

Regarding *Review of wholesale services and associated policies*, Telecom Notice of Consultation CRTC 2013-551, 15 October 2013 and CRTC 2013-551-1, 8 November 2013.

Intervenors

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Dear Commissioners,

Thank you again for the opportunity to appear before the Commission and your questions regarding evidence and proposal that we have submitted in this matter. This final submission provides more detailed answers to your questions, outlines different approaches to the implementation of the regulatory strategy that we have proposed, and specifies the likely implications of options before you for the development of broadband network infrastructure in Canada. We also address certain claims made by other parties at the hearing.

Thank you for considering our proposals.

Sincerely,

Reza Rajabiun & Catherine Middleton

Table of Contents:

- I. Executive Summary
- II. Fact v. Hyperbole
- III. Options and Predictions

Executive Summary

- Empirically based policymaking:** Despite a clear commitment by the Commission to forbear from mandating wholesale access to fibre access and transport facilities under Telecom Decision 2008-17, incentives to upgrade network capacity and deploy advanced fibre-to-the-premises networks remain relatively limited. Today, six years later, fibre diffusion remains negligible (2-3%, which is around 3 times lower than U.S. and 5 times lower than the OECD average) and average speeds Canadian operators deliver to end users are substantially lower than those achieved by their counterparts in many other advanced economies (2-3 times lower in terms of download and 5-7 times lower in terms of upload speeds). If the Commission remains committed to ensuring “Canadians have access to a world-class communication system”¹, then wholesale access obligations can offer a potentially powerful tool for stimulating investment in advanced platforms and increasing the pace of progress in broadband network development.
- Emerging consensus and outliers:** We were pleased that under your probative questions various parties involved in the oral hearing appear to increasingly accept the need to develop a technologically neutral, pro-investment, and transparent regulatory framework for the operation of wholesale access markets. In particular, both cable operators and CNOC now appear to recognize the value of having a wholesale access framework that adequately compensates investors in network facilities. Nevertheless, operators of legacy DSL platforms continue to argue there is no problem with the Canadian broadband system requiring a solution by the Commission. These entities have relied extensively on advertised (versus actual) speed data on what they offer end users to argue that Canadians already have access to a world-class broadband infrastructure and therefore there is no problem for the Commission to address. We submit that the Commission should discount any data and arguments based on advertised speeds because actual service quality is often substantially below advertised rates specified in retail contracts. Others have attributed the problem to a lack of consumer demand, a point refuted by the wide variety of use intensity and pricing data submitted to the record by consumer and public interest advocacy organizations to document that Canadian households and businesses do indeed have a strong demand for high-speed connectivity and for symmetric fibre networks that have yet to be deployed.
- Options and errors:** Capital allocation decisions by legacy network operators to fund investments in other areas (e.g. wireless, media) or pay dividends are more likely to be driving observed network outcomes than assertions of a lack of demand or past regulatory decisions by the Commission. Under Telecom Decision 2008-17 operators had the option to build advanced fibre networks, which they evidently chose not to exercise. What our proposal aims to do is to promote investment, cooperation and risk sharing in advanced platforms by offering whoever chooses to invest in next generation fibre networks a “more than reasonable” return. This regulatory strategy should increase the

¹ Speech by Jean-Pierre Blais to the Vancouver Board of Trade Vancouver, British Columbia November 6, 2014. Retrieved from <http://news.gc.ca/web/article-en.do?nid=900869>

threat of competition facing legacy platform operators, enhancing private sector incentives to deliver high-capacity and symmetric fibre networks that are already available in many other high-income countries and Canadians demand. By continuing to allow privately negotiated wholesale arrangements at prices that vary from the regulated price, as it already does, the Commission will minimize the likelihood the proposed regulatory arrangement will interfere with the operation of market forces as required under the 2006 Policy Direction.

