Report on several submissions in the FPP proceeding for UCLL

By Ingo Vogelsang, Boston University

November 6, 2014

The New Zealand Commerce Commission (NZCC or Commission) has asked me for my opinion on:

a. points raised in specific submissions on my s18 report of July 2, 2014; and

b. points raised in specific submissions on TSLRIC objectives discussed in the Commission's consultation paper of July 9, 2014.

I. The NZCC asked for my opinion on the following submissions with reference to my s18 report:

I.1. WIK on behalf of Vodafone and Telecom, "*In response to the Commerce Commission's "Consultation paper outlining our proposed view on regulatory framework and modelling approach for UBA and UCLL services (09 July 2014)",* paragraphs 42-47

1. Since the critiques by Network Strategies, Vodafone and Telecom of my s18 report are mostly based on WIK, I comment on the WIK submission first.

2. WIK (paragraph 42) makes the interesting observation that the copper network platform should provide a "competitive constraint" on the fibre platform. This notion has been used by the European Commission (2013)[1] in order to keep wholesale FTTH access free from wholesale price regulation. However, Chorus is subject to UFB wholesale access price regulation, and migration to UFB is viewed as desirable. Thus, while copper wholesale access charges have to be compatible with UFB wholesale access charges, there is no additional need for a "competitive constraint".

3. WIK likes Vogelsang's overall conclusion that biasing UCLL wholesale prices upward would unlikely promote competition for the LTBEU (paragraph 42). However, in the same paragraph WIK criticises Vogelsang's (personal) claim that "positive network externality effects of a UCLL price increase for UFB subscribers exceed the negative externalities on copper-based services." While WIK sees a lack of empirical analysis here, in paragraph 48 WIK essentially admits that such an analysis cannot be done. I agree with both these assessments. The statement by Vogelsang about the net effect of externalities is not the result of an empirical estimation, which would be too complex and would lack quantitative data. This is therefore a typical situation for regulators to use their judgment. My judgment in this case was based (a) on the declining customer base for copper versus the increasing customer base for UFB, (b) on the expectation that investments in copper-based applications are largely sunk so that less of them will be lost if the customer base shrinks, and (c) on the expectation that new applications for UFB services require an increased customer base. I also would like to add

[1] European Commission (2013): "Commission recommendation of 11.9.2013 on consistent non-discrimination obligations and costing methodologies to promote competition and enhance the broadband investment environment", Brussels, C(2013) 5761 final.

that, to the best of my knowledge, before my paper there was no discussion of negative externalities for consumers of copper-based services from the migration to UFB.

4. WIK's statement in paragraph 46 establishes a burden of proof that any deviation from TSLRIC has to prove empirically that the consumer losses from price increases are dominated by externality or spill-over gains. In my view, the Commission would have to decide if it subscribes to this view, which according to WIK seems to be shared by regulators in other countries (paragraph 48).

5. WIK (in paragraph 44) draws consequences from Vogelsang's statement on the net effect of externalities that Vogelsang did not draw. There is no statement in the Vogelsang report that the net positive externalities from a UCLL price increase would over-compensate the negative competition effect on the LTBEU. WIK further makes the statement that, in case of a UCLL price increase to enhance externalities for UFB, "average" broadband demand would cross-subsidize ultra-fast broadband demand. This is correct in so far as the explicit subsidies for Chorus are taxpayer-financed, while a price increase for copper UCLL would be consumer-financed.

6. I would also like to comment on WIK's suggestion (paragraph 29) that for the purpose of TSLRIC calculation the "hypothetical firm" should have access to the subsidies Chorus received for the UFB build-out. This comment is also related to WIK's comments on "non-replicable" assets dealt with below. Chorus received the subsidies in order to incentivize the coverage and penetration of a UFB access network. In my view, this includes subsidies for migration from copper to UFB. If now these subsidies were (in the form of lower prices) also provided to copper-based services the intention would be neutralized or even counter-acted. Thus, part of the subsidy goes towards subsidizing the price of UFB services. In my view, another part of the subsidy is intended for the initial build-out costs and the costs of ramping up penetration among customers. In spite of Telecom's claim (paragraph 113 of Telecom's submission) that UFB customers sign up quickly it takes a long time to reach full penetration. Thus, substantial excess capacity has to be financed for many years.[2]

I.2. Network Strategies submission on behalf of Vodafone and Telecom, "*Key issues in modelling UBA and UCLL services"*

7. Network Strategies only refers to the Vogelsang report in its conclusion, thereby mimicking WIK's main critique that Vogelsang's netting of positive and negative network externalities is not based on actual empirical analysis. I agree but assert that the empirical analysis cannot realistically be done.

