its calculation methodology here. BECA still states, that installation costs of ducts are included in the trenching costs without differentiating between sub-ducts and encapsulating ducts.[144] This means, there in now a relevant degree of double-counting relating to sub-duct costs.

c. TERA calculates sub-ducts blended by the different costs of the two diameter classes 14 mm and 40 mm used. Therefore, TERA used hard coded figures for the contribution of its lengths, obviously taken from the access model.[145] The consequence is, if the trench optimisation calculation leads to different results, the blended average is constant although it would have to be changed due to different trenching figures. This is not an adequate procedure for a bottom-up model and this shows again, that the functionality chain between cable, sub-ducts, ducts and finally trench sizes have not been modelled adequately.

d. Additionally we found an inconsistency between TERA's documentation, mentioning 14 and 25 mm sub-ducts, and the 2015 model stating 14 and 40 mm sub-ducts.

7.2.10 Cable optimisation not appropriate

269. The cable optimisation TERA implemented regarding the SLUBH and FWA cables[146] only is a first step into the right direction. If a 12 F cable is full, they take the next 12 F cable and so on. An efficient operator would aggregate the fibre demand into a cable of the next larger size, thus saving additional subducts, ducts and in consequence trenching cost.

7.2.11 Increase of cable cost not justified

270. TERA states, that relating to a hint of Analysis Mason, missing cabling costs would have to be included (cable installation costs, arborist costs). Therefore, TERA updated fibre and copper cable costs by introducing in its model the unit costs used in the model developed by Chorus. Because no data had been provided for arborist costs, no correction has been made to introduce such costs into the model.[147]

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144 See TERA model, "CI-ComCom - Inputs for trenches - v8.0.xlsx", sheets "Trenching inputs (w ducting) b" and "Trenching inputs (w ducting)", cell B80: "*All rates are the national average and allow for excavation, duct install, backfill, surface reinstatement, consenting and traffic management*".

145 See TERA model, CI-ComCom - Inputs - v8.0.xlsx, Sheet "Unit costs calculation", cells N56 to P56.

146 See TERA, Modelling Changes, p. 7.

147 See TERA, Modelling Changes, p. 6f.

271. These changes led to a massive increase of cable prices, especially of fibre cable prices as presented in Table 7-3. Cable prices increased on average by more than 100%. For individual cables the increase even amounted to more than 600% in the case of fibre cables and more than 1,000% in the case of copper cables.

Table 7-3: Copper and fibre cable prices in the 2014 and 2015 cost models

[

] **CNZCI**

Source: WIK calculation based on TERA cost models

272. We have calculated the impact of these cable cost parameter changes on the UCLL and UBA cost outputs of the model. The results are presented in Table 7-4. The cost of UCLL increase by about $ 2.1 or more than 8% which is a quite significant change. The impact on the UBA incremental cost is naturally lower. UBA

(incremental) costs increase by $ 0.11 or by about 1%. The total cost of UBA increase by $ 2.24 or by 6.2%.

Table 7-4: Impact of copper and fibre cable price changes on UCLL and UBA cost

			Absolute Delta 2015 to 2014				
1	UCLL						
1,1		Geographically averaged monthly rental	2,14	2,13	2,12	2,11	2,11
3	UBA						
3.1		BUBA monthly charge	2,24	2,24	2,23	2,23	2,24
3.2		EUBA 40 monthly charge	2,27	2,26	2,27	2,26	2,26
3.3		EUBA 90 monthly charge	2,28	2,27	2,27	2,26	2,27
3.4		EUBA 180 monthly charge	2,28	2,29	2,28	2,28	2,29
3.1		BUBA increment monthly charge	0,1	0,11	0,11	0,12	0,13
			Relative Delta 2015 to 2014				
1	UCLL						
1,1		Geographically averaged monthly rental	8,70%	8,50%	8,31%	8,12%	7,98%
3	UBA						
3.1		BUBA monthly charge	6,28%	6,24%	6,16%	6,11%	6,08%
3.2		EUBA 40 monthly charge	5,97%	5,91%	5,90%	5,83%	5,79%
3.3		EUBA 90 monthly charge	5,91%	5,85%	5,81%	5,75%	5,73%
3.4		EUBA 180 monthly charge	5,75%	5,75%	5,69%	5,66%	5,64%
3.1		BUBA increment monthly charge	0,90%	1,01%	1,03%	1,14%	1,25%

Source: WIK calculation based on TERA cost models

273. According to TERA missing installation costs would be responsible for the cable price increase. We identified that the installation costs are now added to the 2015 model. We focus here on the fibre cable prices, because this the currently selected least cost scenario in the TERA model. TERA introduced installation costs independent of cable size with an amount of [ ] **CNZCI** for fibre cables.[148]

274. These installation cost are significantly inflated and cannot be supported by relevant benchmarks. WIK itself uses in costs models prepared for European regulators a blended price input of 1€/m = 1.66 NZD/m for installation cost. Compared to this number installation costs are overstated by [ ] **CNZCI**. The Swedish cost model also separates input prices for cable material cost and cable installation cost. Installation costs vary according to cable size as shown in Table 7-5. For all cable sizes installation costs are below $ 1, for smaller cable sizes even significantly below $ 1. Compared to the Swedish numbers installation costs in the New Zealand model are overstated by a multiple of 100%.

148 See TERA, CI-ComCom - Inputs - v8.0.xlsx, Sheet "Unit costs calculation", cell M558.

Table 7-5: Fibre Cable and installation costs in the Swedish cost model

Currency rate NZD/SEK
0,17832

Fibre cable for use in trench		Installation per cable-km	Installation per cable-m	Installation per cable-m
In increasing order of size		Base year	Base year	Base year
Cable size (pairs)		year 2013 /km	SKK / m	NZD/ m
2 pairs	2	354	0,35	0,06
4 pairs	4	500	0,50	0,09
8 pairs	8	707	0,71	0,13
12 pairs	12	866	0,87	0,15
24 pairs	24	1.225	1,22	0,22
36 pairs	36	1.500	1,50	0,27
48 pairs	48	1.732	1,73	0,31
72 pairs	72	2.121	2,12	0,38
96 pairs	96	2.449	2,45	0,44
144 pairs	144	3.000	3,00	0,53
192 pairs	192	3.464	3,46	0,62
288 pairs	288	4.243	4,24	0,76
384 pairs	384	4.899	4,90	0,87

Source: WIK calculation based on Swedish cost model, http://www.pts.se/sv/Bransch/Telefoni/Konkurrensreglering-SMP/SMP---Prisreglering/Kalkylarbete-fasta-natet/Gallande-prisreglering/, Final HY Access model 10.1.xlsm, sheet “I_Cost_Cable”, rows 12 to 27

275. The cable cost changes in absolute terms in the 2015 model cannot just be explained by the additional installation cost of [ ] **CNZCI**. A further analysis of the 2015 model shows, that TERA has added to the material costs a service company overhead mark-up of [ ] **CNZCI**.[149] This seems to be double-counting of costs. According to our understanding service companies provide the installation of cable as a service to Chorus. These costs are capitalised as installation cost. They cannot be added once more as service company overheads.

7.2.12 Geomodelling remains intransparent

276. We appreciate that the MDF delineation now is performed by establishing Voronoi polygons based on the shortest distance of each point in the country along the road network.[150] In the same manner the delineation of the street cabinet is performed. According to our experience a street cabinet located at the border of its access area, on a point closest to the MDF location, results in more efficient solutions than the centred approach taken by TERA now. This means, that the model has not implemented the available optimisation and efficiency potential.

149 See TERA, CI-ComCom - Inputs - v8.0.xlsx, Sheet “Unit costs calculation”, cell M544 to 556.
150 See TERA, Model Specification July, Section 3.3; TERA, Industry Comments, p. 13; TERA, Modelling Changes, p. 9.

277. Nevertheless, the Commission provided an updated geomarketing database including new horizontal lengths,[151] changing from 45 to 50 thousand kilometres, for which it remains intransparent why that change occurred. For the access network computation the model uses a MS Access program module, determining the quantities the access network consists of. These were fed into an Excel module calculating the cost of the access network (UCLL without OPEX). Input into the MS Access module are already the shortest paths between each building and the associated Street Cabinet respectively MDF locations. They are detailed down to each single street segment passed.[152] This input into the MS Access tool is output of the geospatial work, and this geospatial work as a module remains to a large extend intransparent to the user, since it is not provided by the Commission. Thus, no external expert can check in depth if the shortest path algorithms work properly or if the Voronoi algorithm mentioned above is designed in the right manner. The additional description provided recently[153] during the actual submission process already indicates an insufficient implementation.

278. In its recently provided description of the GIS modelling environment (para. 21.c) the Commission reveals that the model takes a straight line road segment allocation to the street cabinets and MDF (in case of fibre) instead of the concatenated road length or road distance sum which we have proposed several times as the only really efficient methodology. Thus, the road segments being close to a street cabinet (respectively MDF) from a straight line point of view are allocated to it, neglecting natural hurdles like rivers or valleys or just the fact that streets are routed according to different goals than telecommunication network cost optimization. The straight line approach has been justified by the reduction of computation complexity. But this also reduces cost efficiency and results in a rather poor approximation. Only adding road segment by road segment and comparing the length to the next street cabinets (respectively MDF) along the roads ends in cost efficient results and is the proper implementation of the Voronoi approach. (Straight line is the simplest Voronoi approach one can imagine, but not the most cost efficient one in this case.)

279. The weights chosen by the Commission for excluding private roads and motorways by increasing the cost (length) of its use compared to public roads (GIS modelling environment para. 13: *"give preference to to a network that avoided motorways and privately owner roads, where practical"*) is arbitrarily, not reasoned or argued for. In any case it results in more expensive solutions as would be efficient. We wonder whether the use of a private road should be 3 times or of a motorway should be 5 times more expensive than using a public road, or why the use of a 3 times longer public road should be preferred in case of a private road instead. In case of the

151 See TERA, Industry Comments, p. 13; TERA, Modelling Changes, p. 10.
152 See TERA, Model Documentation July, Section 4.2.
153 See Commission, The Geographic Information System modelling environment for the Unbundled Copper Local Loop and Unbundled Bitstream Access services final pricing principle, 24.07.2015.

motorways it seems to be even harder (factor of 5), also due to the fact that the New Zealand motorways do not have the exclusive characteristics a European motorway or Autobahn has. In any case this approach results in cost overestimation by nature.

280. In any case, in Europe it is common practice that motorways, railway tracks and waterways are included in the optimization approaches and are covered by rights of way for telecommunication line use. In the TERA model the latter are excluded totally (GIS modelling environment, para. 11) Thus, a dedicated optimization potential is excluded and costs are therefore overestimated in this regard too.

7.2.13 Additional reinforcement cost not justified

281. In its answer to the industry comments (p. 7) and implemented modelling changes (p. 9) TERA accepted a network design rule proposed by Analysys Mason. According to this large trenches with more than 5,000 lines shall be protected by reinforcement of the ducts or trenches, thus increasing trenching cost significantly for these segments. TERA does not explain or debate the network resilience proposals WIK made in this regard, e.g. distributing the feeder lines on both sides of the road and thus decreasing risk and cost significantly compared to such reinforcement cost.[154] This proposal would result in a more efficient network deployment than the newly implemented design rule.

