

Hudson, Heather E.; McMahon, Rob; Murdoch, Bill

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Beyond Funding: Barriers to Extending Rural and Remote Broadband

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Beyond Funding: Barriers to Extending Rural and Remote Broadband

Heather E. Hudson¹, Rob McMahon², and Bill Murdoch³

1. Introduction

Research on policies for providing broadband to isolated regions typically focuses on the need for infrastructure funding and various funding options. This paper postulates that infrastructure funding may be necessary, but is often not sufficient to install and operate sustainable broadband services in these regions. Specifically, we address other issues raised in recent Canadian regulatory proceedings concerning broadband funding, and evidence submitted by Indigenous and community broadband providers that serve remote communities in the Canadian North. From this analysis we identify issues in addition to funding for infrastructure that should be considered in policies designed to extend and operate reliable and affordable broadband and to facilitate provision of services by small and local providers.

For example, incumbents may state that they cannot afford to let third parties gain access to their poles or ducts in rural areas as the loss of user revenue would make the provision of services unsustainable. Alternatively, incumbents may charge rates for access to these facilities that make the costs to third parties too high for them to offer affordable rates to their customers. Yet there are more subtle ways to create barriers. An incumbent may delay approvals for access to poles or ducts to the point where the project is significantly behind schedule, and, in some cases, noncompliant with funding deadlines. Or the price charged for access may be increased from what was expected or shown in previous quotes, so that the project is significantly over budget. And if the poles need to be repaired or replaced to carry the additional strands, such as aerial fiber, who is responsible? Who bears the cost? Are there any deadlines to complete the work? Are the deadlines enforceable?

Of course, it is easy to say that although “The devil is in the details,” such details are beyond the scope of most policy makers. Yet from the point of view of an entity that has received public sector funds to upgrade or extend broadband infrastructure, these issues are critical. Unless they are recognized as crucial to the implementation of funded projects, these projects may be delayed or funds may be squandered.

We deliberately exclude from this analysis issues of sources of funding and financial sustainability. Our intent is not to minimize the significance of these issues but to focus on other

¹ Affiliate Professor and Former Director, Institute for Social and Economic Research, University of Alaska Anchorage. Contact: hehudson@alaska.edu.

² Associate Professor, Media and Technology Studies, Department of Political Science, University of Alberta. Contact: rob.mcmahon@ualberta.ca

³ IT Manager, Clear Sky Connections. Contact: bill@clearskyconnections.ca

elements that are often overlooked.

2. The Northern Context

Access to broadband is necessary to participate in the digital economy – for access to services such as education and training, health care, government programs and services, online banking, ecommerce, community development and small business entrepreneurship. These services are particularly important for isolated, primarily Indigenous communities across the Arctic and subArctic. In northern Canada, these settlements, ranging in population from a few hundred or fewer to a few thousand, typically have no year-round road access, and may be hundreds of kilometers from larger regional “hub” communities. Incomes are typically low or seasonal, and costs of living for housing, food and electricity are high.

Broadband availability is also limited in northern Canada. While 92 percent of all Canadian households had access to the target of 50 mbps or more, about 60 percent of Yukon and Northwest Territories (NWT) had access to these speeds (generally in larger, more accessible communities). Conditions are similar in northern regions of the provinces. However, in Nunavut, none of the households (all of which are served by satellite) have such speeds available.⁴ As in other remote and developing regions communications, providers are challenged by high costs, relatively low revenues, great distances, and in the North, difficult terrain and extreme climate.

3. Policy Research Themes

There are numerous funding initiatives to extend broadband to rural areas, and in some cases, to remote regions. In Canada, the Canadian Radio-television and Telecommunications Commission (CRTC) Broadband Fund and the issues it raised are the subject of this paper.⁵ Federal broadband funding is also available through Innovation, Science and Economic Development (*ISED*) *Canada’s* Connect to Innovate initiative, Infrastructure Canada and FedNor, while some other federal agencies such as Indigenous Services Canada (ISC) and Health Canada provide funds for specific regions or uses. Provincial and territorial governments in Canada also provide some funding to extend or upgrade broadband within their jurisdictions.

Other countries may also fund broadband through several agencies. In the U.S., the Federal Communications Commission (FCC) provides broadband funding for both infrastructure and operational subsidies, as does the National Telecommunications and Information Administration, (NTIA) in the Department of Commerce and the US Department of Agriculture (USDA), as well as some other federal agencies and state governments. Australia’s Regional Connectivity

⁴ CRTC (2020). *Communications Monitoring Report, 2020*, CRTC: Ottawa. Available at: <https://crtc.gc.ca/pubs/cm2020-en.pdf>

⁵ CRTC Broadband Fund: <https://crtc.gc.ca/eng/internet/internet.htm>

Program funds projects for unserved and underserved rural communities.⁶

Internationally, both the ITU and OECD identify some of the issues that we address in this paper. The ITU's Study Group Question 5/1 report makes recommendations on issues that we address below on facilitating installations:

- “Governments should make land available for installation of mobile towers and have clear policies and precision in the role of each government department in the document approval chain for facilitating installations....
- “Dig once” policies should be implemented in relation to the laying of fiber, in order to make the cost of installation affordable, while at the same time keeping service fees low.”⁷

The OECD's recently revised and updated Recommendation of the Council on Broadband Connectivity recommends that adherents take measures to reduce barriers to broadband deployment by through regulation and policies to enable infrastructure investment, while safeguarding competition and investment incentives, such as:

- a. “simplified licensing procedures, streamlined access to rights of way and public infrastructure and permits for network construction;
- b. facilitating access to passive infrastructure; and
- c. incentivizing communication network operators to co-operate in network development activities involving civil construction works in order to minimize costs, disruption, and environmental impacts.”⁸

We address these points highlighted by the ITU and OECD in our discussion below.