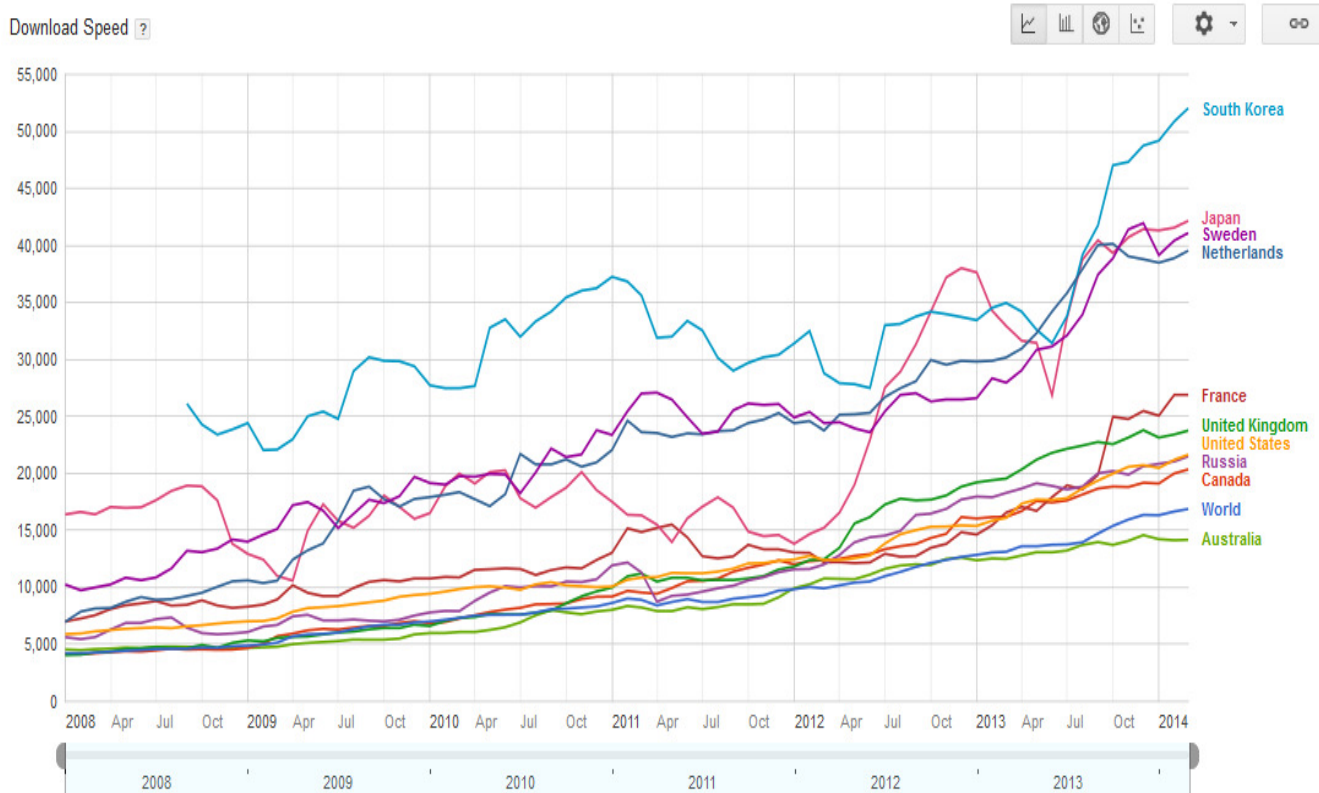
4. **Economic efficiency and political feasibility:** To help reverse evident trends in terms of network quality and technological change, we have proposed extending the scope of the obligations to fibre access and transport facilities, but allowing for a relatively attractive mark-up on Phase II costing in order to encourage capital expenditures on advanced platforms. This approach is intended to balance private interests of dominant operators and smaller service-based competitors, while aligning them with broader consumer and public interest objectives in developing a world class network infrastructure. It is precisely for this reason that you have witnessed an emerging consensus by most of the parties involved in the process around basic elements of the general model we have proposed. Simplifying the obligations and extending their scope to fibre access and transport facilities at a price that encourages private investment represents an efficiency enhancing reform that should benefit both industry and consumers.
5. **Optimal implementation:** Based on your questions at the oral hearing, this final submission further elaborates on variations and trade-offs involved in alternative policy options facing the Commission. Furthermore, we explain why our suggestion for incorporating a high return in the mark-up rate for advanced platforms is likely to be more effective than including fibre deployment costs as an opaque risk factor within the weighted average cost of capital component of Phase II costs (i.e. as proposed by CNOC in its oral reply). Considering various risks associated with policy options that are before the Commission, a mark-up rate that offers the highest return in the next 5-10 years and then gradually reducing the margins back to the current levels in the subsequent decade might be required to ensure that Canadians have access to a world-class communication system. The high-powered “glide path” that we propose would maximize the pace of creative destruction from legacy to next generation platforms in the short to medium term, while minimizing the potential for regulation to become a barrier to competition and innovation in the longer run.²

² The term “glide path” in this context refers to a policy strategy with a high-powered wholesale access price at the start to stimulate investment in next generation platforms and then reducing access/interconnection price on a clear and predictable schedule.