I.3. Vodafone submission, "Comments on consultation paper outlining Commission's proposed view on regulatory framework and modelling approach for UBA and UCLL services" (section E2)

8. Although Vodafone had access to and had commissioned WIK's report (jointly with Telecom), its first conclusions about the Vogelsang paper are very different. Rather than critiquing Vogelsang

[2] Just ask Verizon about FIOS in the U.S.!

Vodafone critiques the consequences drawn from the Vogelsang analysis by the Commission's consulting paper of July 9, 2014.

9. Vodafone (paragraphs E.2.3 and E.2.4) points out that Vogelsang's statements on externalities, innovation effects and spillovers are tentative and indicate small orders of magnitude, while the Commission's consulting paper applies a much stronger and, in Vodafone's view (paragraph E.2.5), selective reading of Vogelsang's statements. I agree having thought of a small to medium UCLL price increase that would only have small externality effects. As a result the effects of netting out positive and negative externalities would also be small. However, some of the discretionary variables in this proceeding may have quite large effects on costs so that larger externality effects are not out of question. In any case, I purposefully refrained from clouding my judgment on the competitive effects with those on externalities.

10. Only in paragraph E.2.7 does Vodafone address the WIK critique of the Vogelsang paper by adding the postulate that a "theoretical possibility of a price increase delivering positive externality effects does not justify the weight placed on this factor." It is unclear whether Vodafone wants no weight or just a smaller weight to be placed on externalities, but then proposes a burden of proof for a trade-off decision to be made: "Unless the Commission can be certain that [the price increase, which imposes "a real and significant cost on RSPs and consumers"] will result in actual positive welfare effects that exceed this cost, no adjustment should be made." In my view, certainty can never be reached. Rather, the statement makes sense if one replaces "the Commission can be certain that" with "in the Commission's best judgment".

11. Vodafone's paragraph E.2.8 actually both concerns the questions raised in Vogelsang's paper and the TSLRIC objectives covered below in section II. Vodafone questions the objective of incentivizing UFB migration in the current proceeding. Rather, the Commission should take a narrower approach of "TSLRIC for UCLL and UBA *copper* services" (paragraph E.2.8). Any efficiencies inherent in UFB migration "must specify the form of these efficiencies and explain how they arise". I cannot comment on the legal aspects of this critique and suggestion. Certainly the externality and spillover effects are also taken care of by other policies, such as the subsidies for the UFB build-out and the pre-determined prices for UFB access. Thus, the externalities relevant for the current proceeding may be only a subset of all relevant subsidies. Furthermore, there could be the issue that copper and fibre are naturally linked in the current proceeding via the MEA that is applied to the full set of current fixed-network customers, not only the shrinking set of copper customers.

I.4. Telecom submission, "*UCLL and UBA FPP: consultation on regulatory framework and modelling approach*", paragraphs 112-115

12. Telecom (paragraph 115) reiterates the main points made by WIK regarding the quantification of externalities claimed by Vogelsang. To this, Telecom adds several new points. First, Telecom (paragraph 112) notes that it is unclear which incremental weight, if any, the Commission might place on the fibre migration incentive. If that weight is small or zero then Telecom's next point is moot. If the weight is high, then Telecom's next point is important. This next and second point is

that, according to Telecom (paragraph 113) the link between UBA (and, though not mentioned, UCLL) prices and UFB migration is at best tenuous. That is, at this point in time migration appears to depend on availability only and not on price. Telecom is probably right that most (though not all) of the observed migration is more driven by availability and the low price elasticity of the first UFB customers than by price, as long as price changes are not very large.[3] I am not sure, though, if price increases within the range contemplated for incentivizing migration[4] will likely have only small effects. Third and as a consequence, Telecom (paragraph 114) suggests postponing the decision on migration incentives via price to the next TSLRIC review, which is currently suggested by the Commission to be five years after the current decision. While this could be a sensible suggestion, it is not clear what the consequences would be in the current context. Would it mean that the re-use of assets should be included or that a quality adjustment for the difference between copper- and UFB-based services should be included? The suggestion might also necessitate an earlier review than after five years.