Another key theme in this paper is participation in policy-making and regulation, particularly by Indigenous representatives and organizations. In the context of telecommunications and broadcasting policy, there is a history of Indigenous advocates engaging in public proceedings to shape and re-shape policy and regulatory frameworks to address their self-determined priorities.⁹ Their work demonstrates innovation, interaction and collaboration

⁶ Government of Australia, Regional Connectivity Program: <https://www.communications.gov.au/what-we-do/internet/regional-connectivity-program>

⁷ ITU Study Group Question 5/1: “Broadband development and connectivity solutions for rural and remote areas.” Annual deliverable 2019-2020.

⁸ OECD, *Recommendation of the Council on Broadband Connectivity*, OECD/LEGAL/0322, 24 February, 2021.

⁹ Philpot, D., Beaton, B., & Whiteduck, T. (2014). First Mile challenges to last mile rhetoric: Exploring the discourse between remote and rural First Nations and the telecom industry. *Journal of Community Informatics*, 10(2)

McMahon, R., Hudson, H.E., & Fabian, L. (2017). Canada's northern communication policies: The role of Aboriginal organizations. In N. Mulé & G. DeSantis (Eds.), *The Shifting Terrain: Public Policy Advocacy in Canada* (pp. 259–292). McGill-Queen's University Press

Szwarc, J. (2018). *Indigenous Broadcasting and the CRTC: Lessons from the Licensing of Native Type B Radio*, CRTC: Ottawa. Retrieved from: <https://crtc.gc.ca/eng/acrtc/prx/2018szwarc.htm>

that take place both within and across regulatory/policy environments. In North America, it reflects a long tradition of comparative telecommunications policy exchange and analysis that Rajabiun and Middleton (2018) argue “offers a unique window into broader international debates about strategy and policy in the transition to next generation networks.”¹⁰

We also contribute to recent discussions of “co-creational” approaches to policy development, which argue that digital inclusion policies should be informed by direct and substantive engagement with affected groups¹¹. Research examines how advocacy groups work with responsive state-based institutions on shaping and reshaping policy to address the inequalities embedded in existing telecommunications policy structures.¹² However, this requires a degree of openness on the part of government institutions, which we recognize is not always the case; various factors can restrict the participatory parity of actors engaged in these processes. We note that in the North American context, public interest groups do have multiple opportunities to intervene in the policy-making process if they wish to do so, and highlight the participation of Indigenous organizations in the CRTC proceedings discussed in this paper.

We recognize that providing affordable and reliable broadband is critical for community development, which we have addressed in other research.¹³ Here, we focus on Indigenous provider issues, generally not been addressed in rural broadband research, which tends to highlight consumer and other user needs. Thus, we do not directly include affordability in this paper, but the conditions that providers, especially small and Indigenous ISPs, face in their efforts to control costs and thus minimize the prices they charge to their customers. We also recognize that economic development includes provision of local jobs, and therefore include a discussion of the need for publicly funded providers to train and hire local employees.

4. The Policy and Regulatory Context

¹⁰ Rajabiun, R. & Middleton, C. (2018). Strategic choice and broadband divergence in the transition to next generation networks: Evidence from Canada and the U.S., *Telecommunications Policy* 42(1): 37-50, p. 41.

¹¹ McMahon, R. (2020). Co-developing digital inclusion policy and programming with Indigenous partners: interventions from Canada, *Internet Policy Review*, 9(2); Robinson et al., (2020). Digital Inclusion Across the Americas and the Caribbean, *Social Inclusion*, 8(2): 244-259.

¹² Moran, R.E. & Bui, M.N. (2019). Race, ethnicity, and telecommunications policy issues of access and representation: Centering communities of color and their concerns. *Telecommunications Policy* 49(5): 61-473

¹³ Hudson, H. E. (2015). After Broadband: An Analysis of Organizational Use of Broadband in Southwest Alaska. Retrieved from https://iseralaska.org/static/legacy_publication_links/2015_06-AfterBroadband.pdf; McMahon, R., Hudson, H.E., & Fabian, L. (2017). Canada’s northern communication policies: The role of Aboriginal organizations. In N. Mulé & G. DeSantis (Eds.), *The Shifting Terrain: Public Policy Advocacy in Canada* (pp. 259–292). McGill-Queen’s University Press.

Regulation of telecommunications across Canada including the northern territories is the responsibility of the Canadian Radio-television and Telecommunications Commission (CRTC). The CRTC also provides some funding for broadband as discussed below. As outlined above, there are several other agencies that provide broadband funding. However, this paper focuses on the CRTC because, as the regulator, it has the task of determining how its mandate of broadband as a basic service for all Canadians is to be implemented. Also, its proceedings address issues beyond one-time infrastructure funding, as being relevant to achieving its goals. Finally, its proceedings include participation by Indigenous organizations, including Indigenous broadband providers, and their comments form part of the public record. Together these elements provide an opportunity to examine the challenges and potential solutions to extending and upgrading broadband in remote regions, and a participatory model including small and indigenous providers, for addressing them.

In April 2015, CRTC announced a proceeding “to conduct a comprehensive review of its policies regarding basic telecommunications services in Canada and of the telecommunications services that Canadians require to participate meaningfully in the digital economy.” It included an examination of how these telecommunications are used by Canadians to access “essential services”, what prices they should be expected to pay, and which areas are unserved or underserved. The Commission also stated that it would consider whether broadband should be considered a basic service available to all Canadians, and “what its role should be in ensuring the availability of basic telecommunications services, particularly in rural and remote regions of Canada.”

The proceeding also addressed whether a funding mechanism was required in the region of the incumbent telecommunications provider serving Canada’s northern territories and adjacent regions and “whether such a mechanism should be considered for other rural and remote areas in Canada.”¹⁴ It was noteworthy in its duration (more than 20 months from the original announcement until the decision, with multiple rounds of written submissions and three weeks of in-person hearings) and in the participation of several consumer representatives and Indigenous organizations including providers of internet services in Nunavut and in the northern regions of seven provinces, where most communities have no year-round road access. They pointed out not only the need for broadband, but the financial, technical, and other difficulties they faced in to serve their isolated communities. Several stated that federal funding was needed to extend broadband in these regions.¹⁵

In its decision after the hearing, the CRTC determined that broadband was to be considered a basic service available to all Canadians, and set targets for universal broadband at 50 mbps

¹⁴ CRTC. *Telecom Notice of Consultation CRTC 2015-134*. (2015) Ottawa, April 9.