282. While we agree to such resilience approaches in general in order to prevent single points of failure and in order to keep the number of customers low being affected by a single failure the modelling philosophy in total does not follow this approach. The complete core network is designed according to a tree topology. This network design implies a lot of single areas of failure affecting high numbers of customers (several MDF areas). One might wonder if trench reinforcement makes sense when accepting much higher numbers of customers being affected by single trench and network node failures.

7.2.14 Trench change from roads to buildings not justified

283. In its answer to the industry comments (p. 5) and description of the implemented modelling changes (p. 11) TERA describes, that they consider non-linear paths because of obstacles from the distribution trench to the building by an additional mark-up (parameter "SubOptimalPath") of 5%.[155] This is not justified from our point of view since the rectangular path assumption for the lead-in already considers the worst case, so the longest path a lead-in could take at all. The horizontal line along

154 See WIK-Consult, Cross-Submission of 19 March 2015, para. 143-146.
155 See also TERA, Model Documentation July, Section 4.3.4.4.

the street and the vertical path towards the building are the two sides of a rectangular triangle, while the hypotenuse would reflect the shortest path to connect the CCT/FAT and the building entry point (ETP). Compared to the shortest connection there is already a mark-up of 41% for the sum of horizontal and vertical line (sentence of Pythagoras). This is the maximum mark-up one could choose for deviations from the shortest path. Another mark-up would result in an overestimation of trenching cost and is not justified from our point of view.[156]

7.2.15 Sharing parameter not appropriate

284. The sharing of underground infrastructure has been accepted by the Commission at [ ] **CNZCI**.[157] This is the lower edge of the frame WIK presented in its February Submission, para. 390. Since New Zealand is a country with well documented infrastructures and the ability to coordinate work and the interest in reducing traffic management and traffic obstacles and also reducing cost we would expect a sharing of 30 % to be more realistic for a HEO.

285. The December 2014 cost model excluded sharing of underground infrastructure (duct and trenches) with other utilities. We have criticised this model assumption in our February Submission.[158] We reported that the relevant range of trenching cost reductions due to external sharing is between 5% and 30% of trenching cost.

286. The Commission has revised its position and assumed that 5% of underground infrastructure will be shared with utility companies.[159] The model implements a sharing cost benefit of 50% of trenching cost[160] which is an appropriate conservative assumption. The combination of these parameters leads to a total trenching cost reduction of 2.5% due to infrastructure sharing. This is not at the lower end of the range we reported as the Commission recognised but just 50% of the low end of the relevant range and it reflects the degree of sharing which Chorus has proposed.[161]

7.2.16 Sharing of aerial not sufficient

287. Aerial sharing has been accepted by the Commission with values just below [ ] **CNZCI** for lead-in and distribution but no sharing has been accepted for the copper feeder trenches.[162] This seems to contradict TERA's statement that the poles on the main's opposite side of the road in any case are telecommunication

156 See also WIK-Consult, Cross-Submission of 19 March 2015, para. 132.
157 See TERA, Model Changes, p. 11.
158 See WIK-Consult, Submission of 20 February 2015, Section 5.11.1.
159 See Commission, UCLL July, para. 1164.
160 See TERA, Model Changes, p. 11.
161 See Chorus, March Cross-Submission, para. 128.
162 See TERA, Model Changes, p. 12.

poles instead of power poles.[163] Thus, there would not be any sharing at the opposite side for aerial lead-ins. We expect, that everywhere where we find aerial infrastructure in New Zealand the infrastructure operator will be open for sharing, and the HEO also would be open and incentivised to do so. In consequence the shares should be higher.

7.2.17 No efficiency consideration conducted for non-network cost

288. The non-network or common or overhead costs in the model are derived from Chorus' accounts. We have criticised in our February Submission that comprehensive checks for efficiency of these cost items have not been conducted.[164] Furthermore, we have provided some indications of irrelevant and inefficient costs.

289. The Commission's approach has led in its December 2014 model to a level of common costs which was beyond any acceptable level of an efficient cost structure and level. We gave reference to benchmarks from NRA cost models in other jurisdictions which are significantly below the common cost share the Commission has calculated in its model. This held for both UBA and UCLL but was mostly significant and problematic regarding UBA.

290. In the new version of the model common costs have not been decreased as they should. They have been increased significantly. In absolute terms non-network costs increased from [ ] **CNZCI** for the reference year 2016 which makes an increase by 78.8%. Table 8-1 and Table 8-2 compare the cost structures of UCLL and UBA in the December 2014 model with the July 2015 model. While the common cost share of UBA cost remained more or less the same (decrease from 22.88% to 21.45%), the common cost share of UCLL exploded from 10.38% to 22.50%. Many NRAs use common cost mark-ups of less than 10%. The Commission's cost share values of common cost exceed relevant benchmark by more than a factor of two. We cannot see any New Zealand specific justification of such inflated cost levels. It just represents inefficiency and the inclusion of irrelevant costs.

291. In absolute terms common cost allocated to UCLL more than doubled from [ ] **CNZCI** to [ ] **CNZCI**. TERA and the Commission did not give reason for increasing UCLL common cost by more than 100%. We are convinced that this increase results from a calculation error which we could not identify but which can easily be corrected.

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163 See Section 7.2.5 of this Submission and TERA, Model Documentation July, Section 4.3.4.7.
164 See WIK-Consult, Submission of 20 February 2015, Section 5.6.9.

7.3 Remaining faults and missing changes of the model

7.3.1 Issues addressed without (proper) model changes

7.3.1.1 Model still not bottom-up in all respects

292. In our February Submission we have pointed out and criticised that the model built does not meet the standard of a true bottom-up model as the Commission and TERA claim it does.[165] In many areas of network design the model is based on the actual network structure of Chorus and not on an efficient network as it should be the case.

293. We could only observe a few improvements in this areas. Some more network deployment aspects have been endogenised and optimised, such as the implementation of the Voronoi algorithm in order to optimise local access areas of the local exchanges.[166] In all other network architecture and dimensioning areas as well as in the area of OPEX and common costs *the model still relies on Chorus' actual cost and not on optimised replacement and efficient costs* which are derived in a bottom-up modelling sense.

7.3.1.2 Shortest path algorithm does not lead to cost optimal results

294. Unfortunately the geospatial work of the model remains to some extent intransparent to the external experts, since it is not made available completely. We are not able to meaningfully consult on this aspect of the Commission (or TERA's) analysis. Whilst the Commission published a description of the GIS modelling environment, this has not provided sufficient detail to understand the exact approach, and steps taken, to determine the geospatial information that occurs prior to the cost modelling.[167]

295. In its Submission of February 2015 (para. 130-136, 380-382) WIK explained that the shortest path algorithm should be applied for the trenching cost (also called augmented shortest path), and not the cable length for each single connection from the CCT to the Street Cabinet and from the Street Cabinet to the MDF (LEX) (in case of copper) or the FAT to the MDF (LEX) (in case of fibre) independently from the other connections, because the cost then would be overestimated. TERA now respond in their answer to the industry comments (p. 13) that they have tested the impact of the augmented shortest path algorithm, finding a significantly increased

165 See WIK-Consult, Submission of 20 February 2015, para. 8 and Section 4.1.1.
166 See TERA, Model Specification July, Section 3.3; TERA, Industry Comments, p. 13; TERA, Modelling Changes, p. 61.
167 See also Section 7.2.11, para. 278 and 279.

length of copper cables, offsetting the savings in trench length and pole reduction so that overall cost would increase. TERA "believes" that the shortest path algorithm applied for each connection individually remains the most relevant and efficient one. However, no proof or evidence is given, such as calculation results or sample topologies, where TERA's reported outcome has occurred. We are not able to reproduce such result due to the above mentioned intransparency of the geospatial modelling. Therefore we have no way of assessing TERA's statement, and we do not believe that being requested to accept such statements as fact represents a true consultation.

296. In contrast to TERA's assertions, the example topologies we provided in Figures 5-4 and 5-5 of our February Submission obviously demonstrate the contrary. A shortest trench automatically includes shorter cables also and allows to aggregate the cables to a higher degree. And it is obvious that the trench cost are high – the difference to cable cost may amount to a factor of 10. Thus, following TERA's assertion shortening the trenches would increase the cable length by more than the 10-fold – unbelievable and beyond our rationale, and without any evidence or proof. We know from our modelling experience, that an augmented shortest path algorithm is saving cost. By the way, nobody would hinder TERA to integrate the cabling cost into the cost optimization of an augmented path algorithm in order to optimize the overall cost. That is what TERA should have done and not just provide a "believer" statement. Furthermore, TERA does not even use a shortest path along road length but by the assumption of road segments allocated by a straight line assumption to the next scorched node (see para. 278, 279 and 280).

7.3.1.3 Overall OPEX approach still flawed

297. The Commission has not changed its overall modelling approach regarding OPEX. The OPEX calculation basically takes the OPEX from Chorus accounts and applies some efficiency adjustments which mainly take note of the OPEX of a fibre access network and not of a copper access network. We have criticised this approach and starting point in our February Submission.[168] We also have proposed alternatives to the Commission's approach which fit better with the Commission's MEA approach.

298. For a variety of reasons which we elaborated upon in our February Submission, Chorus' actual OPEX are the most inappropriate starting point for a coherent and efficient OPEX determination. The Commission even goes a significant step further by testifying *"... that Chorus' operating costs are the best objective evidence of OPEX for a nationwide telecommunications network provider in New Zealand."*[169]

168 See WIK-Consult, Submission of 20 February 2015, Section 4.2.2.1.
169 Commission, UCLL July, para. 1680.

If the Commission provides such a testimony of efficiency on Chorus OPEX, the question comes up, why the Commission still sees the need for an LFI adjustment.

299. The OPEX cost share in the total UCLL cost which we present in Section 8.1 indicates that the Commission's approach will be overstating the relevant OPEX significantly.

300. We comment the model and parameter changes with regard to the LFI and fibre adjustment in detail in Section 7.2.4.

7.3.1.4 Efficiency gains by optimisation of cabinet locations still ignored

301. We have shown in our February Submission that network efficiency of the copper access network could be optimised by endogenously deriving the number and location of cabinets.[170] TERA's wording on this proposal seems to suggest that they share this view but the network optimisation approach of the Commission has excluded this option and the number and location of cabinets remains unchanged.[171]

302. We restate our view that the missing optimisation approach of the Commission regarding number and location of cabinets does not materialise a relevant network efficiency gain. The modelled copper access and UBA network does not represent the efficient cost of a HEO.

303. The Commission's arguments against optimisation of node location and number of nodes is mostly related to the MDF nodes.[172] In particular, the Commission highlights that it is not aware of any cost modelling in any jurisdiction which makes use of a scorched earth approach of node optimisation in a TSLRIC context. This is actually not the case. At the occasion of the April conference[173] we have made the Commission aware that scorched earth approaches are often used in the context of the calculation of mobile termination costs. We have also made the Commission aware that several NRAs optimise in their fixed line networks on the number and location of cabinets with significant efficiency gains.[174]

170 See WIK-Consult, Submission of 20 February 2015, para. 155.
171 See TERA, Industry Comments, p. 13.
172 See Commission, UCLL July, para. 1063ff.
173 See UCLL and UBA services final pricing principle conference held on 15-17 April 2015. p. 239.
174 See WIK-Consult, 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, 6 August 2014, p. 8f.