I.5. CEG report, "*Promoting Competition, Review of Professor Vogelsang*" (comment on report)

I.5.1. Some general remarks

13. In my view, CEG's extensive comments are based on a totally different perception of the s18 objectives than mine. Even if one accepted their s18 perception their arguments and claims are largely flawed.

14. CEG's perception of the s18 objectives is based on a total surplus approach, according to which consumer benefits can be balanced against producer benefits on a one-to-one basis. As a result, unbundling investments that would improve consumer benefits are seen as "wasteful duplication". Total surplus is the dominant efficiency/welfare concept used by industrial organization economists. Nevertheless, it is not the dominant approach in market-related policies. Here a consumer welfare approach is very common.

15. A striking example of this dichotomy is CEG's prime literature citation by Mankiw and Whinston (1986),[5] who show that, under a total surplus approach, free entry competition often leads to excessive entry if there are fixed entry costs. Here "excessive" means that total surplus would be

[3] There exists some similar evidence from fixed to mobile migration. See Vogelsang, I. (2010), "The relationship between mobile and fixed line communications: A survey," *Information Economics and Policy* 22, pp. 4-17.

[4] The incentives currently provided by the Commission can be viewed as not accepting re-use and as not accepting a performance adjustment for UFB over copper-based services. The former can be calculated in a model. WIK (2011) in a P2P model with admittedly optimistic re-use assumptions calculates it at 13-17% of TSLRIC. See WIK, WIK (2011): "Wholesale Pricing, NGA Take-up and Competition". By Hoernig, S., Jay, S., Neu, W., Neumann, K.-H., Plückebaum, T., Vogelsang, I., Bad Honnef, available at: www.wik.org. The valuation difference is harder to assess and could be substantial but could also be low at this time.

[5] Mankiw and Whinston (1986), "Free Entry and Social Efficiency", *RAND Journal of Economics* 17, pp. 48-58.

higher with fewer firms in the market. This result is not as general as CEG makes us believe.[6] However, even though the profession seems to accept the result, there has been no widespread call for legal entry restrictions. Economists generally accept the other part of the Mankiw and Whinston result, which is that free entry leads to lower prices for consumers. For the same reason the famous Williamson trade-off has not fully made it into competition policy practice. In the U.S. "economies as an antitrust defence" are only accepted if they are shown to benefit consumers.

16. If one were to accept CEG's remarks about the wastefulness of unbundling investments that are spread all over their report then the past unbundling investments in New Zealand by other access seekers besides Telecom would have been just as wasteful. Yet they are widely praised and have been regarded as a success. In fact if CEG were right the NZCC (or even the law) should have banned unbundling from the outset.

17. Even if one accepts CEG's total surplus concept their actual analysis provides no balancing or limiting principle. The least they would have had to show was that the claimed inefficiencies from a potential reduction in unbundling (along with externality advantages) would outweigh the negative consequences of higher prices for consumers. Nothing in CEG's report indicates that that could hold.

I.5.2. Some more specific remarks

18. CEG (paragraph 9) claim that "Professor Vogelsang's framework would *never* conclude that a higher access price would promote competition for the LTBEU". As discussed in the next paragraph, this is untrue. In last year's UBA IPP proceeding I remarked about the relevant trade-offs and suggested that, under certain conditions about the effect of unbundling on quality, this could happen (again, under my interpretation of the LTBEU).[7] The difference to the current paper is that this one is about a UCLL price increase. Here my judgment was and is that such a price increase (as long as it is small to moderate) will not lead to any substantial increase in unbundling. CEG make a number of vague statements that it will. However, they provide no evidence. In fact (at least from statements by Telecom), it appears that Telecom plans to do no copper unbundling. In my view, this would be in line with some economic theories (e.g., Sappington, 2005),[8] according to which bypass investment incentives depend on the cost difference between incumbent and potential bypasser and not on the access charge. The reason is that bypass (in this case unbundling) leads to fierce competitive

[6] It does not necessarily hold if fixed costs are sunk or if the number of potential entrants is small.