¹⁵ FMCC proposed the “Northern Infrastructure and Services Fund” (NISF). See CRTC 2015-134, FMCC Final Comments.

download and 10 mbps upload speed. The Commission also recognized that public sector funding could be required to accomplish the goal of extending broadband to rural and remote regions.¹⁶

Some Indigenous and consumer organizations pointed out that market forces had not resulted in extending broadband facilities in much of the North.¹⁷ The Commission appeared to agree, stating that it would establish a new fund to extend and upgrade broadband for rural and remote regions. A total of C\$750 million was to be allocated over five years.

In 2018, the Commission initiated a follow-on consultation on how the fund was to be administered and on eligibility criteria for applicants.¹⁸ In its decision in September 2018, the Commission stated that it would manage the fund internally, and that it would use a “comparative process” to select applicants rather than a reverse auction, as some major carriers had proposed (with the lowest bid for subsidy selected for funding.) The fund requires comparative applications rather than a reverse auction and provides opportunities for participation by community and Indigenous providers. (While a debate about reverse auctions vs. “beauty contests” or other methods of selecting projects to fund is outside the scope of this paper, we note that Indigenous providers and some small ISPs and others serving the North opposed reverse auctions because they felt it would not be possible for them to participate, and that there would likely be no competition among ILECs to serve remote regions, and therefore no reason to go through an auction to award subsidies.)

Following this proceeding, the CRTC took the unusual step of publishing and requesting comments on a draft Application Guide for the fund.¹⁹ Several Indigenous and community providers and other small ISPs filed comments in the consultation process and on the draft Application Guide. Their submissions included references to barriers to implementing rural broadband networks even when funding was made available.

In 2019, the CRTC published a call for rural broadband infrastructure proposals and has since provided two rounds of funding. After reviewing comments from small and Indigenous providers who participated in the consultation, the CRTC then issued a request for comments on barriers to deployment of broadband, although this request was not made until December 2019,

¹⁶ CRTC. *Telecom Regulatory Policy CRTC 2016-496*. (2016) Ottawa, December 21.

¹⁷ First Mile Connectivity Consortium (FMCC) (2016) Testimony of the First Mile Connectivity Consortium (FMCC) in Telecom Consultation CRTC 2015-134. Retrieved from <http://crtc.gc.ca/eng/transcripts/2016/tt0411.htm>.

¹⁸ CRTC. (2018) *Telecom Regulatory Policy CRTC 2018-377*. Ottawa: September 27.

¹⁹ CRTC (2019) *Telecom Notice of Consultation CRTC 2019-45: Call for comments – Application Guide for the Broadband Fund*, March 18, 2019.

after the funding guidelines had been finalized and the call for proposals had been issued.²⁰ After reviewing the submissions, the CRTC stated that “many interveners raised the fact that untimely and costly access to poles is one of the most significant barriers to the deployment of broadband-capable networks in rural and remote regions of Canada.”²¹ It then issued a call for comments regarding potential regulatory measures to make access to poles owned by Canadian carriers more efficient.

The analysis below is based on the CRTC’s notices and requests for comments, submissions by Indigenous organizations, and CRTC decisions to date. We include recommendations developed in collaboration with Indigenous providers and discuss how these suggestions may contribute to ongoing regulatory/policy development in the context of addressing barriers to deployment in rural/remote regions.

5. Wholesale Access to Transport Services

Community and Indigenous service providers generally need access to fiber transport networks provided by ILECs where the cost of installing their own networks is prohibitively expensive. Facilities-based duplication is generally not feasible or very expensive in the Canadian North.

However, lease charges are generally very high, as regulation of wholesale fiber transport services has generally been forborne since 2011. This forbearance is based on the false assumption that all wholesale fiber facilities are potentially competitive. However, regulatory forbearance has not resulted in facilities-based competition in most rural and remote regions but perpetuated difficulties in access to these wholesale transport monopolies.²²

As a large competitive provider states “...where a service provider is attempting to negotiate access to wholesale transport services in a monopolistic wholesale market, negotiations may result in access being granted to the competing service provider, but only at monopolistic rates

²⁰ CRTC (2019). *Telecom Notice of Consultation CRTC 2019-406: Call for comments regarding potential barriers to the deployment of broadband-capable networks in underserved areas in Canada*, December 10, 2019.

²¹ CRTC (2020). *Telecom Notice of Consultation CRTC 2020-366: Call for comments regarding potential regulatory measures to make access to poles owned by Canadian carriers more efficient*, October 30, 2020, para 3.

²² Gauthier, N. (2014). Bolder aspirations needed to improve broadband connectivity in Canada’s North. *Northern Public Affairs*, 2(3), 62-64.

Hudson, H. E. (2017). *When Regulation fills a Policy Gap: Toward Universal Broadband in the Remote North*. Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2944295

Jevne, H. (2018). *Policy Approaches to Internet Access in Northern and Rural Canada*. (Unpublished master's thesis), University of Calgary, Calgary, AB, Canada. Retrieved from https://prism.ucalgary.ca/bitstream/handle/1880/109332/capstone_Jevne_2018.pdf?sequence=1

McMahon, R., Gurstein, M., Beaton, B., O'Donnell, S., & Whiteduck, T. (2014). Making information technologies work at the end of the road. *Journal of Information Policy*, 4, 250-269.

...”²³ For example, an Indigenous provider serving isolated James Bay communities states that it paid almost 50 percent more per MB to the ILEC in 2020, whereas the price of wholesale bandwidth has decreased dramatically elsewhere in the past decade.