II. Fact v. Hyperbole

6. **State of the network and the impetus for reform:** The manner in which the Commission perceives the state of broadband connectivity in Canada is likely to be a critical factor in determining if there is a problem to be solved and how the solution should be fashioned. Knowing this, various parties have emphasized data points that support their private interest positions about what the Commission should or should not do, obfuscated the facts, and emphasized metrics of marginal importance in order to detract attention from key statistics about network quality and fibre diffusion. Others portray a very stark picture of the status quo, pointing out that service-based competition will be eliminated if the Commission fails to act with respect to mandated access to fibre access and transport facilities. Our submissions have instead documented that the quality of Internet connectivity Canadians can achieve in terms of average download speeds remains about average relative to other advanced/high income countries. We have not seen any credible evidence presented by other parties in their written or oral submissions that contradicts the fact that network outcomes in terms of download speeds in Canada are about average/mediocre relative to other high income countries. As fibre diffusion rates highlight, disincentives to deploy advanced fibre platforms also remain strong despite the clear commitment to forbearance in Telecom Decision 2008-17.
7. **Legal mandate and optimal risk management:** If average/mediocre is good enough, then doing nothing (i.e. retaining the Telecom Decision 2008-17 framework) might appear to be a reasonable outcome to this proceeding as any reform is inherently risky and known evils tend to be easier to manage than the unknown. However, doing nothing also involves inherent risks when we consider concerns about service quality and disincentives to deploy advanced fibre networks. The risk of maintaining the status quo arrangements with respect to transport facilities is particularly high for the 20% of Canadians that live in rural and remote areas of the country. To the extent that the Commission is committed to ensuring “Canadians have access to a world-class communication system”, simple regulatory reforms that we have proposed have the potential to increase the pace of progress in broadband network development in both urban and rural areas, while minimizing interference with the operation of market forces as required under the 2006 Policy Direction. Without reforms that stimulate private sector incentives to enhance network capacity and channel capital expenditures to deploying advanced fibre access networks, Canada is unlikely to catch up with leading countries in terms of connection quality and fibre diffusion anytime soon. This long term scenario would not be consistent with the Commission’s statutory mandate under Section 7 of the Telecommunications Act or its stated commitment to policies that ensure Canadians “access to a world-class communications system”.
8. **The denial strategy:** At least since the 2010 Digital Strategy Consultation Paper federal policymakers have recognized the average/mediocre performance of broadband networks available to Canadian households and businesses. More important than international rankings, the gap between the quality of broadband networks experienced by Canadian relative to their counterparts in other advanced economies remains substantial (2-3 times

in terms of download and 5-7 times in terms of upload speeds). Evidence supporting these facts has already been submitted to the record and discussed in detail at the oral hearing. Nevertheless, some entities that have appeared before you (e.g. Bell, Bell Aliant, Telus) continue to deny there is any problem to be solved, and argue that the Commission should retain the current regulatory strategy or delay decisions about extending mandated access to fibre access and transport facilities. To counter this class of claim and provide the Commission with a simple overview of the magnitude of the problem in terms of actual network quality, Figure 1 presents a visual depiction of data we have already submitted to the record on the evolution of download speeds across two sets of leading and lagging clusters of advanced economies, including Canada. Canada is clearly in the lagging cluster of advanced economies based on this and other broadband speed testing methodologies that we have studied and discussed in our previous submissions in this matter. Notably, broadband performance as experienced by Canadians is also lower than in some large middle income countries such as Russia where the public sector has taken an active role in broadband infrastructure development. The fact that lower income countries are now beginning to pass Canada in network infrastructure quality raises serious concerns about the capacity of the current policy regime to achieve its international competitiveness mandate under Section 7 of the Telecommunications Act.



Data from Net Index by Ookla Last updated: Mar 3, 2014

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9. **Rebuttal to the denial strategy:** In contrast to cable network providers who appear to be increasingly accepting of a stable and predictable essential facilities regime at the right price, at the oral hearing operators of legacy DSL platforms continued to deny well-documented concerns about the quality of services they provide to end users and the pace of progress in network development that motivate our recommendations. Consequently, it is imperative to challenge assertions of those who deny evident concerns about network quality and technological change in order to influence your decision in this matter. As an illustrative example we focus on assertions by Telus in their oral reply, but the same basic logic applies to similar arguments from other representative of this class of firms which essentially presented the Commission with similar arguments. At the hearing Mr. Woodhead from Telus asserted to the Commission that “contrary to the assertions of some parties there is simply no problem to solve when it comes to Canadian broadband”. This conjecture was then justified by Dr. Crandall who pointed to Canada’s relatively high telecom investment rates, high degree of platform competition, and “very fast broadband service” now available to Canadians. We confirm past success in terms of relatively high investments and platform competition among legacy DSL and cable operators in Canada, but cannot validate the idea that broadband connectivity is “very fast” relative to other high-income countries. Our research points out that what is particularly puzzling about the evolution of the Canadian system is that relatively high capital expenditures and inter-platform competition among legacy operators have not led to the development of relatively high quality broadband networks.³ Having studied the evolution of actual (versus advertised) network performance measurements in Canada and internationally using a variety of sources and testing methodologies, we cannot confirm the assertion that Canadians are using “very fast broadband service” in terms of upload or download speeds. Moreover, as depicted in Figure 1 above, the magnitude of the gap in download speeds between Canada and the leading cluster of advanced economies has been increasing over the past few years. Canada is clearly not in the leading cluster, a point that must be acknowledged to inform business or policy decisions that help ensure Canadians have access to a “world-class” communication system.
10. **Rebuttal by Canadian business:** Conjectures by Telus and other parties that there is no problem to be solved also stand in sharp contrast to evidence from the business community submitted to the record by the Canadian Federation of Independent Business (CFIB). Since CFIB did not appear at the hearing we fear their valuable evidence might get overshadowed by other perspectives. We think it is therefore important to reiterate their point to counter arguments for complacency or delay. According to surveys of small and medium sized companies in Canada submitted by CFIB to the record in their first round intervention to this proceeding (par. 4), around half of Canadian businesses were somewhat or very dissatisfied with their competitive options for provisioning Internet access services. Notably, the proportion of businesses that were very dissatisfied with their competitive options for Internet access services grew substantially between 2008