[7] See from paragraph 39 of my paper of July 5, 2013: "The unbundling triggered by a higher UBA price is unlikely to lead to a lower end-user price than those that ruled before the increase in the UBA price. If unbundling is unprofitable at the lower UBA price then its costs will quite generally not be so low that it will lead to lower end-user prices than using UBA at the lower price. In order for end-user prices ex post to be lower than before the UBA price increase there would either have to be specific cost effects (sunk costs and larger scale) or lower downstream margins. What one can safely expect, though, is that any additional unbundling will reduce the price-increasing effect of a higher UBA price. Also, there can be other consumer benefits from additional service qualities and from the more robust infrastructure-based competition created by additional unbundling."

[8] See Sappington, D.E.M. (2005), "On the Irrelevance of Input Prices for Make-or-Buy Decisions", *American Economic Review* 95, pp. 1631-1638.

reactions by the incumbent. Now, because of sunkness the incumbent has lower costs than the bypassing potential access seeker. Why was this no issue for the unbundlers prior to Telecom? From the incumbent's perspective they were small (a competitive fringe) so that a strong competitive reaction would not have been profitable. However, Telecom is a large potential bypasser, where a strong reaction will have to be expected. In that sense Chorus' sunk costs in UCLL create a powerful barrier to entry for Telecom's unbundling investments, and Telecom seems to know that.

19. CEG's examples in paragraphs 10 and 38-41 try to create a strawman with very little applicability to the situation. The zero price example (paragraph 10) shows an unsustainable situation. Thus, an increase in price from zero to a positive level would be in the LTBEU, because otherwise the service would cease to be offered. So, the consumers would gain from the price increase, because they could not get the service otherwise. The other example in paragraphs 38-41 about a non-specified price increase again misses the point. The natural assumption in this TSLRIC measurement context is that the UCLL price increase was not due to a cost increase but due to the regulator's discretion. Thus, the price increase in question concerns an increase above costs. This is highly important, because otherwise the previous argument about non-sustainability under prices below costs holds.[9] Thus, if we are talking about an increase above the regulated firm's costs, then in general there will be no "increase in competition in the LTBEU". Rather the initial price increase above cost by the regulated firm can in itself be interpreted as a decrease in competition in the LTBEU. Now, there may be competitive responses by other firms to the price increase but, in general, these responses will at best make up for part of the price increase. The only measure we have for judging that against is the LTBEU.[10]

20. That is also, why to me the statements in paragraph 18 are quite empty. How does one measure "firms' abilities and incentives to engage in competitive conduct or rivalry" if not by measuring the outcome against the LTBEU?

21. The main difference of perception between GEC and Vogelsang is contained in paragraphs 25 and 26, in particular about the statement about s18 that "the legislation contains a relatively generic statement of economic orthodoxy". GEC seems to assume that efficiencies (s18(2)) take priority over the LTBEU or explain the LTBEU, while it is the other way round. The LTBEU is the primary yardstick for efficiencies and competition under the law. This difference becomes particularly clear in paragraph 28 (or in paragraph 31, 2nd bullet), where CEG says "competition will only be in the LTBEU when the benefits of additional rivalry that spill-over to end-users exceed the otherwise socially wasteful duplication of fixed costs". No, the LTBEU is not netted against these "socially wasteful costs". Otherwise, consumers could be better off (in the long run), but that would not be interpreted by CEG to be in their LTBEU because there are these so-called wasteful costs (which are

[9] If there is uncertainty about costs so that the price increase may be below or above costs then an error assessment needs to be made, such as the one suggested in my July 5, 2013 report to the Commission.

[10] If one takes a total surplus approach the initial price increase and the following price increases by others create deadweight losses that would have to be compensated by cost reductions or other competitive moves. The question then always is, why did they not reduce their costs without that price increase?

paid or borne by someone else). In fact, in the case in question most of these costs would be borne by Chorus, who would lose incremental UBA revenues to unbundling. Maybe that explains CEG's position.

22. CEG tends to emphasize that Vogelsang only takes a short-term static view, such as in paragraph 36. This is mistaken. Vogelsang considers long-term effects on consumers via price setting, entry and exit of firms. The assumption (implicitly made by Vogelsang as well as by GEC) is that the UCLL price increase is for the long run.