Yet some incumbents claim that there is little demand for wholesale access for rural and remote communities. For example: “There is also no evidence that any demand for wholesale access exists in unserved or underserved communities to date or that there will be in the foreseeable future”²⁴ However, these providers were participants in the CRTC’s Basic Service hearings in 2015, when Indigenous providers and others that already utilize wholesale transport access from ILECs stated that they needed additional capacity to provide retail services in those regions.²⁵ More recently, these providers have witnessed demand for much more bandwidth for broadband services throughout their territories, exacerbated by increased use of online services during the pandemic. For example, the Indigenous provider serving James Bay now needs 10 GB circuits. Another provider has started to deploy an 800-kilometre fibre-optic network to remote communities, but until construction is complete, communities are dependent on heavily oversubscribed satellite links, and residents cannot access real-time applications that support telemedicine, distance learning and telework.

High prices for connectivity make it difficult for small ISPs to meet the connectivity targets set by the CRTC in its Basic Service Decision at affordable prices. An Indigenous provider serving northern Ontario communities states: “It is not possible to meet 50/10 [MB] service obligations with the current transport costs. The transport costs consume such a large disproportional share of the total costs to provide the service.”²⁶ [In 2016, after reviewing high-speed access rates for several ILECs and other providers, the Commission found proposed wholesale high-speed access rates “unreasonable”.²⁷ It therefore reduced the proposed interim transport component rate for a number of companies by up to 89 percent, and reduced proposed interim access component rates of certain companies by up to 39 percent. Subsequent to that ruling, the CRTC set final rates for aggregated wholesale high-speed access services in Telecom Order CRTC 2019-288.²⁸ However, that policy decision was recently reversed by the CRTC.²⁹]

²³ CRTC 2019-406 – Shaw Cablesystems G.P. Intervention, para 48.

²⁴ CRTC 2017-112 – TELUS Intervention, para 33.

²⁵ CRTC (2016). *Telecom Regulatory Policy CRTC 2016-496: Modern telecommunications services – The path forward for Canada’s digital economy*, December 21, 2016.

²⁶ CRTC 2019-406 – FMCC Final Reply Comments, para 9.

²⁷ See: <https://www.canada.ca/en/radio-television-telecommunications/news/2016/10/crtc-finds-proposed-wholesale-high-speed-access-rates-unreasonable.html>

²⁸ See: <https://crtc.gc.ca/eng/archive/2019/2019-288.htm>

²⁹ See: <https://crtc.gc.ca/eng/archive/2021/2021-181.htm>

In some cases, high rates charged by the incumbent to access facilities may result in a community seeking another solution. For example, in an Indigenous community in Quebec, the Band (local Indigenous government) signed a 20-year contract with the incumbent to connect several community service buildings to fiber optic networks. When the community requested adding two additional buildings to the network, it was quoted C\$15,000 per building. An Indigenous provider subsequently conducted its own engineering study and determined the cost to build a parallel fiber optic network connecting eleven buildings in the community would cost a total of C\$32,000,³⁰ and then installed the network.

Incumbents can also take an excessive amount of time to connect Indigenous providers to their transport services. For example, in Ontario, a large ILEC took more than two years to provide access to various circuits requested by an Indigenous provider.³¹

An ILEC transport network is installed to connect an otherwise unserved community is a defacto monopoly – and an essential service. The CRTC should therefore regulate wholesale transport pricing in the three northern territories as well as in Indigenous and remote regions of the provinces. Service providers that are building transport infrastructure using public funds, including the CRTC’s Broadband Fund, should be required to provide wholesale access to their networks as a condition for funding. Large incumbents should be required to offer 1 GB or 10 GB wholesale access to third-party organizations in a timely manner, and should be penalized for unreasonable delays.³²

6. Access to Support Structures

Access to existing support structures can be critical for extending and upgrading rural broadband. Among the issues noted by competitive providers (both major cable companies and small ISPs) are delays in getting necessary permits, high and/or changing pricing for access, and delays and costs in completing make-ready work such as repairing, anchoring or replacing poles.

As discussed above, there is an imbalance of bargaining power between the access seekers and controllers of support structures, which exert monopoly control over access to existing infrastructure. “Gatekeepers” of support structures also lack incentives to expedite permits and make-ready work, particularly when carriers are accommodating potential competitors, or when utilities have legitimate concerns regarding safety and internal approval processes.

³⁰ CRTC 2017-112 – FMCC Intervention, para 121.

³¹ CRTC 2019-406 – FMCC Intervention, para 45.

³² CRTC 2019-406 – FMCC Final Comments, paras 14-16.

6.1 Delays in gaining access to support structures

Delays in providing information about support structure access charges and in approving access can result in small providers significantly underestimating costs in funding proposals, and can make it impossible to meet project deadlines. Impacts on projects due to such delays can be enormous, particularly in regions of Canada with short construction seasons due to cold weather and limited periods for shipping equipment over ice roads (on frozen lakes and rivers). In several cases Indigenous providers have been forced to wait between 12 to 24 months to get a permit before construction work could begin, a delay that is compounded in regions with short construction seasons.³³

Where the CRTC has jurisdiction, it should specify deadlines for owners of support structures to provide information on costs of access to assets and other related costs. It should enforce timely issuance of access permits by support structure owners

6.2 Pricing of access to support structures

Pricing of access to support structures owned by incumbents can affect both the viability of small and Indigenous providers and the retail prices they can charge to their customers. At the construction phase of a project, these charges may consist of authorization fees, engineering charges, payment for repair, and maintenance – as well as ancillary costs such as snow removal. They may also include the cost to make any modifications to support structures so that they comply with regulations that the incumbent may have either neglected or ignored.

Attachment rates may be higher for utility poles than ILEC poles; in Ontario, prices for utility pole per annum almost doubled (an increase of 95 percent) from 2018 to 2020.³⁴ (These utility pole rates are regulated by provincial entities; we discuss these jurisdictional issues below.) An Indigenous provider stated that the high costs it had to absorb affected its ability to provide affordable services to remote communities: “The issue isn’t whether we can access the poles...it’s whether we can afford the 100 percent increase in attachment fees”³⁵ without increasing proposed broadband rates to customers in remote low-income communities.

