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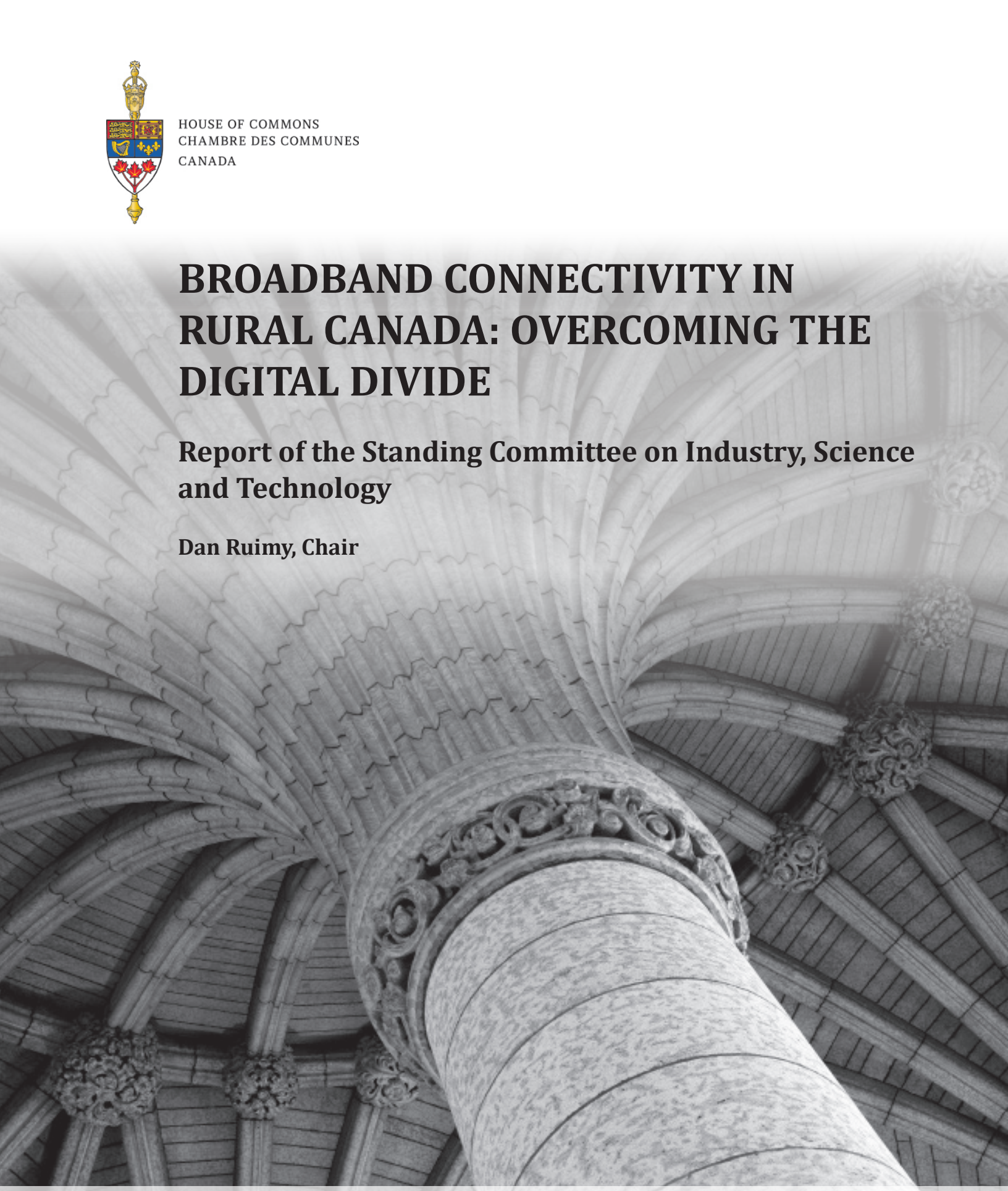
BROADBAND CONNECTIVITY IN RURAL CANADA: OVERCOMING THE DIGITAL DIVIDE

Report of the Standing Committee on Industry, Science and Technology

Dan Ruimy, Chair



APRIL 2018
42nd PARLIAMENT, 1st SESSION

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Chair

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NOTICE TO READER

Reports from committee presented to the House of Commons

Presenting a report to the House is the way a committee makes public its findings and recommendations on a particular topic. Substantive reports on a subject-matter study usually contain a synopsis of the testimony heard, the recommendations made by the committee, as well as the reasons for those recommendations.

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has the honour to present its

ELEVENTH REPORT

Pursuant to its mandate under Standing Order 108(2), the Committee has studied broadband connectivity in rural Canada and has agreed to report the following:

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CHAIR'S FOREWORD

The present study benefited from the time and expertise of well-informed, hardworking and dedicated individuals. The Committee and its study into providing broadband Internet services to rural and remote communities are indebted to their contributions.

Broadband Internet is an indispensable service in Canada. Adequate Internet services are of paramount importance to the economic and social welfare of all communities. However, some communities, especially in rural and remote areas, still struggle to access these services. As a result, the Government of Canada contributed $500 million over 5 years to expand broadband Internet services in those areas. Although much remains to be done, this initiative is essential for Canada to be a leader on this front.

A parliamentary study is a living endeavour: it adapts and evolves on the basis of the testimonies heard. It became quickly obvious to the Committee that the focus of this study had to be narrowed to an investigation of last-mile access. For example, the original motion included defining what constitutes high speed Internet. However, a few months later, before the Committee initiated its study, the CRTC established high speed targets for Internet services. Between November 2017 and February 2018, our Committee heard from 16 witnesses and collected over 25 submissions. Multiple service providers contributed to the study, from small regional providers to Canada's largest telecom companies. We heard not only from business representatives, but also from individual experts and on-the-ground rural service providers.