7.3.1.5 Too many street crossings overestimate cost

304. TERA still ignores that using the same street crossing trench in case of neighbouring buildings as proposed by WIK[175] would reduce the cost towards a more efficient level.[176] They argue, that the buildings have to be next to each other and that the impact of this improvement would be negligible, without any proof or evidence. There are a lot of neighbouring buildings in New Zealand with a distance trench cost below the cost of a street crossing, where using a common trench. Thus, these savings are ignored.

7.3.1.6 Modelling the FWA network can still be significantly improved

305. We recognise that the Commission has changed some assumptions and parameters on its FWA network design which improve the efficiency of the FWA networks in areas in which it is deployed. Nevertheless, the overall modelling approach of not optimising the FWA footprint remains unchanged. Furthermore, the Commission still uses inappropriate or inflated parameters which unnecessarily limit the efficiency and cost saving potential of FWA even within the artificial FWA boundaries chosen by the Commission.

306. We welcome the deployment of FWA in the 700 MHz band which improves FWA coverage.[177] However the modelling remains inconsistent and inefficient because it is based on Vodafone's coverage designed for 900 MHz spectrum. Scaling the spectrum costs according to the number of end-users served by FWA is a much more appropriate assumption on spectrum fees and in line with our proposals.[178] Also serving end-users by FWA only inside the TSO area corresponds to our proposal.[179] Sharing of FWA sites with other network services and network operators also corresponds to more reality and cost efficiency.[180]

307. We still regard the Commission's approach of not considering a cost optimal footprint of FWA as diverging entirely from the TSLRIC approach. The Commission's approach is too conservative and unnecessarily increases UCLL costs. Furthermore, not optimising the coverage of FWA even *within* the RBI constraint area is not convincing. If TERA has advised *"...that such an approach would be complex to the point of being infeasible to apply..."*[181] that is more an expression of the Commission's consultant unwillingness to conduct such an approach. In objective terms we disagree with TERA's statement. The tools of radio network engineering modelling are known and available and not a big deal. Every

175 See WIK-Consult, Submission of 20 February 2015, para. 158.
176 See TERA, Model Documentation, Section 4.3.4.4.
177 See Commission, UCLL July, Attachment D.
178 See WIK-Consult, Submission of 20 February 2015, Section 4.2.6.4.
179 See WIK-Consult, Submission of 20 February 2015, Section 3.5, para 125.
180 We recommended such an assumption in WIK-Consult, Submission of 20 February 2015, para. 199f.
181 Commission, UCLL July, para. 1128.

FWA deployed in the world will have undergone a network engineering design stage, with cost modelling attached. Network Strategies' modelling approach demonstrates clearly how such modelling can be worked out and implemented.[182]

308. We have recognised that TERA has increased the peak throughput for FWA from 16.7 Mbps to 22 Mbps.[183] We could, however, not identify any argument in TERA's model documentation why they did not make use of state-of-the-art LTE advanced systems which provide a significant higher throughput capacity.[184] This would have increased the FWA capacity correspondingly and much more customers could have been served with that technology.

7.3.1.7 Optimising the entire core for trench optimisation still not foreseen

309. There are a lot of customers not communicating over UCLL or UBA services, but using the core infrastructure also, including the FDS. We have given examples for this in our Submission of 20 February 2015, para. 206 (TES, Ethernet Leased Lines, UFB customers). These services increase the infrastructure volumes used, share trenches and cables, but also share the FDS. A larger FDS has benefits to the user because of its lower cost per capacity unit. Thus, this additional traffic cannot be ignored, as TERA still does (answer to the industry comments, p. 15).

310. We have shown in our February Submission[185] that it is necessary to design an efficient national NGN network in order to optimise trenching costs. Simply adopting the existing FDS locations must not be efficient.

311. TERA just argues that optimising the core network would "*... not [be] consistent with the network optimisation approach used by the Commission ...*"[186] We interpret this statement such that TERA agrees to the efficiency improvement argument but does not regard it as feasible to implement it because of a decision of the Commission.

312. The Commission's arguments why it restricted core network optimisation based on the relevant demand are not convincing to us.[187] While we accept that simply taking the existing node locations is an easy approach we also know that due to traffic changes over time this must not be the most cost efficient approach. From network structure cost analysis we know that the allocation of higher network level functions like aggregating bitstream traffic (FDS locations) to a subset of (92) node locations out of the whole set of (790)[188] MDF locations (exchanges) will change over time.

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182 See Network Strategies, Final report for Spark New Zealand and Vodafone New Zealand, Modelling Fixed Wireless Access, UCLL and UBA Final Pricing Principle, Network Strategies Report Number 34020. 20 February 2015.
183 See TERA, Industry Comments, p. 14.
184 See WIK-Consult, Submission of 20 February 2015, para. 445.
185 See WIK-Consult, Submission of 20 February 2015, Section 4.2.8.
186 TERA, Industry Comments, p. 15.
187 See Commission, UBA July, para. 813ff.
188 See TERA, Model Specification June, p. 64.

Chorus' decision may have been efficient at the time taken, but must no longer be efficient today, if taking all traffic growth over time into account. So even if the Commission wants to keep the 92 handover points as an appropriate level of handover, the currently efficient locations will differ compared to the situation before, while keeping the relation of aggregation as the Commission debates.

7.3.1.8 Switch parameters of the model still outdated

313. WIK has pointed out in its February Submission that the switches parameterized for the TERA model are obviously old fashioned or represent outdated equipment. Operators use higher performance switches and higher port densities in the network deployment today as used in the model. An updating to higher performance equipment will typically reduce the cost.[189] The model should therefore be updated further, so that the most efficient equipment configurations are implemented.

314. TERA responded that WIK would not have provided any data to support its argument.[190] This is not true: WIK stated examples for more cost efficient switch equipment configurations and described these in detail in para. 369-373 of its February Submission.

315. TERA secondly responded that the choice of FDS would be quite difficult as it depends on the type of architecture that the operator wants to achieve. As the UBA model contains solely the scope relevant to provide the UBA service, it would be difficult to assess precisely the architecture needed. Again this statement is not supported by evidence, rather, it demonstrates again the conceptual weakness of TERA's cost model. The first part of this statement of TERA shows that again the aim of calculating TSLRIC was failed. The type of architecture should be cost efficient and an inherent part of backhaul and core network cost models, like WIK itself practises in its cost models: our recommendation is both feasible and best practice. Just relying on Chorus existing architecture does not lead necessarily to optimised costs. Besides that, using other and more flexible switch sizes does not lead necessarily to another type of network architecture. In our February Submission we demonstrated the cost decreasing effect of changing this ceteris paribus, that means without changing network architecture. Also the second part of this statement of TERA, stating the UBA model scope is restricted to provide the UBA service, fails.[191] It shows, that TERA's cost model is reduced to an "optimization" of a standalone UBA production, which does not reflect Chorus' and other providers' reality. In short, WIK's examples delivered in its submission showed that already in the incomplete and not cost efficient approach of assuming the HEO replicates Chorus' network architecture and a UBA only production, significant cost

189 See WIK-Consult, Submission of 20 February 2015, para. 270 to 273, 369 to 373.
190 See TERA Industry Comments, p.17.
191 See TERA, Industry Comments, p.17.

reductions can be achieved by changing the existing model to a more efficient switch data input.

316. TERA thirdly responded that the price can change from one country to another and no price has been provided by WIK. This again is not true: WIK's calculation examples are based on a ceteris paribus assumption (para. 369-373). That means, that TERA's prices have been obtained but capacity data has been changed leading to cost reductions. In this context we welcome that TERA accepted our statements of the para. 369-372. But after checking the model update we found, that TERA did not change its models adequately:

Table 7-6: UBA 2014 model 2014, sheet assets

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Table 7-7: UBA 2015 model 2015, sheet assets

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Obviously just the card numbers of the subracks have been changed correctly.

A correct configuration would have been the following one:

Table 7-8: Appropriate EAS dimensioning

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317. TERA simply forgot to double the port capacity (see para. 370 of our February Submission). The effect of this mistake is, that the UBA costs further rise instead of adequately decreasing due to an adequate capacity of first data switches.

318. Moreover, TERA ignores our statement in para. 373 of our February Submission for further efficiencies just by stating that the list of assets is based on the list provided by Chorus and that this choice has been made to reflect the local context, and also that Chorus is one of the operators in New Zealand with the greatest bargaining power. It has to be said, that bargaining power has nothing to do with choice of cost efficient equipment. Moreover, TERA leaves open, how the local context and the list of Chorus leads to cost efficiency of an HEO. The model changes indicate that the opposite happened in the process of updating the model: moving into a more inefficient direction.

319. Finally, we like to add, that we concentrated in our February Submission on checking the cost efficiency of the DSLAM configuration and prices, because these have a larger impact on the total costs due to their higher number compared to the FDS. Therefore focusing on the DSLAMs we made a very detailed analysis in our February Submission, para. 363-368. It should not be WIK's task to prepare an adequate cost model in every detail. This reasons why we limited our submission concerning FDS configuration to the necessary efforts. It should be TERA's task to prepare an adequate model.

320. TERA comments on the DSLAM analysis we provided: No unit cost would have been provided by WIK but total costs only for a given number of customers. Also the source and calculation of the data would not be clear. In fact the data was stated by WIK in para. 365f in its February Submission. It is based on average data used for European regulators and therefore represents a conservative approach instead of using a best practice country approach, and even with this lower cost than those chosen by TERA would occur.

7.3.1.9 Use of one lead-in cable per dwelling remains inefficient

321. We are convinced that a single building access cable using a single larger ETP, where the cable is spliced or patched from an outdoor to an indoor cable and then routed to the individual premises inside the MDU, is more efficient than individual cables from the CCT/FAT to each single premise, also using individual subducts and larger ducts/trenches or space on poles and individual ETPs. Such larger cables would not require additional splicing nor joints/ distribution frames than also

required for the individual cables, but at a better scale. Therefore we cannot follow TERA in not implementing this improvement.[192]

7.3.1.10 The model should implement larger cable sizes

322. We have shown in our February Submission that fibre cabling costs could be reduced in the model by using larger cable sizes.[193] While this proposal in general has been accepted, even more cost savings and more efficient outcomes could be materialised if fibre cable sizes of up to 592 fibres would be used instead of cables with a maximum of 312 fibres. Also 592 fibres is a common cable size being used in many countries.

323. TERA justifies its limitation of cable sizes with its concept to use Chorus' asset list.[194] In our view it is not the proper concept for a true bottom-up model just to implement and rebuild the asset structures of the incumbent. The proper understanding of the job is to build the efficient network not constrained by inefficient technology and asset structure choices of the incumbent. TERA and the Commission once more failed to meet this standard.

7.3.1.11 Number and location of street cabinets remain inefficient

324. In our February Submission we have pointed out that a HEO would not (necessarily) build its network on the basis of the existing number and locations of street cabinets.[195] Instead, the HEO would optimise both elements and thereby save costs.

325. TERA rejects this optimisation step because it would be inconsistent with the network optimisation approach of the Commission.[196] The Commission once more seems to have constrained its advisor to develop a model which realises an efficient cost outcome. TERA, furthermore, argues that there could be very different optimisation criteria. We disagree, cost modelling provides relevant algorithms to achieve efficient network node structures. We can easily provide TERA with such algorithms. From our point of view reducing the cost should be the driving motivation.