An organization of independent providers stated that the utility pole rental rate had “quickly and perversely doubled” in the past few years, resulting in a material blow to the operating expenses of all carriers that use the poles, with the notable exception of incumbent

³³ CRTC 2020-366 – FMCC Intervention, para 21.

³⁴ *Report of the Ontario Energy Board: Wireline Pole Attachment Charges*.³⁴

³⁵ CRTC 2020-366 – FMCC Intervention, para 54.

ILEC.³⁶ A major cable competitor stated that the rate to attach to a pole owned by the electric utility was almost four times as much as to access an ILEC-owned pole.³⁷

The same rate is typically charged regardless of the condition of the support structures. An Indigenous provider in Quebec stated that whenever the staff go into communities, they discover poles are often old and poorly maintained. According to Indigenous providers in Quebec and Ontario, it appears that in some cases the ILECs do not even know the condition of the poles in the communities.³⁸ As one Indigenous provider asked: “If a pole is 50 years old, should rent still be charged and collected?”

Where the CRTC has jurisdiction, it should require information regarding the costs for all aspects of the use of support structures to be clearly and simply stated, predictable, and transparent to third party users – and in particular, small and non-profit providers. Tariffs need to be clear, comprehensive and fair to all parties, without hidden or excessive additional charges.³⁹

6.3 Make-ready issues

Applicants for access to support structures may find that they have not been adequately maintained, or are otherwise not ready for attachments of the providers’ equipment. The need to complete make-ready work may result in delays as well as disputes over which entity should pay for repairs and upgrades. . For example, in one case a permit was not granted sooner by the support structure owner because it was the only authorized entity to conduct repairs. Despite repeated requests, the owner took a year to complete the work, and the leasing organization paid for it to be done.⁴⁰ Typically, there is no incentive for the incumbent to expedite this work.

In the U.S., in 2018, the FCC adopted a One Touch Make Ready (OTMR) principle to help expedite extension of broadband “whereby the attacher, who has the incentive to move quickly, is able to perform simple make-ready work in the telecommunications space on a pole, subject to notice requirements and other safeguards needed to ensure the quality of the make-ready work.” The FCC states:

“. . . new attachers are not responsible for the costs associated with bringing poles or third-party equipment into compliance with current safety and pole owner construction standards to the extent such poles or third-party equipment were out of compliance prior

³⁶ Independent Telecommunications Providers Association: *Submission to Call for comments regarding potential barriers to the deployment of broadband-capable networks in underserved areas in Canada – Telecom Notice of Consultation CRTC 2019-406 – Public Record 1011-NOC2019-0406* (7 May 2020).

³⁷ Telecom Notice of Consultation CRTC 2019-406 – Call for comments regarding potential barriers to the deployment of broadband-capable networks in underserved areas of Canada – Rogers’ Intervention (7 May 2020).

³⁸ CRTC 2020-366 – FMCC Intervention, para 34.

³⁹ CRTC 2020-366 – FMCC Final Comments, para E7.

⁴⁰ CRTC 2019-406 – FMCC Intervention, para 101.

to the new attachment. Although [pole owners] have sometimes held new attachers responsible for the costs of correcting preexisting violations, this practice is inconsistent with our long-standing principle that a new attacher is responsible only for actual costs incurred to accommodate its attachment.”⁴¹

OTMR appears to be an appropriate solution to make-ready issues in Canada. However, criteria for OTMR should be set and enforced by the Commission, not by an ILEC, as one Canadian ILEC has proposed. Owners of support structures should maintain clear and current information on the state of their infrastructure, and be required to make publicly available associated costs to repair/maintain it, which should be subject to review by the CRTC..⁴²

6.4. Dig once

Support structures for broadband include not only poles and towers, but also conduit. Public funds for infrastructure projects such as road construction or upgrades should require the installation of conduit for fiber and other infrastructure, with access ducts for additional providers. Public sector funders and regulators should point out to other infrastructure funding entities that this approach will result in overall cost-savings of public funds. For example, the CRTC should endorse a ‘dig once’ policy in collaboration with other infrastructure developers, such as governments, utility companies, Indigenous governments, and road builders.⁴³

6.5 Reserving space for future use

While incumbents often conclude that there will be little future demand in remote and Northern regions, they may also decide to reserve pole or conduit space for future upgrades or replacements. An independent provider stated “We have ... experienced situations where an ILEC claims no spare capacity due to future use requirements, only to discover later that the capacity had never been used. There are currently no requirements that outline when a support structure owner can claim future use, nor are there any enforcement or recourse mechanisms that can be used for when capacity reservations go unused... Allowing ILECs to reserve capacity for future use gives them priority access over the support structure, providing them a competitive advantage and the ability to slow down the expansion plans of their direct competitors. Furthermore, the ability to reserve unlimited future use eliminates the incentive for ILECs to ensure they are managing their support structures efficiently.”⁴⁴

⁴¹ Removing Barriers to Infrastructure Investment: Third Report and Order and Declaratory Ruling” FCC 18-111, WC Docket No. 17-84, WT Docket No. 17-79, August 3, 2018, para. 121

⁴² CRTC 2020-366 – FMCC Final Comments, paras E15-17.

⁴³ CRTC 2020-366 – FMCC Intervention, paras E33-35.

⁴⁴ CRTC 2020-366 – Eastlink Intervention, para 3.