³Rajabiun, R. & Middleton, C. (2013). Multilevel Governance and Broadband Infrastructure Development: Evidence from Canada. *Telecommunications Policy*. 37(9), pp. 702-714.

and 2012. This type of valuable survey data is important for confirming insights from international indicators of Canada's comparative decline as a broadband leader. Although network operators might think they are doing a good job and there is no problem, evidence suggests that individuals and organizations that rely on Internet connectivity for business applications increasingly disagree. The fact that business dissatisfaction with the operation of the retail Internet access market has grown since the implementation of the Telecom Decision 2008-17 represents another important signal to the Commission about the effectiveness of its current approach and the impetus for reform. According to CFIB this state of affairs is particularly problematic for businesses in rural areas, another important issue that proponents of the status quo approach chose to ignore in their representation to the Commission.

11. **Investment inputs v. network outcomes:** In addition to using data on advertised speeds to attribute lack of investment in fibre access networks to a lack of demand by consumers, proponents of keeping the 2008-17 regulatory framework also appear to be confused about input and market outcome indicators when discussing international evidence. As an illustrative example, testifying for Bell and Bell Aliant, Drs. Hann and Renda argued that the European experience suggests that “Canada ought to think very carefully before it regulates further in this sphere because we don't think it would be good for consumers”. This assertion is based on studies that focus on the links between the density/intensity of regulatory obligations on telecom investment levels in Europe. Our work confirms the results of this class of studies about the negative correlation between capital expenditure levels and regulatory intensity in Europe.⁴ However, we take the issue one step further and show that higher levels of capital expenditures do not necessarily translate into higher network quality or the diffusion of next generation platforms. Our analysis of the European experience highlights that countries with regulatory regimes that were more effective in promoting service-based competition have developed relatively higher quality networks and are further along in the transition from legacy to next generation networks (i.e. higher rate of creative destruction from sunset to sunrise platforms). Emphasis on how much investment made, or not made, if the Commission reforms the wholesale regime, represents a common theme in attempts by certain companies to influence your decision in this matter. We submit that regulations that enhance the productive and allocative efficiency of investments are likely to be more appropriate given that telecom capital expenditure levels in Canada are relatively high, but these investments are not translating into relatively high quality networks or advanced fibre access networks.
12. **Anecdotal v. systematic evidence:** Dr. Renda also stated that “leading countries around the world that have actually deployed fibre-to-the-premises are all countries in which there has been no mandated access one way or the other. I'm talking about the United States, South Korea, Japan, although historically Japan is a bit more complicated. I could

⁴ Rajabiun, R. & Middleton, C. (2015). Regulation, Investment and Efficiency in the Transition to Next Generation Broadband Networks: Evidence from the European Union. *Telematics and Informatics*. 32(2), pp. 230-244.

get further into this.” With respect to the three specific examples noted by Dr. Renda, we explain below why we disagree with his interpretation in the context of this proceeding about wholesale access regulation in Canada.

13. **Relevance of the U.S. policy model:** Most of the data and arguments that you heard about continuing the 2008-17 forbearance strategy build on perceived success of the U.S. experience with forbearance and fibre diffusion. These parties do not appear to recognize that having replicated FCC’s forbearance strategy in CRTC Telecom Decision 2008-17, the same policy model does not appear to have worked as well in Canada in terms of promoting investment in fibre. In the U.S. some legacy operators have taken advantage of forbearance and have been much more innovative than their U.S. and Canadian counterparts in deploying next generation fibre platforms (e.g. Verizon). The fact that similar policies appear to have generated different results highlights the importance of local market and institutional factors in shaping the interplay between public regulation and business strategies of operators. For example, the U.S. is a much bigger market than Canada, with larger firms that are more efficient than their Canadian counterparts due to scale economies. They can therefore raise capital to fund deploying advanced networks at lower prices than their smaller counterparts in Canada. Furthermore, the larger size of the market allows entrants and specialized firms to gain sufficient scale and thus address market failures in situations where the incumbents do not choose to invest. Due to such differences it is not surprising that replicating a model that might seem reasonable in a large market such as the U.S. does not appear to have worked very well given specific conditions in Canada. Additionally, it is important to note that while U.S. fibre diffusion rates are higher than Canada, they are still only about half the OECD average⁵ and U.S. average connectivity speeds are only slightly better than Canada (see Figure 1 above). These considerations cast further doubt on the effectiveness of the U.S. regulatory strategy and its relevance as a policy model for smaller jurisdictions such as Canada to emulate.
14. **Relevance of the Korean model:** The South Korean approach to promoting network development is useful to analyze because it has a unique history. In contrast to U.S. and Canada which emphasized service-based competition in the 1990s and moved to policies aimed at promoting platform competition and investment in the 2000s, Korea sequenced its development policy by first investing public funds in infrastructure and then opening emerging high-capacity access and transport facilities to service-based competition.⁶ While Korea did not adopt local loop unbundling in the traditional sense in which it is understood in North America and Europe, it instead encouraged competition and investment through other means (e.g. subsidies for open access backbone/transport facilities, deploying fibre in apartment complexes and opening each building’s network to