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192 See WIK-Consult, Submission of 20 February 2015, para. 280-281 and TERA, Industry Comments, p. 18.
193 See WIK-Consult, Submission of 20 February 2015, Section 5.4.5.
194 See TERA, Industry Comments, p. 18.
195 See WIK-Consult, Submission of 20 February 2015, para. 303.
196 TERA, Industry Comments, p. 19.

7.3.1.12 Core network structure remains un-optimised

326. The Commission model has not optimised the structure of the core network. TERA just took Chorus' nodes as representatives for the efficient node structure. This remains unchanged in the revised model.[197]

327. TERA justifies its approach with a consistency requirement with the network optimisation approach of the Commission.[198] We interpret this statement such that TERA admits the efficiency potential but it could not be materialised in the model because the Commission restricted the efficiency deviations from the actual network structure TERA could implement.

328. TERA, furthermore, argues that the core network structure looks rather different to that in other countries which represents the New Zealand specificity that the UBA service ends at the first data switch. We totally disagree. The UBA service is part of the whole network Chorus is operating. This should be designed in an efficient manner. As we have shown in our February Submission[199], core network optimisation with regard to network hierarchy and efficient link structure should be independent of the handover points of the UBA service (see also para. 312 above).

7.3.1.13 Core cabling still inefficient

329. WIK proposed in its February Submission (para. 308-310), to aggregate the core network cables to larger cables because of cost savings and synergies. In their answer to industry comments (p. 19) TERA refuses this proposal by the vague argument of resilience purposes, which could need several parallel core cables. We doubt heavily. If an excavator or plough destroys a trench due to construction work typically all cables are destroyed. Thus a space redundancy, typically in form of rings, should be used for improving resilience instead of parallel cables, as it is also demonstrated in TERA's Model Specification 2015 (Section 7.1, Figure 30) and this is state-of-the-art in network planning and construction.

330. Responding to WIK's February Submission statements in para. 336 and 337, where we claim for modern network resilience, TERA negates the relevance of resilience as the lack of resilience would be New Zealand specific and is according to the way Chorus constructed its network.[200] We do not agree such network to be a MEA for modern networks. It is not able to provide reliable services to SOHO, SME and large business customers and it also contradicts the REN network structure as shown in Figure 30 of TERA's Model Specification 2015.

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197 TERA, Model Reference Paper June, Section 3.6, p. 31.
198 See TERA, Industry Comments, p. 83.
199 See WIK-Consult, Submission of 20 February 2015, para. 304.
200 See TERA, Industry Comments, p. 20.

7.3.1.14 Costs of joints significantly inflated and overpriced

331. Unit costs of joints have been updated following a comment of Analysis Mason, that design costs have not been included.[201] Comparing the unit costs of the 2014 model with the updated unit costs of the 2015 model leads to results as shown in Table 7-9. Cost of joints increased on average for copper cables by around 10% and for fibre cables by around 8%.

Table 7-9: Cost of joints in the 2014 and 2015 TERA cost models

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Source: WIK-Consult calculation based on TERA's cost models

332. To assess the new equipment prices we compared input data of European cost models with those used by TERA in New Zealand.[202] Table 7-10 compares the cost

201 See TERA, Modelling Changes, p. 6.
202 Installation and design costs are included in European model benchmarks. This has been confirmed by the respective NRAs to us.

of joints in the cost models of Denmark[203] and Spain[204] with those of the two cost models in New Zealand.

Table 7-10: Benchmark comparison of joint cost

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Source: WIK-Consult calculation based on cost models of Danish and Spanish regulatory authorities.

333. It can be observed that the New Zealand data (for 2015 as well as for 2014) significantly exceed data used in European cost models. In some cases the difference amounts to a factor of more than 10. Probably again data of Chorus have just been taken here without any adequate check for their appropriateness and efficiency. Another explanation for the cost differences could be that costs have been double-counted here by TERA. This could be the case if the numbers now used in the model for joints include the cost of chambers.

203 See Danish cost model, 2012-55-DB-DBA-Fixed LRAIC-Access Cost Model - v4.07 DBA - Public.xlsb, sheet “Assets”.

204 See Spanish cost model, Module_2Invest_Calculation.xlsm, sheets “Inputparameters” and “InputparametersF”, Investment in € per item for connection sleeve, per cable.

7.3.1.15 No efficiency test conducted for submarine and microwave links

334. TERA's model has not optimised the use of submarine and microwave links but has just taken Chorus' link structure.[205] We have provided some practical proposals for improving efficiency which TERA has ignored.[206]

335. TERA argues that optimisation would have no impact on the results. They provide no evidence that this statement is true. How can they know when they have not done it and show results of the comparison?

7.3.1.16 Equipment choice should be supplier neutral

336. In our February Submission we have proposed to use a supplier neutral equipment choice.[207] This enables the inclusion of relevant market information of operators active in the New Zealand market. Instead of being stuck with Chorus (potentially) inefficient equipment choice of the past, this approach comes closer to the state-of-the-art MEA equipment a HEO would use.

337. TERA is correct that Chorus' data is a relevant source of information.[208] But the other operators active in the New Zealand market would also have been and are a relevant source of information regarding the equipment a HEO will deploy in New Zealand. Just to refer on Chorus "greatest bargaining power" is misleading because that may hold nationally but not internationally. We have shown with several examples that Chorus' equipment costs also seem to exceed those of other New Zealand operators.[209] Furthermore, efficient equipment choice is more than price efficiency, it is also performance efficiency in terms of quality and capacity.

7.3.1.17 List prices do not reflect volume discounts

338. TERA states, that the unit prices provided by Chorus are Chorus unit price Delivered Duty Paid and discounts are thus already accounted for. Simply taking Chorus prices does not necessarily mean, that the discounts, that an HEO would achieve, are realized by Chorus. As Chorus also offers non-regulated products and business products, Chorus has the ambition to get higher volume discounts for these assets purchased out of one hand. Taking TERA's undifferentiated statement into account, it is obvious, that this efficiency check has not been conducted.

339. Additionally, an HEO would face different purchase conditions in the case of FTTH/FWA rollout. At the moment, the purchase prices of Chorus reflect a

205 See WIK-Consult, Submission of 20 February 2015, Section 5.6.10 and 5.6.11.
206 See TERA, Industry Comments, p. 20.
207 See WIK-Consult, Submission of 20 February 2015, Section 5.8.1.
208 See TERA, Industry Comments, p. 20.
209 See WIK-Consult, Submission of 20 February 2015, para. 346, 373.

regionally limited FTTH rollout of Chorus in New Zealand. An HEO would realize a larger roll-out reaching further economies of scale through larger purchase volumes. Real world discounts of Chorus do not reflect the discounts which can be achieved with a further FTTH rollout.

7.3.1.18 Duct prices too high

340. First TERA states,[210] that the scope of duct costs used by the NRA in Denmark would not be the same and therefore the comparison made by WIK would not hold. This holds because the cost of ducts would include the installation cost in New Zealand whereas in Denmark it would be included in the cost of building the trench.

341. This is actually not true: BECA still includes duct installation costs in the New Zealand trenching costs: "*All rates are the national average and allow for excavation, duct install, backfill, surface reinstatement, consenting and traffic management.*"[211] This is confirmed by the MS Excel access input model of TERA:

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The switch which determines the ducting installation cost is set to "FALSE", that means that zero installation costs are included in the ducts, what can be proved by setting this value to "TRUE":

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210 See TERA, Industry Comments, p. 20.

211 See TERA model, "CI-ComCom - Inputs for trenches - v8.0.xlsx", sheets "Trenching inputs (w ducting) b" and "Trenching inputs (w ducting)", cell B80.

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This clearly shows, that ducting installation costs are not included in the duct costs in the TERA model. The comparison done by WIK with the Denmark cost model therefore holds. The material costs of ducts are significantly inflated compared to duct costs of an HEO.

342. Secondly TERA states, that the scope of cost of Vodafone's ducts would not be the same and therefore the comparison made by WIK would not hold. TERA is stuck for an explaining answer. So far WIK's comparison with Vodafone duct prices also holds and again it is shown, that material costs of ducts in the TERA approach are significantly inflated compared to duct costs of an HEO.

343. In the light of the statements of TERA which are not true, the new input data for duct material costs confuses us. The already inflated duct material costs in the 2014 model were further significantly inflated instead of being decreased.

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344. Moreover we compared the cost data of the Swedish and the Italian cost models with the New Zealand data. This comparison also underlines the duct costs used by TERA are significantly inflated.

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345. The new now even more inflated figures of the TERA model have been probably taken from the new public BECA report:

> "*25/05/2015 - Regarding PE rates, we confirm discounted supply rates for PE as $10/m for 50dia and $15/m for 110dia. Installation rates are $12/m for 50dia and $15/m for 110dia. This will now apply to all trenching methodologies mentioned in our report. The reason why directional drilling and chain trenching rates did not change is that flexible PE duct must be used for HDD, mole ploughing and thrusting, and was also allowed for in the chain trenching rates*". [212]

These installation rates have nothing to do with material costs of ducts. Obviously TERA has mixed up data leading to significant overestimation of the duct material costs. Moreover a comparison with the cost model of Denmark, where the duct installation costs are stated separately from other costs with 19 DKK = 4.24 NZD,[213] shows that not only the cost of material but also the installation costs are inflated.

346. The statement of BECA concerns us even more: So far supply rates means here cost for the material, double counting of material costs (1. in the TERA model as part of the duct costs, 2. in the BECA model as part of the trenching costs) would significantly inflate the prices. We observe that the MS Excel file "Input for trenches v8.0) contain a lot of figures of BECA including duct supply, for example the mole ploughing figures, because we compared the input figures here with the corresponding output figures of the calculations of BECA, which are the same.[214] Otherwise it would be unclear for what supply costs stands for and what this should justify to be efficient costs. Obviously BECA forgot to delete the $10 material costs per duct in the case of mole ploughing. Extra installation costs have not been considered due to the nature of this methodology to install duct and cable in one step. This error has a big influence, as mole ploughing is often already the cheapest

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212 Beca report, FPP Corridor Cost Analysis – Report 3, New Rates and General Recommendations Prepared for Commerce Commission (Client) by Beca Ltd (Beca), 5 June 2015, p.18.

213 See Danish cost model, 2012-55-DB-DBA-Fixed LRAIC-Access Cost Model - v4.07 DBA - Public.xlsb, sheet "Assets", cell O34.

214 See CI-ComCom - Inputs for trenches - v8.0.xlsx, sheet "Trenching inputs (w ducting)" and Beca-report-FPP-corridor-cost-analysis-of-trenching-and-ducting-rates-in-NZ-28-May-2015.xlsx, sheet "Trenching v3".

cost scenario used by TERA or would be the cheapest cost scenario, if this error would be corrected.

7.3.1.19 FWA site costs too high

347. TERA has confirmed that the FWA site cost in the model included site investment and base station equipment.[215] Thus, because this is not changed in the revised model, this inappropriate modelling approach remains.[216]

348. TERA now has assumed site sharing with two other operators[217] which we proposed[218] and which is appropriate. This reduces the FWA site costs of the HEO significantly. Nevertheless, sharing occurs for still overstated site costs. As we have shown in our February Submission, site costs are overstated by a factor of two compared to European cost models based benchmarks.[219] New Zealand specific cost factors do not seem to justify such discrepancies.