The result may be greatly increased costs for third party providers who may have to install additional (and redundant) support structures. To address this issue, incumbents should be required to reserve pole or conduit space for future upgrades or replacements for no more than five years, after which access to poles should be on a “first come, first served” basis. Any applicant for access to the pole should be required to install its equipment within a specified period such as two years, after which it would need to reapply for access.⁴⁵

7. Spare Capacity and Scalability

While Indigenous populations in Canada’s North are a small percentage of the total Canadian population, they are also the fastest growing. Households are often large, with growing demand for more bandwidth. Networks must be built so that they can scale to accommodate more users and/or more bandwidth-intensive uses. Northern ISPs have already found that some incumbent fiber and microwave backbone (or middle mile) networks have no additional capacity available. For example, in northern Ontario, one ILEC’s engineering of a fiber backbone did not anticipate residential and anchor institution demand. Accordingly, five years after lighting up the backbone, its electronics have reached end-of-life.⁴⁶

Optical fiber networks built using public funds should include additional capacity in the form of “dark fiber” that may be leased and activated in the future. An incumbent challenged this proposal which it characterized as “carriers who build dark fiber be required to build for unknown future capacity,” adding “It would be unprecedented for the Commission to order construction of excess capacity.”⁴⁷ However, where fiber is concerned, installing extra dark fiber during construction is obviously much cheaper than adding fiber in later upgrades and overbuilds.

Estimating future demand in an era of enormous growth in demand for broadband in rural as well as urban regions makes sense for incumbents. It is in the public interest as well as good business sense to install extra dark fiber initially, rather than returning to government agencies to request more funding for expensive upgrades.

In general, recipients of public funds should be required to install enough transport capacity to meet projected demand for at least 10 years.

8. Jurisdictional Confusion

Jurisdictional barriers hinder some of the steps required to install rural broadband. For example, the CRTC has jurisdiction over telecom carriers’ poles, but not those owned by other

⁴⁵ CRTC 2020-366 – FMCC Responses to RFIs, paras 24-27.

⁴⁶ CRTC 2019-406 – FMCC Final Comments, paras 17-18.

⁴⁷ Quoted in Final Comments FMCC 2019-406 March 8 2021,

utilities, generally electric utilities, which are regulated by the provinces. Thus, the solutions we note above concerning access to poles (deadlines, pricing, etc.) cannot be implemented by the CRTC for utility poles.

The federally-established Broadcasting and Telecommunications Review (BTLR) Panel has recommended an amendment to the *Telecommunications Act* to: “[E]mpower the CRTC to review and vary the terms and conditions of access to the support structures of provincially regulated utilities, to ensure non-discriminatory arrangements” (p.26, emphasis added).⁴⁸ However, these recommendations have not been adopted in legislation to date.

In the meantime, a more general remedy suggested by some telecom providers is to establish working groups in each province that would include telecom providers as well as utility operators and other stakeholders to address broadband implementation problems.

An example of a provincial response to access to poles owned by utilities is a recent Ontario law, *The Supporting Broadband and Infrastructure Expansion Act, 2021* (also known as *The Building Broadband Faster Act of 2021*). This Act applies to electric utilities and municipalities, rather than telecom providers (which are federally regulated). It requires that “A[n electric] distributor or transmitter shall compensate the proponent for a loss or expense incurred because the distributor or transmitter failed to comply with a notice...”⁴⁹ This model may also be relevant for telecom providers, but its enforcement of compliance appears very vague.

Some utilities also own fiber networks that could be used to extend broadband. For example, the province of Manitoba, through Manitoba Hydro, owns unused fiber-optic cable installed to communicate with northern hydroelectric facilities. The province recently used a competitive process to make this surplus capacity available to a commercial telecommunications provider to upgrade services for northern communities.⁵⁰ Yet this decision raises new problems for small providers. Existing contracts with the provincial government’s agencies for access to this fiber fall under the new proponent, and existing ISPs will be forced to negotiate access to public owned fiber with a for-profit competing ISP.

Negotiating access to rights of way is another barrier to broadband installation that may involve jurisdictions including cities, municipalities, Indigenous reserves, and other Indigenous territory. Section 43/(3) of the *Telecommunications Act* states: “No Canadian carrier or distribution undertaking shall construct a transmission line on, over, under or along a highway or other public place without the consent of the municipality or other public authority having

⁴⁸ CRTC 2020-366 – FMCC Intervention, paras E19-22.

⁴⁹ Bill 257: An Act to enact the *Building Broadband Faster Act, 2021* and to make other amendments in respect of infrastructure and land use planning matters Legislative Assembly of Ontario, enacted April 12, 2021.

⁵⁰ <https://news.gov.mb.ca/news/index.html?item=51277&posted=2021-05-13>

jurisdiction over the highway or other public place.” Indigenous issues including rights-of-way are discussed below.

9. Indigenous Rights and Jurisdiction

Existing rights-of-way agreements involving Indigenous lands and communities are outdated. For example, many rights-of-way agreements were written in the 1960s/70s, before the formal recognition of Indigenous lands and jurisdiction, and Aboriginal and Treaty Rights. In many cases, telecommunications networks cross Indigenous lands, but the people living on those lands cannot access them. For example, the Economic Development Officer of a First Nation in Northern Ontario stated: “These poles are on our land, in our community. We have the authority to use them. Why do we have to ask Hydro for permission to string a cable on them?” (p.59).⁵¹ Furthermore, members of Indigenous communities do not receive any compensation from telecommunications service providers for using rights-of-way traversing their territories.

Jurisdictional issues regarding communications infrastructure on Indigenous lands should be addressed with reference to Indigenous Lands and Jurisdiction, and Treaty and Aboriginal Rights. Reference in the *Telecommunications Act* to “bodies and levels of government” and public authorities must include First Nations and other Indigenous governments. CRTC regulations should state that the Commission does not have the right to approve construction of transmission lines on First Nations or other Indigenous lands without the consent of the relevant Indigenous government.⁵²

In the spirit of reconciliation, meaningful consultation and informed consent, agreements concerning support structures and rights of way on Indigenous lands need to be updated to address requirements for access and compensation for Indigenous communities or governments.⁵³

In the US, the Navajo Nation Telecommunications Regulatory Commission (NNTRC) has developed its own *Application for Certificate of Convenience and Necessity*, which includes guidelines for provision of telecommunications infrastructure and services on Navajo lands.⁵⁴ Their requirements could serve as an example for Canadian Indigenous agreements concerning infrastructure on Indigenous lands.