⁵ OECD (2013). Broadband Statistics. <http://www.oecd.org/sti/broadband/oecdbroadbandportal.htm>

⁶ Choi, S. (2011). Facilities to service based competition, not service to facilities based, for broadband penetration: A comparative study between the United States and South Korea. *Telecommunications Policy*, 35(9), 804-817.

encourage retail competition, etc).⁷ Consequently, the Korean experience does not suggest mandated access is bad for network development and indeed highlights the importance of a multipronged strategy of addressing market failures in digital infrastructure development with policies that promote risk sharing and service-based competition. The Korean experience suggests that policies that promote investments in upgrading last mile links to fibre and opening them up to service-based competition and innovation might be critical in the diffusion of next generation networks. Nevertheless, many of the varied policy instruments used in Korea are not within the purview of this proceeding or the authority of the Commission. Even though instruments such as subsidies are not available to the Commission, well-designed wholesale access obligations that encourage investment in sunrise platforms might be able to help achieve the same objectives in a more cost effective and efficient manner.

15. **Relevance of the Japanese model:** Much like Korea, the Japanese government has also employed industrial subsidies and tax breaks to encourage access and transport network development. However, it has also combined these policies with a pro-competition unbundling policy on copper and a pro-investment fibre access policy since the early 2000s.⁸ In practice this strategy was achieved by initially setting the price of unbundled fibre loops at around 5 times that of copper connections.⁹ The low price of unbundled fibre led to a rapid loss of market share of the incumbent (Nippon Telegraph and Telephone Corporation, NTT) on legacy platforms to emerging service-based competitors. In combination with this loss of market share on legacy networks a relatively high regulated price for access to unbundled fibre generated strong incentives for NTT to deploy fibre in the mid to late 2000s to customer premises. As this high-powered approach succeeded in establishing NTT as the dominant operator of fibre networks and costs of deployment have been amortized, the Japanese government has gradually reduced regulated access prices to the new infrastructure in order to promote service-based competition and innovation on the high-capacity fibre network that is now near ubiquitous in Japan. The experience from Japan lends support to the proposal that we have submitted to the Commission in this matter to include fibre access and transport facilities within the scope of the obligations and employ a pricing strategy that encourages incumbents and potential entrants to deploy next generation fibre networks. However, as detailed in the subsequent section when we discuss various options for implementing our proposal, our proposal accounts for the key weakness of the Japanese approach by recommending that the Commission adopt a clearly predefined approach to wholesale regulation that initially provides a strong market incentive to invest in next

⁷OECD (2013), “Broadband Networks and Open Access”, OECD Digital Economy Papers, No. 218, OECD Publishing. <http://dx.doi.org/10.1787/5k49qgz7crmr-en>

⁸ Minamihashi, N. (2012). Natural monopoly and distorted competition: Evidence from unbundling fiber-optic networks (No. 2012-26). Bank of Canada Working Paper. <http://www.bankofcanada.ca/wp-content/uploads/2012/08/wp2012-26.pdf>

⁹ Albert Domingo, Marlies Van der Wee, Sofie Verbrugge & Miquel Oliver (2014). Deployment strategies for FTTH networks and their impact on the business case: A comparison of case studies. International Telecommunications Society, 20th Biennial Conference, Rio de Janeiro, Brazil. <http://itsrio2014.com/theprogramme.html>

generation networks with a mark-up rate that is higher than those on legacy platforms, and then gradually reducing it in the longer term in order to minimize the potential for it to become a barrier to competition and innovation.