The Committee is honoured to submit a report with concrete recommendations to the Government of Canada to increase and improve access to broadband Internet, and do so in a manner that is not only affordable to consumers, but profitable to providers.

Dan Ruimy, M.P.
Chair

SUMMARY

Broadband Internet benefits rural and remote communities by bringing them, among other things, education resources, better health services and more economic opportunities. In 2016, acknowledging its importance, the Canadian Radio-television and Telecommunications Commission (CRTC) declared that broadband Internet amounted to an essential service and adopted minimal performance standards across Canada: 50 megabit per second download and 10 megabit per second upload. The CRTC currently collaborates with Innovation, Science and Economic Development Canada (ISED) to fund broadband deployment in rural and remote areas. However, the evidence presented to the Committee by a variety of stakeholders shows that the digital divide remains prominent in Canada, and that the CRTC targets may not be appropriate to all rural and remote areas.

Increasing and improving broadband Internet access in rural and remote areas face many challenges. Indeed, licensed incumbents tend to only invest in high density areas that are more economically profitable. However, small providers, non-profit providers or non-incumbent providers could deploy broadband Internet in rural and remote areas in an economically profitable manner should the Government of Canada adapt the regulatory framework to their means, especially with regards to spectrum and network management, along with funding allocation.

To facilitate broadband deployment in rural and remote communities, the Committee recommends, notably that the Government of Canada consider ways to increase the accessibility of funding programs for small providers, non-profit providers and non-incumbent providers, and consider the spectrum allocation process for the purpose of broadband deployment. The Committee also recommends that ISED develop a comprehensive rural broadband strategy in collaboration with key stakeholders.

LIST OF RECOMMENDATIONS

As a result of their deliberations, committees may make recommendations which they include in their reports for the consideration of the House of Commons or the Government. Recommendations related to this study are listed below.

Recommendation 1

The Canadian Radio-television and Telecommunications Commission consider not only broadband speed, but also other indicators in its targets. These indicators could include, but not be limited to, standards of parity between urban and rural centers, network performance, purchased consumer packages, latency and redundancy. 16

Recommendation 2

The Canadian Radio-television and Telecommunications Commission consider regularly reviewing its target broadband speeds (currently set at 50 megabits per second download and 10 megabits per second upload) to ensure they remain relevant with technological development and international standards, and publish their findings in their annual report on the telecommunications sector. 16

Recommendation 3

The Government of Canada integrate broadband accessibility issues such as affordability and digital literacy in rural Canada within federal programs. 16

Recommendation 4

The Government of Canada take steps to address the challenges of small providers, non-profit providers, and non-incumbent providers of accessing existing infrastructures for the purpose of deploying broadband access, including easements, real servitudes, especially in regards to utility poles. Such measures could include legislative amendments, when feasible, in collaboration with provincial governments. 23

Recommendation 5

The Government of Canada consider ways to encourage the integration of broadband deployment within all infrastructure renewal programs. 23

Recommendation 6

The Government of Canada consider the spectrum allocation process for the purpose of broadband deployment. More specifically, it should focus on the scope of licences, pricing, and effective use of allocated spectrum, including ensuring that small providers, non-profit providers, and non-incumbent providers have reasonable access to spectrum for broadband deployment. 23

Recommendation 7

The Government of Canada consider ways to further encourage non-traditional network operators to apply for federal funding, including, but not limited to, cooperatives, non-profits, partnerships, and local governments. 30

Recommendation 8

The Government of Canada consider ways to increase the accessibility of funding programs for small providers, non-profit providers, and non-incumbent providers. This may include various means, such as simplifying the application and reporting process for these providers..... 30

Recommendation 9

The Government of Canada ensure funding programs support both backbone and "last-mile" infrastructure, and remain technology neutral..... 30

Recommendation 10

The Government of Canada incentivize and encourage investments and partnerships for broadband deployment in rural and remote regions. 30

Recommendation 11

Innovation, Science, and Economic Development Canada develop a comprehensive rural broadband strategy in collaboration with key stakeholders including, but not limited to, all levels of government, civil society, Internet services providers, First Nations, and non-profit organizations. 36

Recommendation 12

The Government of Canada consider new ways of collecting service and performance data in addition to the speed of Internet services, including, but not limited to, adding new indicators, using local knowledge, and reconsidering the conclusions drawn from the current hexagonal mapping system..... 36

BROADBAND CONNECTIVITY IN RURAL CANADA: OVERCOMING THE DIGITAL DIVIDE

On 5 May 2016, the Standing Committee on Industry, Science and Technology (the Committee) adopted the following motion:

> That the Standing Committee on Industry, Science and Technology undertake a study on broadband connectivity, with a primary focus on developing a plan to improve rural connectivity, and demonstrating its impact on local rural economies, including community engagement; that the committee make recommendations that identify and address:
>
> a) what constitutes acceptable high-speed service;
>
> b) the financial challenges of implementing high-speed services;
>
> c) the regulatory changes to encourage the implementation of high-speed service;
>
> that the study consist of not more than six (6) meetings; and that the committee report its findings to the House.

The Committee's study on broadband[1] connectivity in rural areas consisted of seven meetings that took place between 23 November 2016 and 15 February 2017, and benefited from 50 oral and written submissions.[2]

A. Background

In 2011, the Canadian Radio-television and Telecommunications Commission (CRTC or the Commission) recognized the importance of Internet access service by establishing universal

1 In the Telecommunications and Monitoring report 2017, broadband is defined as high-speed Internet with access of at least 1.5 Mbps.