7.3.1.20 Costs for active equipment too high

349. We observe that there is generally not an efficient choice of equipment of different sizes in the model. A different design would better match the demand and would result in more cost efficient outcomes.[220] This holds true especially for the DSLAMs, which are too large for most of the cabinets they are deployed in, and where significant customer growth cannot be expected. It also holds for the FDS, which in several locations are significantly under-dimensioned and where state-of-the-art suppliers would deploy switches of larger size, by this also meeting future capacity growth. TERA's arguments[221] cannot be followed, because it is not task of the modeller to select one or two configurations being most representative, but selecting a tool-kit being most cost efficient. And in no case a modeller should rely on the poor equipment list an incumbent is providing, who of course has its own high cost intention as part of his market role, but he should pick the most efficient equipment available in the market, e.g. by also asking other operators and, if required, suppliers.

350. We respond to a specific response made by TERA by submitting, respectfully, that it is not the task of WIK to provide adequate data. Instead it is the role of the

215 See TERA, Industry Comments, p. 9.
216 See WIK-Consult, Submission of 20 February 2015, para. 360.
217 See TERA, Industry Comments, p. 22.
218 See WIK-Consult, Submission of 20 February 2015, para. 199f.
219 See WIK-Consult, Submission of 20 February 2015, para. 361.
220 See WIK-Consult, Submission of 20 February 2015, para. 363f.
221 See TERA, Industry Comments, p. 21.

Commission and its supporting advisors to investigate in efficiency and objectivity.[222]

7.3.1.21 Discrepancies of demand figures not

351. In our February Submission we have claimed that demand figures differ across the models.[223] TERA explains these differences with different data sources to be used in different parts of the model.[224] We understand this explanation but recognise that the inconsistencies remain and are not corrected as they should be. This model error therefore remains.

7.3.1.22 Dimensioning the network for more than 100% of demand remains an error

352. The Commission[225] and TERA[226] have confirmed that the access network has not been dimensioned for actual but for potential demand. Potential demand is determined in the model by all address points in New Zealand.

353. We still regard this approach as an conceptual error of the model.[227] If the HEO's network covers a larger footprint than the one determined by actual demand, the incremental costs of covering the difference in demand has to be regarded as an investment which the HEO undertakes to meet the difference between potential and actual demand with a certain probability. The cost and risk of that incremental investment should be covered by the HEO and the potential revenues of potential demand. It is inappropriate that actual demand has to cover those costs. This holds in particular under the constant demand assumption of the Commission.

354. We cannot confirm TERA's advice to the Commission that TSLRIC modelling in other jurisdictions usually assumes a modelled demand which is 10-20% below the modelled footprint demand.[228]

355. We recognise and welcome that the Commission has reduced the gap between dimensioning demand and actual demand by treating HFC demand as part of the fixed-line service demand (and therefore the actual demand within the model).[229] By adding [ ] **CNZCI** lines of HFC demand the gap reduces from 13.1% to 9.1%

222 See also TERA. Industry Comments, p. 22.
223 See WIK-Consult, Submission of 20 February 2015, Section 5.14.1.
224 See TERA, Industry Comments, p. 23.
225 See Commission, UCLL July, Attachment A.
226 See TERA, Industry Comments, p. 23.
227 See WIK-Consult, Submission of 20 February 2015, Section 5.14.2
228 See Commission, UCLL July, para. 957.
229 See Commission, UCLL July, para. 971.

but remains highly relevant and sensitive. According to a sensitivity conducted by TERA adding HFC demand has led to a 4% decrease in UCLL cost.[230]

7.3.1.23 Problem of double-recovery of costs remains unsolved

356. We have provided examples in the model where there are indications of double-recovery of costs because TERA did not demonstrate how they separated OPEX for running the UCLL and the UBA networks from expenses which are related to transaction services.[231] TERA just states that they did take care.[232] They did, however, not give any evidence how they did it. This means, TERA did not provide comfort that the double-recovery problem is excluded or at least controlled in an acceptable way.

357. In our analysis of the costing approach related to transaction charges, we provide evidence that double-recovery of OPEX for UCLL and UBA on the one side and transaction services occur (at least to a relevant probability).[233]

7.3.1.24 No efficiency considerations conducted for non-network costs

358. In our previous model analysis we have criticised that TERA has not conducted any efficiency adjustments on the overhead costs provided by Chorus.[234] TERA just replies that their approach is robust.[235] How can an approach which should identify and calculate efficient cost just take an operator's actual cost as the representative for efficient costs without any efficiency test be appropriate at all? How ignorant can an expert be to solve relevant problems?

359. We have supported our view that the identified common cost (significantly) overestimate efficient cost by comparing the resulting cost shares of the model with benchmarks. In the revised model TERA has corrected its wrong application of the EPMU allocation rule so that common costs are now allocated to the total attributable costs of a service and not only to its OPEX. At the same absolute level of common cost this change of allocation keys just redistributes common costs from the UBA to the UCLL service. This means that the resulting cost structure is no longer directly comparable with the one which is showed in Table 5-5 of our February Submission.[236]

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230 See TERA, Sensitivity Analyses, p. 14.
231 See WIK-Consult, Submission of 20 February 2015, para. 141 and Section 5.3.3.
232 See TERA, Industry Comments, p. 26.
233 See Section 3.6 of this report.
234 See WIK-Consult, Submission of 20 February 2015, Section 5.6.9.
235 See TERA, Industry Comments, p. 26.
236 See WIK-Consult, Submission of 20 February 2015, p. 94.

360. Nevertheless, we calculated the cost structure of UBA and UCLL in the revised model. Table 7-11 and Table 7-12 present the results of this calculation.

Table 7-11: Cost shares for UCLL

		Model 2015 – Year 2016		
		Annual CAPEX	OPEX	Non-network costs
National		66.61%	10.89%	22.50%
	Urban	70.20%	6.09%	23.71%
	Non Urban	63.17%	15.49%	21.34%
		Model 2014 – Year 2015		
National		76.45%	12.99%	10.56%
	Urban	76.60%	12.82%	10.58%
	Non Urban	76.29%	13.17%	10.54%

Source: WIK calculations based on TERA cost model

Table 7-12: Cost shares for UBA

	Share of CAPEX in Total Cost	Share of OPEX-Maintenance in Total Cost	Share of OPEX-Non Maintenance in Total Cost	Share of Non-network in Total Cost	Total UBA Cost
Model 2015 – Year 2016	62.38%	9.43%	6.69%	21.51%	
Model 2014 – Year 2015	43.29%	13.02%	21.10%	22.59%	
Change 2015 vs. 2014	**59.05%**	**-20.12%**	**-65.01%**	**5.09%**	**10.38%**

Source: WIK calculations based on TERA cost model

7.3.2 Issues ignored

7.3.2.1 MEA for UBA

361. The arguments regarding the Commission's dual MEA approach seem to be exchanged and the Commission has used its discretion to choose an inefficient solution.[237] No HEO making network architecture decisions to find the lowest cost

237 We have extensively dealt with the MEA approach of the Commission and its problems lastly in WIK-Consult, Submission of 20 February 2015, Sections 1.2 and 2.2.

solution, to find a future-proof solution and to make competitively robust solutions would ever choose to build a FTTH/FWA network to provide access and not using the same network to provide bitstream access. We have extensively submitted on the inefficiencies and inconsistencies caused by the dual MEA approach of the Commission.

362. In making its choice towards a dual MEA the Commission values the reproduction of the current network architecture, which is in transition to the future-proof network structure currently being deployed in New Zealand, higher than a conceptual coherent approach. This is a conceptual breach within the "convential TSLRIC" approach which guides the Commission in general. The Commission's choice results in a unnecessary and unjustified increase of the cost of providing the UBA service.

363. A UBA product could be efficiently produced on a FTTH MEA by just using Ethernet switches at the MDF locations or at an even higher level with an option to also increase bandwidth significantly.

7.3.2.2 FWA in the context of the copper network still ignored

364. The Commission still ignores FWA to be a relevant technology in deploying a new copper network as a FTTN reference architecture. If the HEO builds a new copper network today it would also make use of the cost saving potential of deploying FWA in the low density/high cost areas. We did not find any discussion of this proposal which we made in our February Submission[238], neither in the Commission's further draft determinations nor in the new TERA documents.

7.3.2.3 Cost adjustment has to be conducted per exchange

365. The December 2014 model[239] as well as the 2015 model[240] show that copper access generates lower costs in some MDF areas and fibre access (including FWA) in other MDF areas. According to a recent model simulation conducted by TERA a technology choice MDF by MDF would lead to a cost reduction for UCLL by 7.2% compared to the base case of a (pure) fibre (including FWA) MEA approach.[241]

366. In our February Submission we have developed the argument that a technology choice at a nationwide level is not consistent with the MEA approach of the

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238 See WIK-Consult, Submission of 20 February 2015, Section 4.2.3.2.
239 See TERA, Model Specification November 2014, p. 80.
240 See TERA, Model Specification June, p. 95.
241 See TERA, Sensitivity Analyses, p. 8.

Commission and its TSLRIC principles.[242] Instead, we recommended a technology choice MDF by MDF.

367. The Commission justifies its choice of a single MEA with the advice that it is not aware of any regulator undertaking TSLRIC determination modelling a network with FTTH in some exchange areas and FTTN in others.[243] This is actually not true. The Commission itself as well as the Swedish regulator uses a mixed MEA technology choice between FTTH and FWA to achieve a lower cost level. The Spanish regulator also applies a mixed approach between copper and FTTH MEA, depending on the areas deployed. Also the European Commission enables a dual MEA approach between various NGA technologies in its costing recommendation by stating, that "*an FttH network, an FttC network or a combination of both can be considered a modern efficient NGA network*".[244]

7.3.2.4 Deficiencies in the data generation process remain

368. In our February Submission we have identified a variety of deficiencies in the data generation process regarding parameters to populate the model.[245] We have, furthermore, developed proposals for a due process of data generation. We have criticised in particular that the Commission did not make use of available market knowledge of all market players in New Zealand. Instead, the Commission mostly relied on data provided by Chorus to populate the model.

369. The time from the first draft determination in December 2014 to the further draft determination in July would have been sufficient to organise the data generation process more transparently and more appropriately. On the basis of the December 2014 model the Commission could have designed a questionnaire to ask all market players (and other experts) on exactly the data requirements of the model. Such a process would have exploited the full market knowledge in New Zealand. Furthermore, by having got parameter values from a variety of market players it would have been much easier for the Commission to choose relevant values without facing the bias of getting information just from one (mostly) interested party. This process is conducted by many NRAs in other jurisdictions to avoid a biased data generation process. The Commission has missed this opportunity.

242 See WIK-Consult, Submission of 20 February 2015, Section 4.2.5.2.
243 See Commission, UCLL July, para. 1033f.
244 See EU Commission, Recommendation of 11.9.2013 on consistent non-discrimination obligations and costing methodologies to promote competition and enhance the broadband investment environment, p. 9, para 41.
245 See WIK-Consult, Submission of 20 February 2015, Section 4.2.9.