⁵¹ Cited in CRTC 2019-406 – FMCC Intervention, para 63. (Rowlandson, John. (2020) “Getting up to Speed in 19 Sioux Lookout Area First Nations.” Unpublished report, p. 59. March.) Note that three jurisdictions are involved here: federal (telecom), provincial (electric utility), and First Nation.

⁵² CRTC 2019-406 – FMCC Final Comments, para 41.

⁵³ CRTC 2020-366 – FMCC Intervention, paras E36-41.

⁵⁴ See:

http://nntrc.org/uploads/FileLinks/f25715e8b19a450c85cdea027b8b9679/2014_12_10_NNTRC_11_001_Second_Report_and_Order_CCN_1_1_1_1.pdf

10. Indigenous Consultation and Engagement

Consultation with Indigenous communities is necessary to ensure that Indigenous and other communities in rural and remote regions are aware of the potential impacts and opportunities of publicly-funded broadband infrastructure projects affecting them.⁵⁵

Original CRTC Broadband Fund guidelines stated that applicants should show that they “attempted to consult” with communities. Such a requirement could be fulfilled by a letter never received or a telephone call never answered. Further, an example of acceptable consultation was a “market study” that could be done using available information (e.g. population, average income, public institutions, local businesses, etc.) without any interaction with the community.⁵⁶ Applicants for public sector funding should be required to include a summary of who was consulted, how the consultation was carried out, and relevant findings.

A specific definition of “Duty to consult” should also be developed in this context. An example adopted by the Government of Canada is outlined in “Guiding Principle No. 4” in *Aboriginal Consultation and Accommodation - Updated Guidelines for Federal Officials to Fulfill the Duty to Consult* (March 2011).⁵⁷

In the U.S., the FCC must “send any public notice seeking comment on any petition for designation as an eligible telecommunications carrier on Tribal lands, at the time it is released, to the affected tribal government and tribal regulatory authority, as applicable, by the most expeditious means available.”⁵⁸ Also the FCC requires a *Tribal Government Engagement Obligation* from carriers receiving subsidies to provide services on Tribal lands. These carriers must demonstrate that they have coordinated with the Tribal government and provide a report documenting their compliance.⁵⁹ The FCC determined that, at a minimum, the annual Tribal engagement obligation for ETCs must include: (1) needs assessment and deployment planning; (2) feasibility and sustainability planning; (3) marketing services in a culturally sensitive manner; (4) rights-of-way processes, land-use permitting, facilities siting, environmental and cultural preservation and review processes; and (5) compliance with Tribal business and licensing requirements.⁶⁰ We recommend that similar requirements could be adopted by the CRTC for carriers that provide services on Indigenous lands.

⁵⁵ CRTC 2019-406 – FMCC Reply Comments, para 66.

⁵⁶ CRTC 2019-45 – FMCC Intervention, para E11.

⁵⁷ Cited in CRTC 2017-112 – FMCC Reply Comments, para 57. (See: <http://www.aadnc-aandc.gc.ca/eng/1100100014664/1100100014675>)

⁵⁸ Ibid.

⁵⁹ Form available at: <https://www.usac.org/wp-content/uploads/high-cost/documents/Forms/FCC-Form-481-Template.pdf>

In addition, the articles in the *United Nations Declaration on the Rights of Indigenous People* (UNDRIP) specify consultation, as does Canada's Truth and Reconciliation Commission (TRC) in its Call to Action #92, on "Business and Reconciliation".⁶¹

By engaging with Indigenous groups, commercial providers also gain several benefits. As discussed below, they can reduce costs through training and employing local residents, and contribute to local and regional economies, which in turn create additional demand for their services. They also demonstrate their corporate social responsibility through tangible benefits to affected communities.⁶²

11. Training and Hiring of Local Residents

Barriers to installing rural broadband can include lack of skilled local people to build and maintain the facilities. Public sector funders seek to ensure that the facilities get built, but rarely include requirements for training and hiring of local residents. For example, an Indigenous entrepreneur recently noted that an incumbent provider with public sector funding relied entirely on a contractor brought in from a southern province rather than training or hiring any local people to install a fiber network in a northern community. The result is typically higher installation and maintenance costs (including travel and lodging as well as wages for outside crews) and no transfer of skills or income to the community. Also, The COVID pandemic has highlighted the need for immediate responses to local network and infrastructure issues in remote and rural communities where telecom providers have been unable to dispatch repair people due to lockdowns.

The term "rarely" is used above as we are unaware of any such requirements in recent funding initiatives in North America or in rural regions elsewhere, although some may exist. One such initiative, known as the Northern Pilot Project, funded by the former Canadian Department of Communications, required that participating communities provide a location for communications equipment, and at least two community members to be trained to operate and maintain the equipment. Eventually, an Indigenous communications society was formed to implement this model on a regional basis.⁶³

Yet if the goal is to both minimize installation and operational costs as well as contribute to the economic development of the region, training and hiring of local residents should be a requirement. The Broadband Fund and other public sector funding for non-profit and Indigenous providers should include allocations for training of local/Indigenous community members for

⁶¹ See: http://www.trc.ca/websites/trcinstitution/File/2015/Findings/Calls_to_Action_English2.pdf, p.9.

⁶² CRTC 2019-406 – FMCC Intervention, para 59.

⁶³ Hudson, Heather E. and Edwin B. Parker. (1975) "Telecommunication Planning for Rural Development." *IEEE Transactions on Communications*, Fall.

network installation, operation and maintenance, community outreach and other tasks. In the case of commercial providers receiving public funding for northern projects, government should not fund training, but rather should make training and subsequent employment a condition of accessing public funding. The Commission should require recipients of public funds to provide an annual report on the progress and number of trained local employees as well as details about their positions (such as titles and duties).