2 The Committee held seven meetings rather than six as planned in the motion. The study on broadband connectivity in rural areas includes the testimony provided by Deputy Premier of the Northwest Territories, the hon. Robert C. McLeod, during a meeting held under another study on November 23, 2016 (As per the motion adopted on November 23, 2017, INDU #35). The study also includes all evidence and documents received in public in relation to the study entitled "Briefing on Broadband Connectivity in Rural Canada" (As per the motion adopted on November 30, 2017, INDU #87), which included two meetings held on May 30, 2017 and November 23, 2017, as well as all evidence and documents received in relation to the study entitled *Broadband Connectivity in Rural Canada*, for a total of 26 briefs and 24 witnesses.

target speeds of 5 Megabits per second (Mbps)[3] download and 1 Mbps upload. Targets were established to ensure that all Canadians, particularly those in rural and remote areas, could benefit from a greater level of broadband access.[4]

In 2014, Innovation, Science and Economic Development Canada (ISED) attempted to increase access to broadband Internet with the Connecting Canadians program.[5] Targeting "last-mile"[6] networks rather than backbone,[7] the program constituted an investment of "$305 million over five years to extend and enhance broadband Internet service for Canadians in rural and Northern communities."[8] Within the program, the federal government worked "with Internet service providers (ISP) and other stakeholders across Canada to make high-speed Internet (5 Mbps) available to thousands of households in rural and remote parts of the country."[9]

In April 2015, the CRTC launched consultations on the delivery of broadband Internet services in Canada.[10] The CRTC submitted findings and decisions to ISED on 21 December 2016. The Commission argued therein that many Canadians still face challenges regarding the availability and adoption of broadband services.[11]

Notably, the CRTC found that 18% of Canadians — most of whom live in rural and remote areas — do not have access to speeds of 50/10 Mbps.[12] While the data collected by the CRTC showed that 97% of Canadians have access to Long-Term Evolution (LTE) mobile

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3 In the Telecommunications and Monitoring report 2017, Megabits per second (Mbps) is defined as a theoretical unit of measurement of the speed for data transfer over a transmission medium (e.g., copper, co-axial cable, fibre optics, or wireless), consisting of 1,000,000 bits per second or 125,000 bytes per second where a byte consists of 8 bits.

4 Canadian Radio-television and Telecommunications Commission (CRTC), Broadband Report (November 2011), report, 8 May 2012.

5 Government of Canada, Digital Canada 150 Connecting Canadians, 13 September 2017.

6 Last mile refers to any connection (DSL, fibre, cable, etc.) from the backbone to households and businesses.

7 Backbone refers to the high capacity trunk system that brings Internet to a community. In very remote areas, the backbone can be a satellite Internet service.

8 Government of Canada, "Chapter 3.4 Supporting Families and Communities," Budget 2014.

9 Government of Canada, Digital Canada 150 – Extending and Enhancing broadband, information document, 13 September 2017.

10 CRTC, The CRTC wants to talk about broadband Internet with Canadians!, News release, 14 January 2016 (the Commission consulted Canadians via, for example, online surveys and public hearings).

11 CRTC, CRTC Submission to the Government of Canada's Innovation Agenda, information document, 21 December 2016.

12 Ibid.

wireless where they live, many respondents claimed they do not have access to LTE mobile wireless along highways and in remote areas. The CRTC also underlined problems associated with the affordability of Internet services and digital literacy: 36% of respondents said they were limiting their Internet use due to cost and 24% cited lack of skills as an explanation for limiting their use of the Internet.[13]

To address these gaps, the CRTC decided to consider "broadband access Internet service … a basic telecommunications service for all Canadians. The CRTC … also [set] faster speed targets and [created] a new fund that [would] invest up to $750 million over and above existing government programs."[14] The Commission aimed that, by 2021, 90% of Canadian households and small businesses have access to speeds of 50/10 Mbps for basic telecommunications services and to an unlimited data option for fixed broadband.[15] The CRTC determined these targets after hearing various proposals from stakeholders.[16] Compared with its 2011 targets, the CRTC proposed to increase the speed of broadband Internet by a factor of 10.[17] The CRTC established the $750 million fund to support projects in areas that do not meet the Commission's new targets. Managed at arm's length by a third party, the fund will focus on underserved areas and will complement the efforts of the federal government.[18]

The Government of Canada announced in 2016 an investment of up to $500 million over five years to extend broadband Internet in rural and remote communities. The Connect to Innovate program "supports new 'backbone' infrastructure[19] to connect institutions such as schools and hospitals with a portion of funding for upgrades and 'last-mile' infrastructure to households and businesses."[20] Set at 5 Mbps, ISED's targets for "last-mile" projects fall short of the CRTC's, in order to ensure that the program focus is on most underserved households.[21] The submission process for Connect to Innovate ended on 20 April 2017. ISED received 892 projects submissions totalling $4.4 billion. At the time of writing, ISED

13 Ibid.

14 CRTC, CRTC establishes fund to attain new high-speed Internet targets, 21 December 2016.

15 Ibid.

16 Standing Committee on Industry, Science and Technology (INDU), *Evidence*, 1st Session, 42nd Parliament, 30 May 2017, 1000 (Christopher Seidl, Executive Director, Telecommunications, CRTC).

17 INDU, *Evidence*, 1st Session, 42nd Parliament, 23 November 2017, 1105 (Christopher Seidl).

18 CRTC, CRTC establishes fund to attain new high-speed Internet targets, 21 December 2016.

19 In this report, the word "infrastructure" encompasses any physical or organizational structures, including support structures.