7.3.2.5 BECA's approach to determine trenching costs still cannot be verified

370. Especially regarding traffic management cost the BECA report of 2015, Section 15, is intransparent regarding the determination of the height of the traffic management cost. Thus, the cost in total cannot be verified fully.

7.3.2.6 Efficiency of modern trenching technologies not considered

371. Modern trenching technologies include mini- and micro-trenching. These are not considered in the new BECA report and the trench cost used in the model despite the fact, that Chorus is already using these technologies as new and efficient deployment form, like other cost saving improvements also.[246] Since these proposals not even have been debated in the industry comments document of TERA. We insist that these cost improvements should be realized as state-of-the-art technology.

7.3.2.7 Difference of copper connections of the model and Chorus numbers remains unexplained

372. The 2015 model uses the same number of copper connections as the 2014 cost model. This indicates to us that the difference of this number to the number of copper connections observed by Chorus by about 3% which TERA reported in its November Model Specification[247] still remains[248].

373. Neither in TERA's new model documents nor in the Commission's further Draft Determination we found any reference to this problem. We therefore conclude that this difference remains unexplained and unjustified. We have pointed out in our February Submission that such inconsistencies should be sorted out and resolved.[249] It is unsatisfactory that this has not yet happened in the long revision period of the model.

7.3.2.8 Efficiency improvements for OPEX over time still ignored

374. In the 2015 cost model as well as in the 2014 cost model labour related OPEX are inflated over time by the LCI. In our February Submission we have pointed out that the LCI index should be corrected by an efficiency adjustment factor which reflects

246 See WIK-Consult, Submission of 20 February 2015, Sections 5.6.7, 5.8.6, 1.1.2.5 etc.
247 See TERA, Model Specification November 2014, p. 54.
248 See TERA, Model Specification June, p. 66.
249 See WIK-Consult, Submission of 20 February 2015, Section 5.14.6.

productivity gains over time.[250] Based on international benchmark examples we suggested that this efficiency factor should not be less than 5% p.a.

375. The Commission agreed in principle to allow for an adjustment for productivity gains for OPEX-related labour.[251] It was, however, sceptical to find an appropriate value for such an adjustment. Furthermore, the Commission points out that the LCI for all industries already captures productivity gains of around 1.7% over 15 years.[252] Therefore, the Commission concludes that "*there is no definitive evidence to show what the adjustment for productivity efficiency should be for UCLL services, and it could be greater or smaller than the productive efficiency gains already included in the LCI for all industries.*"[253]

376. We do not agree with the analysis and conclusion of the Commission. By excluding sector-specific efficiency gains the Commission endorses that all OPEX-related processes of Chorus and its service companies are perfect, efficient and that there is no potential for further improving them. Given the analysis we are providing regarding non-recurring charges it will become obvious that that is not the case.[254] There is a significant potential to improve process-related efficiency in New Zealand.

377. On a worldwide basis productivity gains in telecommunications exceed productivity gains for all industries by several percentage points. Why should New Zealand be different to the rest of the world? Why should New Zealand have reached already a steady state in telecommunications where no sector-specific productivity gains are achievable anymore?

378. Actual developments in the New Zealand telecommunications industry speak a different language to us. All major telecommunications companies (including Chorus) are in the process of running major productivity improvement programs with significant reductions of personnel or have announced such programs. New Zealand seems to be a bit later here than telecommunications industries in other countries. These programs indicate that the telecommunications industry is in the process of materialising major sector-specific productivity gains. By ignoring these developments the Commission is withholding the benefits of these efficiency improvements from end-users. We therefore conclude that recent developments in the New Zealand telecommunications industry should urge the Commission to include efficiency gains in labour-related OPEX.

250 See WIK-Consult, Submission of 20 February 2015, Section 4.2.2.2.
251 See Commission, UCLL July, para. 1503.
252 See Commission, UCLL July, para. 1505.3.
253 See Commission, UCLL July, para. 1506.
254 See Section 3.6.6 of this Submission.

7.3.2.9 Overlapping of non-TSO and FWA coverage area remains

379. In our analysis of the 2014 cost model we had identified an overlapping of network coverage in the non-TSO areas and the FWA coverage area.[255] A mapping of the TSO areas with the FWA coverage areas showed that in the 2014 model 7,011 buildings which were connected via FWA fell outside the TSO area. This was inconsistent and led to a double-recovery of costs because capital costs for connections of the non-TSO areas were excluded from the cost base.

380. The Commission admitted this model error and agreed that conceptually such overlapping should not occur.[256] Furthermore the Commission notes that the model had been changed to avoid such overlapping,

381. Our colleagues from Network Strategies, however, identified that in the 2015 cost model 4,842 buildings which are served by FWA are outside the TSO boundaries.[257] This finding indicates that the model error has not been disposed.

7.4 New model errors and inconsistencies

7.4.1 WACC value not consistently applied in the model

382. A consistent modelling approach should apply a uniform value of the WACC throughout the model. That is not the case in the July 2015 model. The model uses a WACC value of 6.03% to transform investment costs into annual CAPEX. On the other hand, TERA applies a WACC value of 6.47% to transform the annual value of “Poles – Network deployment compliance” to an investment value.[258] This is inconsistent and incorrect.

7.4.2 Incorrect rural SLU cost determination

383. In the December 2014 model of TERA at least the proportion between national, urban and rural UCLL and SLU costs were consistently related to each other. This does not hold anymore in the 2015 model. The non-urban monthly rentals in the 2015 model are negative.

255 See WIK-Consult, Submission of 20 February 2015, para. 125.
256 See Commission, UCLL, para. 1132, p. 208.
257 See Network Strategies, , Draft report for Spark New Zealand and Vodafone New Zealand, Revised draft determination for the UCLL and UBA price review, UCLL and UBA Final Pricing Principle, CONFIDENTIAL, Network Strategies Report Number 35013. 28 July 2015, section 7.2.2.
258 See TERA model, CI-ComCom-Inputs-v8.0, sheet „Unit costs calculation”, cell J30.

[

] **CNZCI**

Source: CI-ComCom - UBA model v8.0.xlsb, sheet “Pricing”

384. Although the Commission sets prices only on the basis of averaged costs, the negative results for the rural part of the service still has importance with regard to the consistency of modelling results. The negative values are highly irrational. They show impressively the inadequateness of the current model status. This irrational result seems to be generated by the “SLU costs = UCLL costs minus SLU-backhaul costs” logic of the Commission.

Table 7-13: UCLL, SLU and SLU backhaul prices in the 2015 model

[

] **CNZCI**

Source: CI-ComCom - UBA model v8.0.xlsb, sheet “Outputs”

385. In rural areas the SLU backhaul costs are higher than the cost of UCLL leading to a negative cost result of SLU. This shows the absurdness of this calculation approach, which we have criticised for its implication of artificially increasing the

UCLL costs by transferring UBA related costs.[259] It seems, that this fundamentally wrong approach now strikes back in the form of negative implausible cost results. This result would mean that in rural areas a part of the access lines is more expensive than the full access line. This is implausible, incorrect and represents a model error.

7.4.3 FDS capacity dimensioning is incorrect

386. Despite having delivered in our February Submission an actual FDS capacity description for the switches used in the model, its implementation still is not correct, since it underdimensions the switch capacity significantly (for details see Section 7.3.1.8).

7.4.4 Incorrect treatment of lead-in contributions

387. The lead-in cost are redesigned but treat the end-user contributions still incorrectly. These are only partially excluded from the UCLL calculation. The details can be found in Section 7.2.7.

7.4.5 Inconsistencies between various modules of the model

388. In our model analysis presented in our February Submission we identified discrepancies between the various models.[260] In particular the OPEX model generates other OPEX and non-network cost shares compared to the UCLL UBA model. Furthermore, different numbers of lines are used in the different model modules.

389. TERA explains these discrepancies and differences with different timings of the input generation of the various modules of the model. This may explain such inconsistencies but it is not an appropriate justification. In particular the use of different numbers of lines in the various modules remains a model error which leads to inconsistent results. For example, the access network is dimensioned to service [ ] **CNZCI** address points while these address points are related to [ ] **CNZCI** locations (or buildings).[261] The OPEX model still draws on [ ] **CNZCI** connections.[262] For allocating total cost to costs per line TERA is using now a number of [ ] **CNZCI** connections, which reflects the added

259 See WIK-Consult, Submission of 20 February 2015, Section 4.2.4.
260 See WIK-Consult, Submission of 20 February 2015, Section 5.1.2.
261 TERA model, See CI-ComCom - Access network - v8.0.accdb, Table SOURCE_BUILDINGS, Column NB_TOTAL, Data summed up and number of ID_Building.
262 TERA model, CI-ComCom-OPEX model v8.0.xlsm, sheet “Results”, cell K20.

HFC connections, but this number is still inconsistent to the other line numbers presented.[263] It should be doable to avoid and correct such discrepancies.

7.4.6 Inconsistent and incorrect treatment of duct costs

390. TERA further inflated the duct costs in the 2015 model instead of reducing them. Hereby TERA ignored clear indications of benchmarks, which have been presented. Furthermore, it has not been taken into consideration, that BECA already included installation costs of ducts in the trenching costs (see para. 341ff in this report).

391. BECA inflated the cost of the trenching variant mole ploughing because BECA did not remove the cost for duct material costs which are separately calculated in the TERA model. Costs are inadequately inflated by double counting duct material costs (see para. 346 in this report).

263 TERA model, CI-ComCom - UBA model v8.0.xlsb, sheet “Dashboard” , cell H25.

8 Model sensitivities and overall assessment of the model and its results

8.1 Model sensitivities

392. Just comparing the outcome of the new model calculations indicates that the 2015 model of the Commission is not so much different from the December 2014 model. The costs for the regulated services in the first year of calculation (2015, respectively 2016) decreased in the case of UCLL by 1.26 % and increased in the case of (incremental) UBA by 9.53%. We are at the moment not commenting on this change of cost on the resulting cost level which is from our previous and our current model analysis not justified by any means. From a pure (technical) modelling perspective a cost change by a few percentage points is not surprising when hundreds of model and parameter changes are conducted.

393. What we are more concerned with from a (technical) modelling perspective is the level of changes within and between broad cost categories. Table 8-1 shows the cost changes between the 2014 model and the 2015 model in the broad cost categories of CAPEX, OPEX and common costs for UCLL. While the CAPEX share decreased by 12.9% and the OPEX share by 16.2% in the case of UCLL, the common cost share more than doubled or increased by 113.1%. These structural changes in general are not compatible with a prudent modelling process.

Table 8-1: Change of overall cost structure between 2014 and 2015 for UCLL

		Model 2015 – Year 2016		
		Annual CAPEX	OPEX	Non-network costs
National		66.61%	10.89%	22.50%
	Urban	70.20%	6.09%	23.71%
	Non Urban	63.17%	15.49%	21.34%
		Model 2014 – Year 2015		
National		76.45%	12.99%	10.56%
	Urban	76.60%	12.82%	10.58%
	Non Urban	76.29%	13.17%	10.54%

Source: WIK calculations based on TERA cost model

394. The structural discrepancies between the 2014 and the 2015 models become even more obvious in the case of UBA. Table 8-2 shows that in comparison to 2014 CAPEX have increased by nearly 60% in the 2015 model. Non-maintenance OPEX on the other hand decreased by 65%.