23. CEG is right (in Footnote 19) that paragraph 2 of the Vogelsang report is unclear. The cost pass-through under perfect competition depends on the relative slopes of the demand and supply curves. Under horizontal supply the cost pass-through will be 100%. Only under vertical supply would it be zero, but that situation is virtually unconceivable.

24. The test proposed by CEG in paragraph 47 can only be done against the LTBEU.

25. Paragraph 49 again seems to be at odds with s18, "…although prices might increase, *the conditions and environment for competition* are not affected – and that is what matters under the legislation". In other words, in CEG's opinion the LTBEU does not matter.

26. Section 3 of the GEC report, which deals with their assessment of competitive effects, contains very little that is not in Vogelsang's report. Insofar, the claims contained there about the Vogelsang paper's shortcomings are totally exaggerated. The main claim is that Vogelsang considers a (low to moderate) price increase to have only a "second-order" effect on UCLL unbundling (paragraph 54 with reference to Vogelsang's paragraph 14). I still believe the effect to be second order. A first order effect would occur if the spread between UCLL and UBA prices were increased. In this context it is remarkable that CEG does not refer to paragraph 5 in Vogelsang's paper, where the issue is explained more and even a reference to "wasteful duplicative investment" is made.

27. Considering that CEG in paragraph 57 (and paragraph 63) makes a very tentative statement about the unbundling ("A higher price for the UCLL **may** therefore make it [i.e., Telecom] **less likely** to decide to unbundle the copper network." [emphasis added]), CEG's conclusions about the competitive effects in paragraph 63 are very strong without taking into consideration the price effects.

28. In paragraph 60 (1st bullet) CEG seems to propagate the view that infrastructure competition in the copper network is a bad thing, because it would create spare capacity for Chorus' copper infrastructure and idle capacity on the fibre networks. CEG furthermore refers to the distortion in competition through Telecom's large market share (2nd bullet) without mentioning that Telecom was handicapped until now by being forbidden to unbundle.

29. Paragraph 61 mentions the "business stealing effect" of competition as a bad thing. However, that effect is associated with any competition, good or bad.

30. CEG's arguments in paragraph 74 on the irrelevance of the UCLL access charge for Chorus' price responses in LFC area are fairly much in line with the arguments in paragraph 35 of the Vogelsang paper. Nevertheless, the regulated access charge has focal point properties that make it a likely reference point for pricing.

31. Paragraph 75 makes reference to internal pricing by Chorus and asks if there may result relevant competitive effects in the context of s18. In my view, they do. The internal reference prices ("opportunity costs") are closely related to the wholesale access charges.[11]

32. The CEG submission ends on positive notes about Vogelsang's statements on direct and indirect network externalities and spill-overs. In most of CEG's arguments about the desirability of moving customers from copper to fibre services no mention is made of externalities. So, these seem to appear as additional benefits. In my view, they are not. There would be little reason for public subsidies for the UFB networks if it were not for externalities and spill-overs. Otherwise, there would only be the argument that the innovators cannot capture all the benefits of their innovations, but that would equally apply to all innovations.

II. The NZCC has asked for my opinion on the following submissions on TSLRIC objectives:

II.1. Chorus submission, "*Submission in response to the Commerce Commission's Consultation paper outlining its proposed view on the regulatory framework and modelling approach for UBA and UCLL services (9 July 2014)*" , paragraph 7 and 218

33. I take the liberty of extending my comments to Chorus' paragraphs 5-9 and 213-222.

34. Chorus clearly calls for "a conventional application of TSLRIC" (paragraph 6). Chorus justifies this

- with the relevance of copper for some time and outside Chorus' UFB areas, "noting there are competing networks in other LFC regions" (paragraph 6.1) but not noting areas without LFC (and without competing networks?).

- with "long-term competitiveness of the market" (which market?), benefit to New Zealanders from right price signals for investment (which investment?) and industry transition to UFB services going forward (paragraph 6.2).

- with regulatory certainty and predictability, which should receive particular weight. "This includes taking a conventional approach to TSLRIC, as the Commission signalled to the market in 2002 and 2004" (paragraph 6.3).

[11] See DeGraba (2003), "A Bottleneck Input Supplier's Opportunity Cost of Competing Downstream", *Journal of Regulatory Economics* 23, pp. 287-297.