20 Government of Canada, Connect to Innovate, information document, 6 October 2017.

21 Government of Canada, Connect to Innovate-Frequently asked questions, 25 September 2017.

allocated funds to 101 projects totalling $262.9 million.[22] ISED is expected to announce more allocations in 2018.[23]

In spite of the above efforts, there are still challenges in providing broadband access to rural and remote areas. As Pamela Miller, Director General, Strategic Policy Sector, Telecommunications Policy Branch for ISED, mentioned in May 2017:

> Despite the strong progress, as we all know, there are still broadband gaps in certain parts of the country, particularly in rural and remote areas. These areas typically have lower population densities, making the business case for private sector investment more challenging.[24]

Despite these investments,[25] there remains a substantial difference in broadband service availability between urban areas, on the one hand, and rural and remote areas, on the other (see Figure 1 and Table 1).[26] By preventing Canadians in rural and remote areas from participating in the digital economy, this 'digital divide' exacerbates the challenges they already face.[27]

The CRTC estimates that reaching target speeds in rural areas will take 10 to 15 years.[28] However, some stakeholders argue that the affected Canadians cannot wait that long:[29] "The longer these underserved regions lag behind their urban counterparts, the more it hinders this country's social and economic development."[30] Technological improvements

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22 Government of Canada, Announced Connect to Innovate projects, 19 February 2018.

23 INDU, *Evidence*, 1st Session, 42nd Parliament, 23 November 2017, 1100, 1105 (Susan Hart, Director General, Connecting Canadians Branch, Innovation, Science and Economic Development [ISED]).

24 INDU, *Evidence*, 1st Session, 42nd Parliament, 30 May 2017, 0850 (Pamela Miller, Director General, Strategic Policy Sector, Telecommunications Policy Branch, ISED).

25 Government of Canada, Connect to Innovate, information document, 6 October 2017; CRTC, CRTC establishes fund to attain new high-speed Internet targets, 21 December 2016.

26 INDU, *Evidence*, 1st Session, 42nd Parliament, 6 February 2018, 1555 (Dean Proctor, Chief Development Officer, SSi Micro Ltd.); 8 February 2018, 1540 (John Meldrum, Vice-President and Corporate Counsel, Regulatory Affairs, SaskTel), 1540 (Geoff Hogan, CEO, SouthWestern Integrated Fibre Technology); Southwestern Integrated Fibre Technology Inc. (SWIFT), brief, 19 December 2017.

27 SWIFT, brief, 19 December 2017, (the digital divide "creates a new underclass of people already facing challenges").

28 INDU, *Evidence*, 1st Session, 42nd Parliament, 23 November 2017, 1105, 1110 (Christopher Seidl).

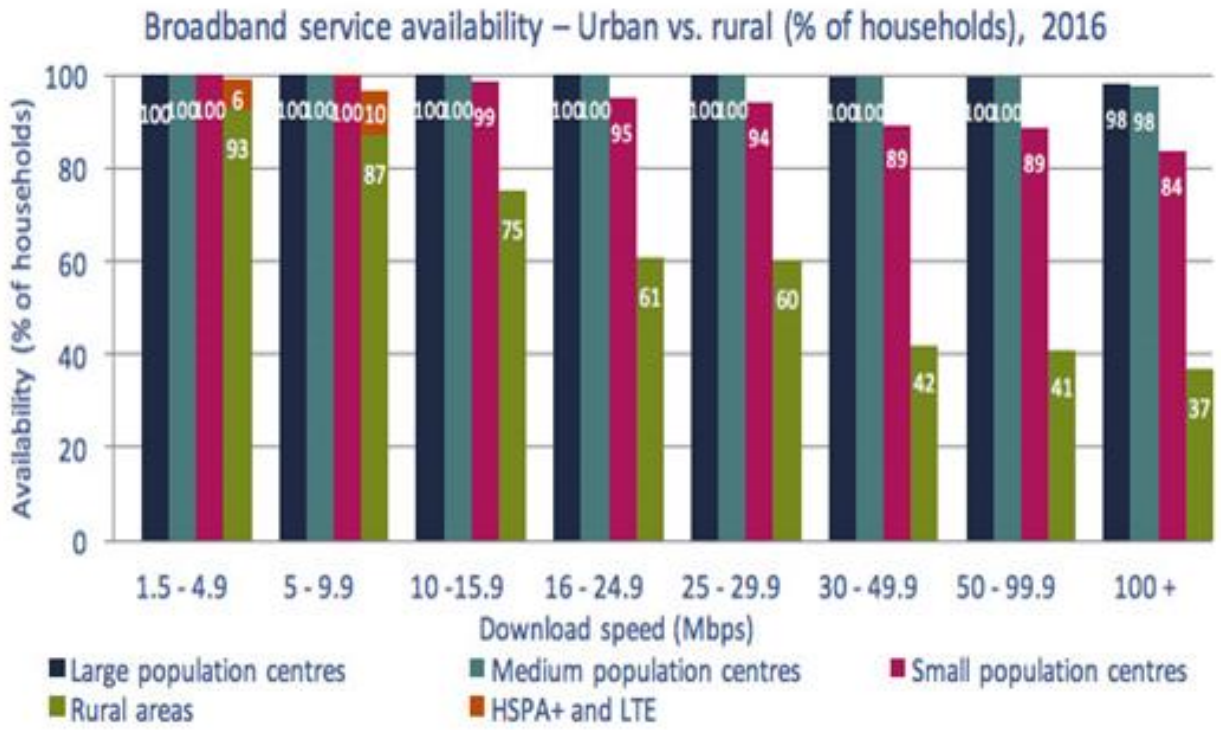
29 INDU, *Evidence*, 1st Session, 42nd Parliament, 8 February 2018, 1535 (John Meldrum); NorthwesTel, brief, 19 February 2018.