Table 8-2: Change of overall cost structure between 2014 and 2015 for UBA

	Share of CAPEX in Total Cost	Share of OPEX-Maintenance in Total Cost	Share of OPEX-Non Maintenance in Total Cost	Share of Non-network in Total Cost	Total UBA Cost
Model 2015 – Year 2016	62.38%	9.43%	6.69%	21.51%	
Model 2014 – Year 2015	43.29%	13.02%	21.10%	22.59%	
Change 2015 vs. 2014	**59.05%**	**-20.12%**	**-65.01%**	**5.09%**	**10.38%**

Source: WIK calculations based on TERA cost model

These significant structural changes indicate that the 2015 model seems to model a totally different world and a totally different network than the previous model. Such level of changes need justification, explanation and reconciliation in a prudent modelling and decision process. Neither TERA nor the Commission are providing this explanation and justification of these overall structural cost changes.

395. The observation presented in para. 394 that TERA must have modelled a totally different network, becomes even more clear and transparent if one compares the cost of the various network elements between the two models. Table 8-3 compares the (total) cost shares of various network elements of the UBA model between the two models. The costs of the network elements represent their (allocated) costs including CAPEX, OPEX and common cost. The cost shares changed dramatically. For instance, the cost share of DSLAM rack and DSLAM sites nearly doubled. The Exchange-FDS fibre cost share dropped from 40% to 24%. The share of Exchange DSLAM Racks most dramatically decreased from 5% to 2%.

Table 8-3: Cost share of UBA network elements in the 2014 and 2015 cost models

	Share of element cost in total annual cost 2015	Share of element cost in total annual cost 2014
MDF Sites	3.68%	1.47%
Cabinet xDSL Cards	5.63%	8.62%
Cabinet SHDSL Cards	0.46%	0.75%
Cabinet DSLAM Racks	34.95%	18.73%
Cabinet DSLAM Sites	9.84%	5.40%
Exchange xDSL Cards	3.68%	5.69%
Exchange SHDSL Cards	0.17%	0.29%
Exchange DSLAM Racks	2.11%	5.06%
Exchange DSLAM Sites	10.72%	8.70%
Exchange-FDS fibres	23.77%	40.29%
FDS SFP	0.76%	1.22%
FDS Cards	0.79%	1.19%
FDS Racks	0.68%	0.88%
FDS Sites	2.76%	1.70%
Sum	100.00%	100.00%

Source: WIK-Consult calculations based on the TERA cost models

8.2 Overall assessment of the model and its results

396. We have shown in the subsections of Section 7 that there are many items where the model design and parameter changes are not adequate, sufficient or correct. We still miss changes we proposed, which in many cases are not argued by TERA or the Commission, and we also list cases where the issues mentioned by us in previous submissions are simply ignored. In addition we found new errors in the WACC computation, the rural SLU cost determination, the FDS capacity dimensioning and in the consideration of the lead-in contributions (Sections 7.4.1 to 7.4.4) and inconsistencies between the modified model modules (Section 7.4.5). We expect that these will be corrected.

397. Our sensitivity analysis comparing the 2014 model results and even more important the major cost categories with those of the 2015 model demonstrate significant changes in most items (Sections 8.1 and 7.2.1). These changes have not been argued for or just described in the draft decision or the accompanying model description documents, despite having major impact on the final results.

398. Summing up all changes in the model parameters and the modelling approach to only minor changes in the resulting new UCLL and UBA charge proposal needs more explanation and justification. This holds in particular for some massive changes of parameter values.

399. The non-network related and common cost change dramatically compared to the model approach before, without making it transparent or arguing for. They are also not checked for efficiency nor are they benchmarked (Sections 7.2.17 and 7.3.1.24). We therefore strongly recommend to the Commission to analyse these cost positions and improve its transparency. We expect and strongly recommend significant reductions.

400. The OPEX are still much to high compared to our international experience. They are not modelled bottom-up but are just taken from Chorus' accounts and not checked for efficiency, nor do they consider efficiency improvements over time as one can expect in modern telecommunication operations (Sections 7.3.1.3 and 7.3.2.8). Such approach manifests existing inefficiencies. Thus we recommend to analyse and rework the approach taken so far completely, either by a bottom-up approach or at least by including efficiency considerations for the initial values and their development over time.

401. The consideration of cost for Leased Lines relies on one intransparent benchmark approach, which is significantly below our experience and expectation. We would expect that the use of national data provided by Chorus would be the most reliable way of appropriate cost allocation between the services using the access network infrastructure (Section 7.2.2). Therefore we recommend the Commission to use its legal power requesting the appropriate data from Chorus in order to realize a detailed cost sharing approach. We cannot imagine that a modern telecommunication operator does not have a sufficiently detailed database, at least in its network management systems.

402. The geo-modelling remains intransparent to a major degree, even with the additional documentation the Commission has provided in the middle of this submission period. It at least reveals that the Voronoii approach chosen is based on a straight line instead of shortest road length allocation of the cabinet respectively MDF areas. We have shown that this approach is inefficient. This inefficiency is obviously accepted by the Commission for the benefit of savings in computing time and consultants effort (Section 7.2.12). So it becomes clear that the

shortest path is not applied in two ways, by delineating the access areas for the MDFs and street cabinets inefficiently and by not applying an augmented shortest path for the trench length (Sections 5.3, 7.2.12, 7.3.1.4). We strongly recommend applying these tools as proposed here.

403. The model is not really working in a bottom-up manner to the extent one could and should expect. This includes the modelling of the core network (Sections 7.3.1.1, 7.3.1.7, 7.3.1.12, 7.3.1.13) or the street cabinets (Section 7.3.1.11). Furthermore one could expect that the MEA chosen for the UBA is the same as used for UCLL (Sections 176 and 7.3.2.1). These approaches will improve efficiency to the extent a proper state-of-the-art modelling should deliver. Thus we recommend the Commission to advise TERA implementing these aspects.

404. The network element cost did change between the 2014 and 2015 model versions in an erratic manner (Section 7.2.1) and in general are overestimated and often inappropriate sizes used. This holds for the electronic equipment (Sections 7.2.3 and 7.3.1.8) and the passive elements cables, joints, ducts and FWA sites (Sections 7.2.11, 7.3.1.14, 7.3.1.18 and 7.3.1.19, for cables we also refer to Sections 7.2.10 and 7.3.1.10). In general the equipment prices should be supplier neutral and not only rely on the incumbent’s prices and investments not checked by benchmarks (Section 7.3.1.16). Therefore we strongly recommend to rework the set of network elements, their sizes and their cost in this regard.

405. Reworking the modelling approach in the regard mentioned above would result in major efficiency improvements, in a real HEO MEA approach, which is state-of-the-art, and by this resulting in an increase in predictability, reliability and investment security for the approach taken for the Commission’s decision, to the long term benefit of all stakeholders of the New Zealand telecommunications market.

9 International comparison

9.1 The Commission's approach

406. In Attachment Q the Commission sets out to examine "*what information, if any, we can draw upon in determining the further draft UCLL prices from international comparators including those provided by Spark. It also considers other comparators provided as part of our previous IPP processes.*"[264] For this it uses not only the benchmark set that was submitted by Spark but also two further such sets that the Commission itself had used in the past. It is our opinion that the Commission has not undertaken an adequate examination of the reasons for the glaring differences between the numbers that come out of the benchmark sets and the relevant estimate from the TERA model for New Zealand.

407. The first point is that the Commission commits a grave error by using for all the comparisons the estimate with TSO areas excluded. When comparing the (average) costs of providing a UCLL line in different countries, it is necessary to use as candidates for the comparison cost estimates that reflect the costs of a comparable aggregation of lines. And that would in this case be the cost of all lines. It is particularly noteworthy that TERA, in its study for the Commission on the same subject matter[265] (henceforth "the TERA study") makes exactly the same point, arriving after corresponding adjustments at a value of 38.13 NZD per month instead of 26.31 NZD that the Commission uses (referring to it as the "FPP levelised" price). TERA's approach is the correct one.

408. Obviously, had the Commission used the figure of 38.13 NZD, it would not have been able to cavalierly gloss over the differences between the result from the cost model and the benchmarks. Given that the Commission uses the wrong cost estimate from the TERA model to compare it with the benchmark values, this comparisons becomes meaningless. The Commission should carry out the comparison with the relevant cost estimate for New Zealand and then form an opinion on how to account for the differences.

409. The Commission emphasizes that the difficulties with using benchmarks, and the not satisfactory results from previous determinations that were based on benchmarks, had led to applications from five interested parties that the FPP be applied which meant that a cost model had to be developed and the price for a UCLL line be determined by such a model. It is clear that the dissatisfaction of some of the interested parties submitting this application had arisen from their belief that the benchmarking exercises had led to prices that were too high. The fact that now the result from the model under the FPP is now even higher should give the

264 Commission, UCLL July, para. 1804.
265 See TERA, International Comparison.

Commission some pause and lead it to examine more carefully as it did the reasons why the estimate from the model, even the one that it uses, is higher than the cost figures from at least some of the benchmark countries.

410. The best example for this is the Commission's assessment of the benchmark data set submitted by Spark in its Figure 3. All benchmarks are below the FPP levelised. The Commission's commentary in respect of this is essentially that these benchmarks may be strongly driven by the approach of individual regulators. The reference is in particular to the Irish benchmark, for which it would be the case that it be highly weighted to only the largest exchanges. The Commission then replaces the Irish benchmark with another one for a different year that would not be based on this approach. The benchmark so obtained then reaches into the realm of the cost estimates obtained from the TERA model. The Commission then concludes "(a)ccepting 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 modelled FPP urban price and its 2007 price is close to our modelled FPP geographic average". No attempt is made to reconcile the other benchmarks with the result from the TERA model. In particular, the Commission did not address the difference between the benchmark for Sweden and the cost estimate from the TERA model, although it shows Sweden in its Figure 3 to be the only country that meets the 2007 IPP comparability criteria. Supposedly no or only a few adjustments would have been necessary to come to an assessment to what extent the Sweden benchmark is comparable to the New Zealand result and draw corresponding conclusions from this.

411. From above description of the Commission's handling of the benchmark set submitted by Spark, two aspects are worth highlighting:

- The Commission considered it admissible to make an adjustment to a benchmark, i.e. to the benchmark for Ireland, to thus be able to make a comparison.
- At another location of Attachment Q (para. 1815), the Commission expresses its concern of basing prices on a single benchmark, where the reference here is to the case of Sweden.

It is interesting at all that the Commission in the case of Ireland resorts to an assessment of the difference between an individual benchmark and the New Zealand cost estimate. By admitting this for Ireland and expressing concerns in the case of Sweden, the most obvious candidate for an individual comparison, the question is raised whether the Commission applies, as the case may be, different standards as to the question when a benchmark may individually be comparable and when not. WIK for its part, as demonstrated in the following subsection, considers it good practice to base conclusions on the comparison with a single benchmark as long as care is taken that actually all important differences between the benchmark country and the target country have been removed.