35. Chorus then summarizes that the above considerations "underpin the importance of the TSLRIC price sending an efficient build or buy signal by reflecting an efficient cost for an HNE supplying the regulated service in New Zealand" (paragraph 7).

36. In the context of a concept like TSLRIC taking a conventional approach can be inherently dangerous if it means that the concept cannot be adapted to new and unforeseen circumstances or if new insights lead to improvements. TSLRIC is a living concept that has been developed by regulators, international institutions, network operators, consultants and academics around the world. It could be evolving because of new technical and market developments and because of new regulatory and academic concerns about flaws in the current concept. TSLRIC has become a paradigm of costing that is subject to the test of expert opinions like other paradigms. In that sense sticking to an outdated version of TSLRIC may not be sustainable for the future. That does not mean that new developments have to be accepted. They may prove to be dead ends or to be unsuitable for a particular country and its legal or market situation. But a decision to deviate from the current version of the paradigm in favour of an older one needs to be justified carefully because it may lead to a break in the future if the new version turns out to be the better one. The Commission's statements of 2002 and 2004 precede some relevant new developments of the TSLRIC concept. Sticking with the old TSLRIC model therefore needs justification.

37. Chorus puts most emphasis on the "efficient build or buy signal" (paragraphs 7 and 9) but also quotes the Commission on s18 about predictability supporting investments and investments promoting competition for the LTBEU. This is in line with Chorus' justifications for a conventional TSLRIC approach and to resist "new and unconventional suggestions" to lower prices (paragraph 9). If I read Chorus correctly they think of the efficient build or buy signal in terms of a copper-based network not in terms of its replacement by a MEA. In my view, this would be hard to follow, because nobody would (re-) build such a network.

38. Chorus (paragraphs 213 and 214) agrees with the TSLRIC objectives on investment efficiency and predictability as stated in the Commission's consultation's paper, paragraphs 110, 112, 113, 116, and 119. Chorus then (paragraph 216) adds that "in this first implementation of TSLRIC it is important that the Commission adopts a conventional approach and is consistent with the information it gave to the market in 2004. A long-term reputation for regulatory predictability will enhance investment incentives, which will directly promote competition for the long-term benefit of end users." While this quote may appear to be consistent with the Commission's stated TSLRIC objectives, it raises the major difficulty that between 2004 and now the TSLRIC concept has hibernated in New Zealand. New developments and experiences have happened elsewhere so that what was conventional in 2004 may no longer be state of the art in 2014. At the very least this has to be confirmed or rejected from today's perspective, not from the 2004 perspective. In addition, the Commission has in the last few years gone through IPP proceedings for UCLL and UBA, which were based on TSLRIC modelling in other, comparable countries. These models were researched by the Commission and were viewed as acceptable by the Commission. They represent a range of

models that could well be considered as an acceptable set, from which the Commission could be expected to choose the appropriate one for New Zealand.

39. For Chorus (paragraph 217) any acceptable TSLRIC model should reflect the legal, technical and market conditions of New Zealand. While this postulate appears natural, its very narrow interpretation in the remainder of Chorus's submission makes one wonder. TSLRIC cost modelling never measures the exact (efficient) costs of a network but rather is the best feasible approximation. In the same way it cannot exactly fit all the conditions of a particular network or service configuration of a place. Within the next few years conventional telephone networks in many places around the world will be shut down. Their replacement then will not be the copper network but will have to provide all the services required.

40. Chorus (paragraph 218) states that "setting prices on the perceived costs of a feasible HNE (and not an unrealistically efficient new entrant), will encourage efficient build or buy decisions in that it discourages inefficient duplication of infrastructures." This sentence contains two remarkable properties. The first is an "unrealistically efficient new entrant", which does not seem to have been characterized before. Before Chorus only alluded to unconventional TSLRIC leading to lower costs, because of re-use of assets and re-costing based on quality differences. Maybe, the concepts are meant to be the same. The second remarkable property is the "inefficient duplication of infrastructure" arising from a low TSLRIC price. My remarks above in paragraphs 14-16 characterize my thoughts about inefficient duplication. In addition, there is this reference to low prices triggering such "inefficient" duplication. Since there are two prices at stake, UCLL and UBA, which of those is meant here? Obviously, a low UBA price relative to the UCLL price will trigger no duplicative investment, while a low UCLL price relative to the UBA price may trigger such investments. If both prices are low then the absolute difference would matter.