16. **Capital allocation and fibre diffusion:** Some parties to the proceeding suggested that deploying fibre is very costly and risky. However, we also heard from Bell that for aerial distribution plant, the cost of fibre is nearly equivalent to the cost of copper, with the added advantage that fibre provides an operator with a technologically future proof distribution network providing a platform with higher capacity, greater flexibility to provide advanced services, and lower operating costs. Importantly, there also appears to be a substantial marketing edge to branding a service as a fibre based service (e.g. “Fibre”, “Optik”, “FiberOp”). Generally speaking, this has led to incumbent carriers to choose to upgrade their end-of-life copper networks with fibre and in specific markets choosing to overbuild their FTTN networks with fibre in order to gain a competitive advantage (Quebec City, Halifax). These considerations indicate that revenue performance and margin performance will be enhanced at lower risk by deploying more fibre than by deploying copper replacement/upgrades. That said, accelerating the overbuild of existing legacy copper broadband networks with fibre would lead to an increase in capital requirements. The implication is that by accelerating fibre deployment an operator can become more efficient and potentially reduce its weighted average costs of capital once the initial investments are made as the company’s business will now have less risk associated with it. This strategy has notably been pursued by Verizon Communications Inc. which has aggressively overbuilt the majority of its copper network with FTTH over which it provides all its services under the brand name FiOS. This discussion runs against the grain of the arguments that you have heard attributing disincentives for fibre diffusion to its risky nature. In the long term fibre is the more efficient and least costly option for carriers to pursue to prevent the decline in market share to cable providers.
17. The rate of deployment of the sunrise platform is also restricted by competition for available capital at a carrier that needs to target generating sufficient cash flows to support capital expenditures in multiple areas including the more profitable wireless segment, spectrum, the strategically important media and data center segments, funds for debt reduction incurred to fund acquisitions, and support relatively large dividends which are growing. We note in particular that the Canadian industry is highly concentrated and vertically integrated, with investment by operators in spectrum, wireless, network upgrades, data centers, and media all coming at the expense of upgrading the network to fibre. In this light, one can understand how the high and increasing degree of horizontal and vertical integration by Canadian operators over the past decade has limited their capacity to deploy their scarce capital resources to building next generation fibre networks Canadians demand.¹⁰ It is also important to note that even within Canada there

¹⁰ It is precisely for this reason that research on European telecoms suggests structurally/functionally separated network operators tend to be around 20% more efficient than their vertically integrated counterparts. Buno, Clementinca (2012). Vertical and horizontal integration in public utilities. Evidence

are considerable differences in the extent to which fibre has been deployed among carriers. It is curious to note that Bell Aliant, which did not have material wireless or media assets, deployed fibre far more extensively than Bell Canada (which has invested heavily in wireless, spectrum, media, and data centres) or Telus (with extensive wireless assets and data center assets). To gain further insights into why Canadian operators have not deployed fibre more extensively, detailed analysis of confidential segmented information filed by the carriers would be required. If these operators do not innovate soon and transition to fibre, their weighted average cost of capital will continue to go up. We don't see any reason why Canadian households and businesses should pay for decisions by a small number of dominant firms that have failed to take advantage of cost and risk reductions that can come from moving from legacy to advanced fibre technologies.

18. **Platform competition:** Given Commissioner Menzies' questions to us regarding disincentives for fibre diffusion, we elaborate on the issue further. From the financial perspective of incumbent operators, upgrades of more modern copper plant are generally more difficult to justify (the cost of VDSL2+ on top of existing copper tends to be lower than a FTTH rebuild since FTTH requires investment in a distribution plant). This distinction can for example explain why firms with older aerial plants such as Bell Aliant have had stronger incentives to deploy fibre than their counterparts with more modern copper plants (Bell, Telus). That said, if the VDSL2+ plant is going to be competing against a cable DOCSIS 3 plant, then deploying fibre when upgrading the network is more likely as it accounts for the risk facing DSL operators that DOCSIS 3 plants will allow cable competitors to gain further market share and/or charge premium prices. The loss of market share by incumbent DSL operators to cable network operators that have deployed DOCSIS 3 can be partly attributed to their unwillingness to accelerate fibre deployment in the face of competition from higher quality/faster offerings by cable companies. In addition to providing a high rate of return through the mark-up rate on advanced fibre networks, the Commission could decrease available wholesale mark-up rates on legacy copper builds. This would increase incentives for operators of older copper plants to decommission and replace them more rapidly with next generation fibre platforms.
19. **Payback on fibre:** You have also heard the claim that fibre is expensive to deploy and the payoff period is too long to make it financially justifiable to capital markets (e.g. Bell, Telus presentations). To verify this claim we have explored some available estimates of costs and payoff periods to fibre deployments in both urban and rural settings. There is significant variation in the range of cost estimates of both pass through and connecting homes across various international examples of fibre deployment.¹¹ Even with the highest estimates that we have seen (New Zealand at approximately \$3500 per connection) the

from telecom EU operators and Italian water regulatory agencies. (Doctoral dissertation). Università degli studi di Bergamo. Dipartimento di Ingegneria gestionale, Dalmine, Italy. Retrieved from <http://hdl.handle.net/10446/26697>

¹¹ See Domingo et al. (2014). Supra note 9.