9.2 A suitable international comparator: Sweden

412. The Commission has found that among the countries whose UCLL cost may be used as a benchmark for the cost of the UCLL in New Zealand, Sweden is the only one that could be considered as comparable to New Zealand.[266] As mentioned already in the preceding subsection, while in respect of Sweden the Commission expresses concerns of using a single benchmark, it nevertheless does exactly this with the Ireland benchmark from the set submitted by Spark. We are of the opinion that it is good procedure to take a single benchmark that, as in the case of Sweden, is similar to New Zealand and uses a bona-fide TSLRIC bottom-up cost model, and to apply to the resulting benchmark adjustments for those country-specific differences to New Zealand that still exist.

413. In the following we make this point, starting from the relevant bottom-up cost model for Sweden and adjusting the cost estimate therefrom for the specific Sweden/New Zealand differences identified in the TERA study. Previously, we have pointed out that these differences, especially trenching lengths, trenching costs and depreciation factors, are still based on weaknesses in the TERA model approach, but for this exercise we provisionally accept them as “objective” differences in New Zealand. The result of the exercise should be a cost per line that could reasonably be expected to be applicable in New Zealand. The result, taking all the precautions for obtaining a conservative estimate, is that the cost from TERA’s New Zealand model is 65 % higher than the cost estimate based on the Swedish benchmark. For this we use as estimate for New Zealand the one for the whole country, i.e. a monthly cost of 38.13 NZD, as TERA argued should be used for the purpose and provided for in Figure 2 of their study.

414. Our methodology is summarized as follows. The starting point is the total amount invested in Sweden for the provision of the UCLL in the year 2009. We then use a global multiplicative factor to increase this amount to make it compatible with the amount that would have to be invested if these connections were provided in the New Zealand environment. The understanding and assumption is that the costs are higher in New Zealand than they are in Sweden due to differences in trenching lengths and trenching costs. As mentioned, as source for information on these differences we use the TERA study, which as a document prepared for the Commission should be regarded as a legitimate source for the purpose. The use of a global multiplicative factor is justified, since we select a value that is conservative in the sense that one can safely assume that it is the highest to be applied to any

266 See Commission, UCLL July, para. 1815.

of the inputs. Next, the figure for the total investment in the UCLL is adjusted to reflect input prices for the year 2015 and then divided by the number of active UCLL lines in Sweden, which gives us the average investment for one UCLL line if installed in New Zealand. Then the depreciation factor[267] holding for New Zealand is applied to that investment value. The resulting figure represents the annualized capex of a Swedish UCLL line if it had been installed in New Zealand. Finally, an amount representing both opex and common cost is added.

415. In the now following paragraphs we discuss the approach for obtaining the information regarding the parameters that are needed for carrying out the exercise as just discussed.

416. **Total invested capital in the UCLL connections in Sweden:** In the first step, the total relevant capex for the year 2009 is identified and calculated on the basis of the cost model which was used by TERA (in the following "the Swedish cost model").[268] The total network capex sum up to a total of 40.5 billion SEK for wholesale products including UCLL lines. This sum has been derived from six asset cost classes, where expensed equipment and installation costs (OPEX) have been removed:

a. Acc. Digging. in street

b. Acc. Cable. Copper, SN- PDP- SDP buried or on poles

c. Acc. DP. Cabinet

d. Acc. Digging. EFSD and mini duct and trench to NTP

e. Acc. MDF and Frame unit

f. Acc. Islands

Next this capex is allocated to the UCLL wholesale product by using the same allocation factors that have been used in the Swedish cost model. After converting in NZD with the exchange currency rate used by TERA[269] we obtain the capex values corresponding to UCLL wholesale service. This 2009 UCLL capex of 4.5 billion NZD for all UCLL lines is transformed into a value per UCLL line by dividing through all active UCLL lines, 2.9 million, as it is also done in the Swedish cost model. This leads for 2009 to a UCLL capex per line of 1,551 NZD. As the Swedish cost model contains price data of 2009, TERA adjusted price data to 2015.[270] We did the same by deriving an average price factor for this transformation by using the price trend values of the Swedish cost model that correspond with the selected

267 "Depreciation factor" is TERA's term, WIK would prefer "capital recovery factor" which appears more precise, since it also accounts for the interest that must be covered when recovering the invested capital.

268 See TERA, International Comparison, p. 5: Swedish Post and Telecom Authority (PTS), Cost results of LRIC Hybrid Model version 7.1 ("Final Hybrid Access model v7.1 PUBLIC.xls" and "Final Hybrid Consolidation model v7.1 PUBLIC.xls"), 26 November 2009.

269 See TERA, International Comparison, p. 6.

270 See TERA, International Comparison, p. 12.

UCLL cost categories.[271] The calculated average price trend per year, 2.27%, results in an average price factor of 114.42% (change 2009 to 2015). After multiplication with the 2009 UCLL capex per line of 1,551 NZD, a capex value per UCLL line of 1,774 is obtained for the year 2015.

417. **Multiplicative factor to be applied to the total invested capital as derived above:** From the Swedish cost model, we gather that 70 % of annualized capex is due to underground infrastructure (Asset cost class Acc. Digging. in street). To obtain this result, we identified the share of trenching cost with the help of the Swedish model by dividing the UCLL trench capex for 2015 through the total UCLL capex for 2015. This part of the investment is according to Table 6 in the TERA study 64% more expensive in New Zealand than in Sweden. Just to mention again, we believe that the Commission significantly over-estimates trenching costs in New Zealand. This means, the difference should actually much lower. Further, according to the same source, lines are in New Zealand on average 25% longer than in Sweden. We use this information to increase the cost per line so far obtained by that percentage. The global multiplicative factor f is therefore arrived at as follows:

$$f_1 = [0.7 * (1 + 0.64) + 0.3] * I$$

$$f_2 = f_1 * (1 + 0.25)$$

$$f = f_1 * f_2$$

where

f_1 ≡ the multiplicative factor adjusting for higher underground infrastructure cost in New Zealand

f_2 ≡ the multiplicative factor adjusting for the higher cost of longer lines in New Zealand

I ≡ the investment per line in Sweden

and the numbers reflect the percentages by which costs are higher (according to TERA) in New Zealand (0.64 and 0.25) and the share of the investment to which one of the cost increases applies (0.7). The resulting value of the global multiplicative factor is thus 1.81.

418. **Depreciation factor for New Zealand:** As shown in the TERA study, and as generally recognised, the depreciation factor is to be derived on the basis of the formula

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271 Final Hybrid Consolidation model v7.1 PUBLIC.xls, Sheet “C_Cost_Category”, columns N (equipment costs) and W (installation costs).

$$\frac{r - \pi}{\left(\frac{1+\pi}{1+r}\right)^n}$$

where

r ≡ the nominal pretax WACC

π ≡ is the price trend for the modelled asset

n ≡ the asset life

While for the nominal pretax WACC the value from the New Zealand model, i.e. 8.3 %, is available, the applicable values for the price trend and the asset life need to be estimated. This is so because we apply the depreciation factor to an investment value composed of different assets with varying economic lifetimes and price trends for which in each case a weighted average needs to be determined.

First, we discuss the weights that need to be used for composing the weighted averages of economic lifetimes and price trends. From Figure 2 of the TERA study, the table below shows the shares of the different types of assets for Sweden and New Zealand:

	Type of asset		
	Underground infrastructure	Cables and joints	Other
Sweden	70 %	10 %	20 %
New Zealand	50 %	30 %	20 %

As is obvious from the information in the table, cables and joints make up a much larger share of cost in the New Zealand than in the Sweden case with correspondingly lower and higher share for underground structure. As already pointed out at earlier occasions, this reflects a suboptimal installation of cables as implemented by the TERA model for New Zealand. We therefore use the shares as shown for the Sweden case.

As regards asset lives and price trends, we use values that were gathered from the New Zealand model and are shown in the table below together with their weighted averages using the weights according to the asset share shown above for Sweden.

	Type of asset			**Weighted average**
	Long-lived (mainly underground infrastructure)	Middle-lived (mainly Cables and joints)	Relatively short-lived (all other)	
Economic life time	50 years	20 years	14 years	39.8 years
Price trend	3.3 %	2.5 %	2.0 %	2.96 %

We thus have the parameter values to populate the formula for the depreciation factor d as follows:

$$d = \frac{8.3\% - 2.96\%}{\left(\frac{1 + 2.96\%}{1 + 8.3\%}\right)^{39.8}} = 6.16\ \%$$

419. **Common cost, opex and other costs:** Given that Sweden and New Zealand are both developed countries and have similar price and cost levels, as pointed out in the TERA study, there should be no differences in levels of opex and common cost. This is in fact the case for opex. For common cost, however, the value shown is with about 6 NZD substantially higher than the one for Sweden, shown to be about 2.50 NZD. TERA points to the fact that Chorus, different from international comparators, is not an integrated operator and therefore would suffer diseconomies as far as its administrative operations were concerned. Against this must be set the fact that Chorus is mainly operating as a wholesale firm that faces lower common cost in terms of customer care and other administrative functions such as billing. This cost advantage would more than compensate any disadvantage it might have due to not being an integrated operator.

420. Having thus determined the values of the parameters that need to go into the adjustment of the Sweden benchmark, we can determine the annualized capex for a line if it were installed in New Zealand, as shown in the table below:

Parameter	Value
Investment per line according to the Sweden model	1,774 NZD
Multiplicative factor to account for higher cost in NZ	1.81
Investment per line after adjustment for higher cost	3,211 NZD
Depreciation factor after adjusting for different weights for asset types	6.16 %
Annualized capex	193.12 NZD
Monthly capex	16.09 NZD
Opex, common and other costs according to Swedish benchmark (estimate, obtained from the TERA study)	7.00 NZD
Final adjusted Swedish benchmark	23.09 NZD

421. It is important to note that the value of the Swedish benchmark of 23.09 NZD per month, adjusted for differences with New Zealand is to be compared with the value of 38.13 NZD that TERA on behalf of the Commission showed to be the relevant cost for New Zealand. The result of this comparison is that the cost in New Zealand based on a properly adjusted benchmark is more than 65% higher than in Sweden.

422. In other words, based on its own analysis of an appropriate comparator country the cost model developed by TERA for the Commission overestimates the relevant costs in New Zealand by 65%. If this factor of cost overestimation is applied to the FPP price proposal this would go down from in the first year 2015 from $ 26.74 to $ 16.19.

9.3 Some further comments on benchmarking

423. We agree with the Commission's assessment that the spatial dispersion of end-users might potentially be a factor driving higher costs for New Zealand if compared to some other countries.[272]

424. We do, however, not agree with the Commission's conclusions about the differences between New Zealand and Sweden in this regard. Sweden has a rather similar population density as New Zealand (20 people per square km in Sweden and 15 in New Zealand)[273]. What is even more important is that the degree of urbanisation is not lower in New Zealand than in Sweden. In both countries the percentage of the population in urban areas amounts to a high value of 86%.[274]

272 See Commission, UCLL July, para. 15.
273 See TERA, International Comparison, p. 23.
274 See http://data.worldbank.org/indicator/SP.URB.TOTL.IN.ZS/countries.

The intuitive explanation which the Commission provides to explain the network length per line difference is not convincing to us. The Commission explanation is "*that Sweden has large areas where no one lives*".[275] This also holds for New Zealand. This means there is no convincing explanation yet on the table why network length per line is 25.6% higher in New Zealand than in Sweden. This might simply be the result of model errors in New Zealand.

275 Commission, UCLL July, para. 15, footnote 5.

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