41. Chorus (paragraph 218) seems to accept "precedents from regulators in other jurisdictions" about "real-life operational aspects" and cites examples from Belgium, Sweden and Ireland (paragraphs 219-222). This is selective both w.r.t. the countries chosen and the topics to be included. One could equally argue that the re-use of non-replicable facilities improves the realism of the models and that therefore the U.K. or the European Commission provide for relevant examples. These are judgments for the Commission to make.

II.2. WIK on behalf of Vodafone and Telecom, "*In response to the Commerce Commission's "Consultation paper outlining our proposed view on regulatory framework and modelling approach for UBA and UCLL services (09 July 2014)", paragraph 12*

42. I take the liberty to include more than WIK's paragraph 12 in my analysis, because those other paragraphs are linked to paragraph 12.

43. In paragraph 12 WIK notes that the "build or buy" signals provided by wholesale access charges do not hold for "non-replicable" assets, which by definition cannot be replicated so that no decision to "build" can be made for those assets under any wholesale access price. Ducts, for example, are

viewed as being in that category. Such non-replicable assets of the legacy infrastructure can, however, be re-used for the new infrastructure that serves as the MEA.

44. According to WIK (paragraph 13) for non-replicable assets the European Commission sees no necessity to price them at full replacement costs. Rather (paragraph 16), there should be a dual valuation approach, where replicable assets are valued at their replacement costs, while non-replicable assets are valued either at their book value indexed by inflation or at zero (if fully depreciated). It is interesting to note that this approach does not seem to recognize the opportunity costs of such assets (for example, if they can be rented out for other uses[12] or if there is not enough space for accommodating both, legacy uses and new uses).

45. The main concern of the European Commission seems to have been to avoid the over-recovery of costs, and its approach is likely to achieve just that (paragraph 17). This is also what Ofcom had intended as a predecessor to this approach (paragraph 18). However, in my view, it is a somewhat strange justification to view it "as the proper and appropriate implementation of TSLRIC in the specific circumstances of the migration to NGA". I find this strange because the same reasoning would hold for a continuation of the old service as for a migration to the new service. In both cases the non-replicable infrastructure is "re-used" in the future, in one case for the old service in the other for the new one. To give an example, TERA and the Commission suggest that both the fibre MEA and the copper network should be modelled in order to determine the TSLRIC as the cheaper of the two. WIK favours an approach of putting in a discount for re-usable assets. It would make no sense whatsoever if the discount were not applied as well for the copper network to be modelled.

II.3. Network Strategies submission on behalf of Vodafone and Telecom, "*Key issues in modelling UBA and UCLL services"*, section 2.2

46. Network Strategies raises two important points that should be seen together. First, there is no need for creating a new concept of the expectations of a "reasonable" investor, because predictability is already part of the law and of the TSLRIC method if applied consistently and in a state-of-the-art fashion. Second, in order to evaluate potential trade-offs between predictability and the efficiency of investment the TSLRIC model should be flexible enough to calculate the "costs" of enhancing predictability in terms of investment efficiency (i.e., in terms of the resulting UCLL and UBA prices). In my view, at least conceptually, though probably not quantitatively, the benefits of predictability could also be calculated and doing so might help clarify the role of the "reasonable investor". The main benefit of predictability is that it reduces the relevant investment risk. In addition it improves the forecast of market outcomes. Thus, in principle an increase in predictability should reduce the relevant WACC. Here is where the "reasonable investor" would come into play. The WACC is calculated based on observations from the relevant debt and equity markets of the firm. These markets are populated by "real" investors, who react to news about the firm. While the physical model relevant for measuring TSLRIC may represent a "hypothetical" firm, the financial model

[12] In that sense contrary to WIK's statement (paragraph 19) mandated access to ducts would make a difference for the valuation of ducts.

relevant for calculating the WACC may be ill advised if it uses only “fully rational and fully informed investors”. In any case, if market observations were concurrently available a change in predictability should change the measured WACC. A second issue is that the improved forecasting information puts investments on a better footing. In case of sunk investments this reduces the value of the real option to wait. This real option is not currently included in the TSLRIC calculations anywhere, but that is only justified if the option to wait is sufficiently low in value. The predictability inherent in the TSLRIC process may justify not considering effects of real options on the firm’s cost of capital.