30 INDU, *Evidence*, 1st Session, 42nd Parliament, 23 November 2017, 1105, 1110 (Christopher Seidl).

also risk increasing the digital divide as some communities have access to ever more effective Internet services while others continue to lag behind.[31]

31 INDU, *Evidence*, 1st Session, 42nd Parliament, 6 February 2018, 1155 (Dean Proctor), 1605 (C.J. Prudham, Executive Vice-President and General Counsel, Xplornet).

Figure 1 – Broadband service availability – Urban vs. rural (% of households),



Notes: The HSPA+ (high-speed packet access or 3G) and LTE bars show the additional effect that inclusion of these technologies would have on the following categories: HSPA+ and LTE for 1.5 to 4.9 Mbps availability, and LTE for 5 to 9.9 Mbps availability.
Satellite services are excluded since they have a national footprint.

Source: CRTC, "Figure 5.3.17 Broadband service availability – Urban vs. rural (% of households), 2016", Telecommunications and Monitoring Report 2017, 2017.

Table 1* - Broadband service availability in rural areas, by download speed and number of platforms (% of households), 2016

Number of wireline platforms	1.5 Mbps and higher	5.0 Mbps and higher	10.0 Mbps and higher	16.0 Mbps and higher	25.0 Mbps and higher	30.0 Mbps and higher	50.0 Mbps and higher	100 Mbps and higher
1	37	39	40	36	36	26	26	25
2	33	30	25	21	20	16	15	11
3	23	18	10	4	4	0	0	0
Total	93	87	75	61	60	42	41	37
Mobile only	6	10						

Note: * "This table shows the percentage of households in rural areas that have access to broadband services at varying speeds, [via] three platforms (DSL/fibre, cable modem, and fixed wireless), as well as the percentage of rural households that can only get mobile service (HSPA+ and/or LTE at 1.5 Mbps, LTE at 5 Mbps)."

Source: CRTC, "Table 5.3.15 Broadband service availability in rural areas, by download speed and number of platforms (% of households), 2016", Telecommunications and Monitoring Report 2017, 2017.

B. From backbone to "last-mile"

From the implementation of backbone infrastructure to the deployment of "last-mile" infrastructure, many elements, such as performance assessment or regulations, can come together to facilitate broadband deployment in rural and remote areas.

1. Performance

Performance indicators allow comparing the state of broadband connectivity from one community to another in Canada. However, witnesses expressed different points of view on what those indicators should be.

a. Speed

Witnesses expressed different viewpoints on the CRTC's targets.[32] Most support offering an unlimited data option for fixed broadband access services.[33] Indeed, data limits prevent broadband use in rural areas and data overage surcharges increase the cost of Internet services.[34] However, many witnesses do not support the 50/10 Mbps target. Some, believing it too low, fear that the CRTC will have to regularly update it to keep up with technological change.[35] Corroborating their testimony is the fact that actual broadband speeds in Canada substantially lag behind many countries that invest more in digital infrastructure.[36]

[W]hile most Canadian communities do have Internet coverage, in many rural communities, the available speeds are so low that they only allow for a limited number of uses

Indeed, while Christine J. Prudham, Executive Vice-President, General Counsel of Xplornet, claimed that 95% of Canadians living in rural have Internet connections,[37] the 2017 Telecommunications and monitoring report shows that 99% of Canadians living in rural areas do have Internet access (including wireless), but to speeds between 1.5 and 4.9 Mbps, and only 42% have access to speeds between 30 Mbps and 49.9 Mbps (see Figure 1). Thus, while most Canadian communities do have Internet coverage, in many rural

32 Clearwater County Council (CCC), brief, 25 October 2017; Saskatchewan Association of Rural Municipalities (SARM), brief, 11 December 2017; Independent Telecommunications Providers Association (ITPA), brief, 30 January 2018.

33 INDU, *Evidence*, 1st Session, 42nd Parliament, 8 February 2018, 1550 (William Chen, Director, Wubim Foundation).

34 The Communications and Monitoring report 2017 reported that: "In 2016, of companies that reported data overage charges, approximately 6.0% of their total retail mobile revenues were reported to be directly from revenues collected from subscribers who exceeded allowable monthly data limits."

35 Cybera Inc. (Cybera), brief, 13 October 2017; Parkland County (PC), brief, 20 October 2017; SWIFT, brief, 19 December 2017; Eastern Ontario Regional Network & Eastern Ontario Wardens' Caucus (EOWC & EORN), brief, 23 February 2018.

36 SWIFT, brief, 19 December 2017.

37 INDU, *Evidence*, 1st Session, 42nd Parliament, 6 February 2018, 1605 (C.J. Prudham).

communities, the available speeds are so low that they only allow for a limited number of uses.[38]

Other witnesses argue that the CRTC speed target is too ambitious for rural areas, considering the cost and timeframe of achieving them.[39] A universal threshold also makes it more difficult for the CRTC to respond to the particular needs of different communities:

> [The CRTC speed target] significantly [increases] areas considered "underserved." If funding and capacity-building support are not properly allocated, there is a risk that areas with relatively strong broadband service that are narrowly under the new 50/10 threshold may receive funding at the expense of rural and remote areas with speeds that are much lower.[40]

Although the CRTC favours universal targets, many witnesses support different approaches. The Blue Sky Economic Growth Corporation (Blue Sky) argued that the CRTC should have an incremental improvement approach by assessing the characteristics of each community, including population density, current service availability, incumbent providers, and backhaul capacity, before establishing its specific performance targets. This would be more viable for ISPs and would allow for marked service improvement.[41] Other witnesses claim that the CRTC should focus on connectivity rather than capacity.[42] Consequently, the CRTC must cater to the various needs of different rural and remote communities.

b. Other factors: affordability, digital literacy and service quality

As William Chen, Director of the Wubim Foundation, explained, speed is too static to be the only metric of success. Other metrics, qualitative and quantitative, may be used by the CRTC to guide its broadband strategy.[43] As many witnesses claimed, affordability and digital

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38 INDU, *Evidence*, 1st Session, 42nd Parliament, 30 November 2017, 1120 (Sara Brown, member, Federation of Canadian Municipalities).