payoff period does not seem unreasonable (less than 10 years in Canada, assuming that end users are willing to pay the same \$35 average subscription price for fast and symmetric fibre networks that they are now paying for connections on legacy platforms). At the lowest end of the cost spectrum (NTT in Japan with approximate costs of \$400 per connection fibre deployment, including both pass-through and last mile links), at the current Canadian market prices the payoff period would be less than one year. More realistically, the average per connection cost (including both pass through and last mile links) across available estimates seem to converge to around \$1000. At this rate the payoff period in Canada to investing in fibre would be less than 3 years, only if one could access local structures and backhaul transport facilities at a reasonable price. Furthermore, in terms of rural deployment, technological advances in designing fibre and hybrid fibre/wireless networks for places with low population densities and challenging terrains make them increasingly affordable, reducing the payback period to around 8 years.¹² While this estimate might be relevant for servicing 20% of Canadians that live in rural and remote areas, for the more than 80% of Canadians that live in low cost urban areas the estimated fixed cost of around \$1000 and payback period of around 3 years might be realistic. Incentivizing incumbents and potential entrants to take advantage of these financial opportunities represents the least cost and potentially most effective approach for the Commission to ensure that Canadians have access to a “world class” communication system in the not so distant future.

20. **Cost variation on legacy platform:** Mr. Englehart of Rogers emphasized an important point that we think is relevant in the context of claims by legacy DSL operators and the approach we have proposed for reforming the wholesale regime. Rogers suggested that DSL operators have managed to get from the CRTC higher wholesale prices on various facilities than regulated prices cable companies are able to charge. From an economic perspective this is of particular concern since such a pricing strategy can serve as a form of regulatory protection for relatively lower quality/speed copper plants against competition from relatively faster DOCSIS 3 networks of cable operators. If such a policy is indeed in place, it would further help explain why Canadian DSL operators appear so complacent and have not taken advantage of the CRTC’s forbearance policy under the 2008-17 to deploy fibre. Such a policy distorts competition and should be reversed. If anything, due to the relatively higher quality of services cable operators can offer they should be getting rewarded more for their innovation than firms that have become complacent with the free cash flows (FCF) they generate on legacy copper platforms.

¹² Alcatel-Lucent (2012). Rural Broadband Financial ModelingL Rapid Business Case Assessment for Local Governments Seeking Alternative Approaches. http://www3.alcatel-lucent.com/belllabs/advisory-services/documents/Rural_Broadband_Financial_Modeling_EN_Market_Analysis.pdf

III. Options and Predictions

Based on questions Commissioner Menzies asked us about the implementation and implications of our proposal, as well as evidence and recommendations by other participants in the proceeding now on the record, this section outlines various options that are before the Commission. We document a number of variations on the general regulatory strategy that we have proposed in order to promote incentives for operators to invest in broadband infrastructure capacity and next generation platforms Canadians demand. Given the Canadian experience since the implementation of Telecom Decision 2008-17 and publicly available data on the record, we discuss likely implications of the range of choices before the Commission. It is imperative to reiterate that various policy options before you in this proceeding, including doing nothing, involve certain risks, which we discuss below. Please note that these options are mutually exclusive. To maximize the pace progress in network development we recommend option 4.

21. **Option 1. Delay a decision:** Various parties, including the Competition Bureau, have argued that the Commission should just delay making a decision in the matter of mandated access to fibre access and transport facilities and instead wait for the results of further studies, pilot projects, or data on future success in terms of fibre diffusion. We submit that there is already a clear evidentiary basis reflecting concerns about the state of the network emphasized by the vast majority of interveners in this proceeding. Delaying a decision about the regulatory environment for the operation of the wholesale market is likely to only increase uncertainties facing private sector entities and lower levels of government who are aware of market failures under the current regime and may have the capacity to do something about it.
22. **Option 2. Commit to forbearance:** Given the experience under the 2008-17 framework, it does not seem likely that commitment to forbearance or even rolling back some of the existing wholesale obligations as suggested by some parties, is likely to help Canadian operators catch up with their counterparts in leading countries. However, relative to a delaying strategy, a clear commitment to what we already have might be better because it would at least clarify the extent to which the Federal government is committed to ensuring Canadians have access to a “world-class” communications system. Reducing regulatory uncertainty this way could send a clear signal to provinces, municipalities, and other entities concerned about digital infrastructure quality that they must fashion their own solutions. Nevertheless, it is important to reiterate that evidence submitted to the record by us and various other parties about the evolution of connectivity in Canada suggests that a lack of access obligations on fibre access and transport facilities is not necessarily conducive to their development. Under such a policy choice and if the slow pace of transition to fibre that we have experienced in the past few years continues, Canada would reach fibre diffusion rates around what is the current average for OECD countries sometime between 2025 and 2030 (i.e. around 15-20%). If such a trajectory is not good enough, then we urge the Commission to search for more innovative solutions to increase the pace of progress in network development and incentives for fibre diffusion. Furthermore, a continuation of the 2008-17 forbearance strategy is likely to

further limit the capacity of service-based competitors to serve Canadians who are not served very well by dominant legacy network operators.