12. Financing

Indigenous providers face ongoing challenges to securing financing for projects supported by the Broadband Fund and other government sources. For example, the initial *Guide* required that applicants provide “an irrevocable letter of credit from the lending institution, if relying on credit.” However, many Indigenous communities are limited in their ability to apply for credit because of existing but outdated *Indian Act* regulations that do not allow a lender to put a lien on on-Reserve assets. Some First nations have managed work-arounds. As well, the Canada Infrastructure Bank recently launched a new fund, the Indigenous Community Infrastructure Initiative, that supports not-for profit organizations.⁶⁴

13. Procurement

In addition to financing, organizations based in rural, remote, Northern and Indigenous communities face limited choice of contractors who can install and/or maintain support structures in remote communities and are familiar with the infrastructure, climate, people and resources. Waivers may be appropriate to allow for non-competitive procurement to hire such contractors rather than those certified by the infrastructure owners that would have to make multiple fly-in trips. OTMR procedures (see above) may also be a solution in some cases to enable the providers to hire their own contractors to complete the work.

Procurement guidelines can also positively contribute to Indigenous skills and jobs. An Indigenous ISP pointed out that a necessary component of any broadband development funding mechanism “is supporting opportunities for development and growth of First Nations and Aboriginal businesses.” A mechanism known as a Procurement Strategy for Aboriginal Businesses (PSAB) or similar policy should be included by the Commission as a procurement requirement for providers seeking government funding.⁶⁵

⁶⁴ See: <https://cib-bic.ca/en/the-canada-infrastructure-bank-launches-its-indigenous-community-infrastructure-initiative-to-accelerate-new-investment-and-reduce-the-infrastructure-gap/>

⁶⁵ Procurement Strategy for Aboriginal Business. See <http://www.aadnc-aandc.gc.ca/eng/1100100032802/1100100032803>

14. The Need for Accurate and Accessible Data

Non-incumbents need to be able to identify, find and access existing infrastructure. Timely and meaningful methods for updating data are required as current information is often inaccurate or out of date.⁶⁶ For example, Service Alberta, the department responsible for managing Alberta's SuperNet contract, "lacked the systems to properly measure performance and enforce compliance of the contracts to build and run the system."⁶⁷ One Indigenous organization stated that "the ISED map contains inaccuracies with regard to First Nation communities' access to broadband, both transport and last mile".⁶⁸ Several other interveners noted that the 25 square km hexagons utilized by ISED's map in many cases are not detailed enough to identify clusters of populations such as small communities, or availability of broadband to all locations within the hexagon.

An open access, publicly available database could include location of dark fiber; location and condition of support structures; location of towers; and age, condition and capacity of electronics. These maps and information should be reviewed and updated annually, with sanctions such as fines for infrastructure owners who do not provide annual updates, or provide erroneous or outdated information. It should also incorporate consumer-side mapping data, such as that collected and reported through the CIRA Internet Performance test.⁶⁹ In the event that providers succeed in classifying some information as proprietary, entities preparing proposals for public sector funding should be able to apply for this information and receive it in a timely manner in order to plan projects and submit funding proposals.

15. Conclusions

This paper has presented barriers to extension of broadband into remote and Indigenous regions in addition to funding requirements that should be addressed by regulators and policy makers. It identifies steps required to reduce or eliminate these barriers. It also highlights the role of small and Indigenous providers in providing these services

Our conclusions include:

Opportunities for Small and Indigenous Providers: While new funding sources to extend broadband and other services can help to bridge connectivity gaps, it is important to ensure that the terms of eligibility do not exclude potential competitors including small, Indigenous, and

⁶⁶ Hambly, H., & Rajabiun, R. (2021). Rural broadband: Gaps, maps and challenges. *Telematics and Informatics*, 60

⁶⁷ See: <https://www.cbc.ca/news/canada/edmonton/alberta-auditor-general-supernet-1.4896294>

⁶⁸ CRTC 2017-112, All Nations Trust Intervention, para 8.

⁶⁹ Hambly & Rajabiun, 2021.

McMahon, R., Smith, T.J. & Whiteduck, T. (2017). Reclaiming geospatial data and GIS Design for Indigenous-led telecommunications policy advocacy: A process discussion of mapping broadband availability in remote and Northern regions of Canada. *Journal of Information Policy*, 7: 423-449.

community providers, and that requirements for participation are appropriate for smaller providers.

Funding is not sufficient: To accomplish goals of extending affordable and reliable broadband to remote and Indigenous regions, funding is not likely to be the only factor that policy makers and regulators need to consider.

Access to existing networks: Conditions for access to transport networks and to existing infrastructure such as poles and conduit need to be reviewed to minimize delays and paperwork for permits.

Pricing: Affordability for users will depend on construction and operating costs of rural broadband networks. Charges that small and competitive ISPs pay to lease capacity and connect to existing infrastructure will be passed on to the customers.

Incentives: Incumbent facilities owners have little incentive to expedite access to their networks for potential competitors. Strategies that can support the efforts of the new providers can expedite broadband build-outs. An example is OTMR (One Touch Make Ready)

Consultation: Meaningful consultation requires significant efforts to inform communities and engage with them about projects intended to serve them. This consultation can also benefit providers by contributing relevant information about existing facilities and local conditions and sensitivities.

Training and Hiring Local Residents: Rural broadband projects are intended not only to provide connectivity to communities but to contribute to their development. Training and hiring local people not only creates jobs but are likely to reduce costs rather than depending on outside staff and contractors.

Participation: Small and Indigenous providers should be encouraged to participate in hearings and other proceedings by regulators and policy makers. While not all of their proposals may be adopted, they can provide first hand testimony and examples that would not otherwise be available to decision makers.

Enforcement: License conditions such as local consultation, rollout deadlines, and quality of service metrics must include explicit means of enforcement.

Rural Data: Government and/or operator data on rural coverage, transmission speeds, and service quality may be inaccurate or incomplete. Government data should be regularly updated and checked for accuracy. Additional sources should be made available to contribute more accurate or granular data for broadband planning and funding.

Relevance for other Regions: While conditions vary, the experience in extending broadband in northern Canada offers lessons relevant for other countries, especially those with rural or isolated populations.