39 Bell Canada (Bell), brief, 30 January 2018; NorthwesTel, brief, 19 February 2018; TELUS, brief, 26 February 2018.

40 Alberta Association of Municipal Districts and Counties (AAMDC), brief, 6 October 2017.

41 Blue Sky Economic Growth Corporation (BSEGC), brief, 2 November 2017.

42 INDU, *Evidence*, 1st Session, 42nd Parliament, 30 November 2017, 1120, 1135, 1145 (Ray Orb, Chair, Rural Forum, Federation of Canadian Municipalities); ITPA, brief, 30 January 2018; Bell, brief, 30 January 2018.

43 INDU, *Evidence*, 1st Session, 42nd Parliament, 8 February 2018, 1550 (William Chen); First Mile Connectivity Consortium (FMCC), brief, 13 October 2017; Regional and Rural Broadband project (R2B2), brief, 22 February 2018.

literacy are important factors of broadband access in rural and remote areas.[44] Performance, therefore, might not only be established on the basis of speed, but also over such matters.[45] Many witnesses claimed that access to a service, on its own, is not a determinant of subscribing to that service.[46] The difference between accessing a service and subscribing to one is salient in rural areas where prices for similar services are higher than those in urban areas.[47] Furthermore, some residents of rural and remote areas are not aware of the benefits of broadband Internet, which would require additional programs aimed at encouraging digital literacy.[48]

In light of these issues, in its 2017 budget, the Government of Canada announced two five-year investments: $13.2 million towards affordability and $29.5 million towards digital literacy. The affordability focus "will facilitate access to low-cost home Internet packages [and will] provid[e] 50,000 refurbished computers through the existing computers for success Canada program to families."[49] The digital literacy focus "will foster more inclusive Canadian Internet literacy by supporting initiatives that teach basic skills including how to use the Internet safely and effectively to certain groups that are affected by digital divides including seniors, low-income Canadians, [I]ndigenous peoples, and those living in northern and rural communities."[50]

Witnesses contend that the CRTC should assess the quality of Internet services after subscription. Indeed, they argue that rural and remote areas often struggle with Internet services of high latency[51] and low effective speed — as opposed to advertised speed.[52] The Federation of Canadian Municipalities (FCM) argued that this problem is common across Canada, as Internet networks fail to serve a high number of subscribers during peak

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44 Federation of Canadian Municipalities (FCM), brief, 20 October 2017. See also Cybera, brief, 13 October 2017; FMCC, brief, 13 October 2017; BSEGC, brief, 2 November 2017; Big Lakes County (BLC), brief, 24 November 2017; Van Horne Institute (VHI), brief, 24 November 2017.

45 INDU, *Evidence*, 1st Session, 42nd Parliament, 30 May 2017, 0905 (Christopher Seidl).

46 INDU, *Evidence*, 1st Session, 42nd Parliament, 30 November 2017, 1105 (Ray Orb); BLC, brief, 24 November 2017.

47 Canadian Rural Revitalization Foundation, Rural Development Institute (Brandon University) & Rural Policy Learning Commons (CRRF et al.), brief, 13 December 2017.

48 BLC, brief, 24 November 2017; VHI, brief, 24 November 2017; CRRF et al., brief, 13 December 2017.

49 INDU, *Evidence*, 1st Session, 42nd Parliament, 30 May 2017, 0855 (Pamela Miller).

50 Ibid.

51 In the Telecommunications and Monitoring report 2017, latency is defined as the delay between transmission and receipt of signal.

52 INDU, *Evidence*, 1st Session, 42nd Parliament, 1 February 2018, 1540 (Steve Finlayson, NetWhisper Inc.); EOWC & EORN, brief, 23 February 2018.

times.[53] However, Ms. Prudham claimed that effective speeds were often different from advertised speeds: Internet being a shared resource, she asserted, a provider cannot guarantee the speed of service.[54] Witnesses also underlined the issue of redundancy for satellite-dependent communities.[55]

> **"[Broadband] breaks down the barriers. … It's the way to communicate, to have contact with the rest of the world."**

Without comparable access to broadband Internet, residents of rural areas cannot benefit from the same services as those enjoyed in urban areas.[56] Dean Proctor, Chief Development Officer for SSi Micro Ltd., explains the life-changing impact of broadband access for rural and remote communities:

> This [broadband] breaks down the barriers. These are the roads that cannot be built to these areas. The communication system is, in fact, the way out. It's the way to communicate, to have contact with the rest of the world. It's a way to complete education, to continue education. It's a way to sell as well as to buy merchandise online. It's a way to carry on banking and government services, and it's—something that I'm sure this entire committee is concerned about—digital democracy. It's really been earth-changing.… Some of the stories coming in make you want to cry—they really do—just in terms of the joy and the open feeling that people are receiving from having technology. They know full well it exists they just don't have access to it.[57]

Considering the importance of broadband access for rural and remote areas residents, many witnesses suggested that the federal government ensure that minimum quality of basic services in rural and remote areas is on par with urban centers.[58]

Recommendations

The Committee recommends that:

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53 INDU, *Evidence*, 1st Session, 42nd Parliament, 30 November 2017, 1150 (Ray Orb).

54 INDU, *Evidence*, 1st Session, 42nd Parliament, 6 February 2018, 1615 (C.J. Prudham).

55 INDU, *Evidence*, 1st Session, 42nd Parliament, 30 November 2017, 1105, 1125 (Ray Orb); Association of equipment manufacturers, brief, 14 February 2018; NorthwesTel, brief, 19 February 2018.