23. **Option 3. Mandate access to fibre on the same terms as legacy platforms:** Under your probative questions, both cable network operators and members of CNOOC appear to have recognized that adopting a clear and stable regulatory regime that compensates risky investments in FTTP and FTTN infrastructure would be in the interests of market participants. In its closing remarks CNOOC proposed including fibre access in the regulatory framework, but to incorporate any additional investment risks it might have for providers in the weighted average cost of capital component in the Phase II costing methodology. While we think this is a good start, as noted accelerating fibre deployment could actually reduce the weighted average cost of capital in firms that choose to be more innovative and employ technological advances to reduce costs. Even if this were not the case and deploying fibre is risky as some claim, then we think including a higher margin on new platforms in the opaque Phase II cost calculation is not going to send a very informative signal to investors that Canada is open for investments in fibre networks and offers a good wholesale return to firms that will build them. The proposed approach by CNOOC might help stimulate service-based competition, but it is not likely to have a very strong positive effect on incentives to invest in fibre access and transport facilities. Consequently, we maintain that our proposal for incorporating a higher mark-up rate on fibre still remains the most effective approach to increasing investment incentives and the pace of creative destruction from sunset to sunrise platforms.
24. **Option 4. Mandate access with a high-powered incentive scheme (i.e. “the glide path”):** As a high-powered alternative to the proposals that we expected various parties to submit to the Commission, in our previous submissions we have outlined a unique solution that aims to balance competing objectives of market participants and align them with those of Canadian consumers. Specifically, we proposed including fibre access and transport facilities within the scope of the regulatory regime, but allowing potential investors a “more than reasonable” rate of return on investment. Despite questions from CNOOC and Rogers in the earlier stages of the process, we did not want to get into the details of the pricing strategy until the Commission first determines if the current state of the network is good enough and if something should be done about it. Given questions from Commissioner Menzies at the hearing, below we specify variations on our high-powered glide path to employing wholesale access regulation to enhance the pace of transition from legacy to next generation fibre networks over the next 15 years. The objective of our proposal is to help Canada catch up with the leading cluster of advanced economies in terms of the quality of Internet access services operators are able to deliver individuals and businesses in the not too distant future.
25. **Variation on Option 4:** As a starting point for the analysis, consider the example of the Japanese approach to unbundling and differentiated pricing discussed above in response to a comment by Bell’s representative. The access price to fibre was set at a five times multiple of the wholesale price for unbundled copper, leading the Japanese incumbent (NTT) to rapidly decommission the old and move to the new. However, the high mark-up

became a barrier to competition over time and has resulted in the rise of private wholesale transactions at market prices below the regulated price of unbundled access to fibre. To avoid the mistakes of the Japanese model and maximize the likelihood that our plan promotes investment in fibre and does not become a barrier to competition, adopting a clear pricing schedule that allows for a very high margin on wholesale fibre in the first five years of the proposed strategy and then reducing it to the current level of 15% that is available on legacy platforms represents a baseline option.

26. Given the current 15% mark-up level adopting a large price multiple like Japan would likely not be feasible or desirable in Canada since that would yield a 75% mark-up on FTTP. A gap in the regulated price of around two times the current 15% rate on legacy platforms would yield a target fibre wholesale mark-up rate of 30%, which should be attractive to most domestic and international investors. This mark-up level would enhance the appeal of upgrading legacy copper plants to incumbent platform operators, and if the incumbents choose not to act, clear and predictable essential facilities obligations on local access and transport facilities could increase the threat of entry by others. If the Commission decides that a multiple of two is not sufficient, it could also reduce the mark-up rate on legacy platforms. This larger gap would further enhance incentives to decommission the old and replace it with the new. This analytical framework provides a menu of options to choose from within the general regulatory approach proposed to enable the Commission to influence the private sector investment and competition incentives that will ultimately determine the pace of progress in network development in the future.
27. If the Commission chooses the policy strategy that we have recommended, we suggest adopting a clear timetable that provides stronger short term incentives to deploy fibre (e.g. 30% until 2020), and reducing this mark-up incrementally over time so that it does not become a barrier to competition and innovation (e.g. reduce mark-up by 5% every 5 years). Given that the Commission already allows for privately negotiated agreements at prices below the regulated price, it is unlikely that our proposed approach will interfere with the operation of market forces as mandated under the 2006 Policy Direction. If the Commission wants to reduce investments in legacy copper and cable plants even more, perhaps to further increase the pace of progress in fibre deployment, in addition to a high mark-up on fibre it could reduce the margin on legacy platforms (e.g. from the current 15% to 10 or 5). The general point is that by incorporating fibre access and transport facilities into the regulatory framework and optimizing regulated pricing across legacy and next generation platforms the Commission has the power to help promote the capacity of service providers to build and maintain the world-class communication systems Canadians demand. By not including fibre access and transport facilities in the regulatory framework (i.e. maintaining the 2008-17 regime), the Commission will give up the key policy instrument that it has available for ensuring that Canadians have access to a world-class communications system.

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