56 PC, brief, 20 October 2017.

57 INDU, *Evidence*, 1st Session, 42nd Parliament, 6 February 2018, 1645 (Dean Proctor).

58 FCM, brief, 20 October 2017; EOWC & EORN, brief, 23 February 2018.

1. **The Canadian Radio-television and Telecommunications Commission consider not only broadband speed, but also other indicators in its targets. These indicators could include, but not be limited to, standards of parity between urban and rural centers, network performance, purchased consumer packages, latency and redundancy.**

2. **The Canadian Radio-television and Telecommunications Commission consider regularly reviewing its target broadband speeds (currently set at 50 megabits per second download and 10 megabits per second upload) to ensure they remain relevant with technological development and international standards, and publish their findings in their annual report on the telecommunications sector.**

3. **The Government of Canada integrate broadband accessibility issues such as affordability and digital literacy in rural Canada within federal programs.**

2. Infrastructure

Witnesses noted that Canada's telecommunications sector is complex to manage and regulate. According to the "South Western Integrated Fibre Technology" (SWIFT), it is led by an oligopoly of incumbents who use "their dominance in infrastructure and content to reduce the scope for end users to competitively [provide] services and applications,"[59] making it much harder for smaller players to participate and, thus, prevents competition.

a. Physical Infrastructure

Because backbone and last-mile infrastructure are interdependent, some witnesses argue that the federal government should not prioritize one over the other in its policies.[60] Luc Delorme, Acting Director, Spectrum, Information Technologies and Telecommunications, Connecting Canadians Branch, and Programming and Engineering for ISED, underlined their importance by comparing backbone to a highway and off-ramp, and last-mile to any surface street.[61]

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59 SWIFT, brief, 19 December 2017.

60 INDU, *Evidence*, 1st Session, 42nd Parliament, 30 November 2017, 1100, 1135 (Ray Orb), 1120 (Susan Hart); EOWC & EORN, brief, 23 February 2018.

61 INDU, *Evidence*, 1st Session, 42nd Parliament, 30 May 2017, 0950 (Luc Delorme, Acting Director, Connecting Canadians Branch, Program and Engineering, ISED).

There are a number of existing technologies that can provide Internet services, including, but not limited to:[62]

- Cable provides data transmission over coaxial cable;
- Fibre uses glass threads or plastic fibres to transmit data using pulses of light;
- Digital subscriber line (DSL) provides data transmission over a copper local loop;
- Fixed Wireless uses either licensed or unlicensed spectrum[63] to provide communications services (voice and/or data) where the service is intended to be used in a fixed location;
- LTE Mobile is a protocol or standard used for communications between a mobile phone and cell towers in mobile networks. LTE is also referred to as 4G (fourth generation) cellular technology; and
- Satellite uses an antenna to receive a signal from a space-based satellite, and transmits it via data cable, DSL, or fibre services to the premises.

There appears to be no consensus as to which technology is better for rural and remote areas. Some witnesses contend that fibre is very efficient and "future-proof." Its installation is more expensive than any other technologies, but cheaper to maintain.[64] Nevertheless, the cost of fibre makes it a less feasible option in very sparsely populated areas.[65] While older than other technologies, DSL remains relevant when used in combination with fibre, but it may not respond to future performance standards.[66] Fixed wireless is a very good

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62 The technology definitions come from: CRTC, Broadband service coverage in Canada Technology, 20 April 2016.

63 Spectrum is a band of colors produced by a separation of the components of light by their different degrees of refraction according to wavelength. In this report, the term "spectrum" refers to "spectrum band" which is a specified band or range within the overall spectrum of electromagnetic radio waves used as a channel for sending or receiving communications

64 INDU, *Evidence*, 1st Session, 42nd Parliament, 8 February 2018, 1645 (Pierre Collins, Project Manager, Montcalm Télécom et fibre optique), 1635 (Geoff Hogan); Cybera, brief, 13 October 2017; BLC, brief, 24 November 2017; VHI, brief, 24 November 2017; SWIFT, brief, 19 December 2017; Shaw Communications Inc. (Shaw), brief, 12 February 2018; NorthwesTel, brief, 19 February 2018.

65 INDU, *Evidence*, 1st Session, 42nd Parliament, 6 February 2018, 1625 (Dean Proctor).

66 SaskTel, brief, 23 February 2018.

alternative to fibre in lower density areas,[67] but its capacity to provide high-speed Internet services over time is also limited.[68] Satellite is a last resort solution for very remote areas in the short term.[69] Technological improvements may increase its technical performance in the medium term,[70] especially with Low Earth orbit satellites (LEO).[71] In fact, in the 2018 budget, the federal government proposed to invest $100 million over five years to support LEO development through ISED's Strategic Innovation Fund.

Various regulatory issues pertain to the management of physical telecommunications infrastructure. Witnesses pleaded that, without governmental support, infrastructure is very expensive to build and access.[72] Without "right of way,"[73] new providers cannot access existing infrastructure to modify and improve them for the purpose of delivering broadband Internet services. Without such permission, new providers may incur higher costs to provide access to Internet services.[74]

Some support structures exacerbate difficulties of accessing infrastructure. The fact that hydro poles,[75] for instance, are not governed by the CRTC, leads to "vastly divergent rates being charged for identical services only because hydro support structure rates are set by provincial regulators and the rates of Bell Canada and TELUS are set by the CRTC."[76] Because broadband is not considered in infrastructure programs, such as road-building, costly telecommunications infrastructure will, in some cases, be added after the fact:[77]

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67 INDU, *Evidence*, 1st Session, 42nd Parliament, 30 May 2017, 0845 (Pamela Miller); VHI, brief, 24 November 2017; SaskTel, brief, 23 February 2018; TELUS, brief, 26 February 2018.

68 Institute for Local Self-Reliance (ILSR), brief, 19 February 2018.

69 Ibid.

70 INDU, *Evidence*, 1st Session, 42nd Parliament, 23 November 2017, 1000 (Luc Delorme, Acting Director, Connecting Canadians Branch, Program and Engineering, ISED).

71 Ibid., 1125 (Adam Scott, Acting Director General, Spectrum Licensing Policy Branch, ISED).

72 ITPA, brief, 30 January 2018; EOWC & EORN, brief, 23 February 2018.

73 Right of way is a type of easement (or real servitude). An easement is a right to use another person's real property for a specified purpose.

74 INDU, *Evidence*, 1st Session, 42nd Parliament, 8 February 2018, 1530 (Pierre Collins).

75 Canadian Cable System Alliance (CCSA), brief, 27 September 2017; ITPA, brief, 30 January 2018; Shaw, brief, 12 February 2018; EOWC & EORN, brief, 23 February 2018.

76 ITPA, brief, 30 January 2018.

77 INDU, *Evidence*, 1st Session, 42nd Parliament, 8 February 2018, 1655 (Pierre Collins); R2B2, brief, 22 February 2018.

> **Mr. Ruimy (The Chair):** Just to follow along the lines of where Mr. Eglinski was going, do you know if they are pre-wiring when they're doing infrastructure, building roads, and those sorts of things? Are they building it into the actual infrastructure?
>
> **Mr. Pierre Collins:** When they do a road?
>
> **The Chair:** When they're building a new road.
>
> **Mr. Pierre Collins:** No.
>
> **The Chair:** They're not doing that?
>
> **Mr. Pierre Collins:** No. They open the street three times, one year at a time, just to make sure they bother everybody.
>
> **…**
>
> **Mr. Pierre Collins:** We call that "planning." Planning is something that exists here but nowhere else.[78]

Susan Hart, Director General, Connecting Canadians Branch, from ISED stated that: "the best and most cost-effective way to deploy broadband is when you're planning that as part of other infrastructure. If there are other roads being built, you actually include the fibre build with it at the same time."[79]

To increase access, witnesses suggested incentivizing stakeholders to share infrastructure by encouraging service-based competition rather than facilities-based competition.[80] While some providers share telecommunications towers in some instances, Brent Grisdale, Founder and Vice-President Business Development of Rigstar Industrial Telecom, suggested instead resorting to an infrastructure bank or, as it is done in the United States, selling towers to operate them as a real estate investment trust.[81]

Furthermore, to facilitate their management, the Government of Canada could consider telecommunications infrastructure within its national strategic infrastructure. This way, some witnesses argue, providers could benefit from preferential financing terms to build

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78 INDU, *Evidence*, 1st Session, 42nd Parliament, 8 February 2018, 1655 (Pierre Collins).

79 INDU, *Evidence*, 1st Session, 42nd Parliament, 23 November 2017, 1150 (Susan Hart).

80 VHI, brief, 24 November 2017; SWIFT, brief, 19 December 2017.

81 INDU, *Evidence*, 1st Session, 42nd Parliament, 1 February 2018, 1630 (Brent Grisdale, Founder and Vice-President Business Development, Rigstar Industrial Telecom). A REIT is company that owns, and often operates, income-producing real estate. In Canada REITs are trusts that are exempt from the tax on specified investment flow-through entities. To qualify as a REIT, a trust must meet certain conditions that recognize the unique history and role of collective real estate investment vehicles.

infrastructure and the CRTC could manage it, rather than the provinces.[82] Notably, some companies that cannot access infrastructure at an affordable price have developed innovative solutions, such as using old gas pipes or old water pipes to bury fibre optic cables.[83]

Lastly, the Van Horne Institute raised the point that, by relying on market forces, the CRTC risks disadvantaging "rural and remote communities where market forces may be nascent at best or completely non-existent."[84]

b. Network and spectrum management

The governance of network access for providers may affect, in turn, access for end-users. To encourage competition among ISPs, the CRTC mandates incumbents to sell high-speed access services at wholesale prices to smaller ISPs.[85] Many ISPs from rural and remote areas plead in favour of increasing the regulation of wholesale pricing in order to increase access and affordability for end-users.[86] Others, especially incumbents, disagree: without wholesale pricing, or with more flexible network management, they would have more incentives to build and invest in rural and remote areas.[87] To also encourage competition, the Olds Institute for Community and Regional Development argued for the CRTC to compel incumbents to lease their fibre to other companies. However, for the sake of transparency, the witness also claims that the leasing of fibre and the conditions of the lease should be public information.[88]

Other witnesses support open-access networks to encourage competition in the delivery of broadband Internet services.[89] Open access involves, for instance, allowing any person to access a network in order to provide Internet services.[90] Ms. Prudham claimed that offloading from larger antennas — by relieving congested mobile networks with more

82 CCSA, brief, 27 September 2017; ITPA, brief, 30 January 2018.

83 INDU, *Evidence*, 1st Session, 42nd Parliament, 8 February 2018, 1645 (Pierre Collins).

84 VHI, brief, 24 November 2017.

85 CRTC, Telecom Order CRTC 2017-312, 29 August 2017.

86 FMCC, brief, 13 October 2017; SWIFT, brief, 19 December 2017; SaskTel, brief, 23 February 2018; SSi Micro Ltd., brief, 23 February 2018.

87 Bell, brief, 30 January 2018; NorthwesTel, brief, 19 February 2018; TELUS, brief, 26 February 2018.

88 Olds Institute for Community and Regional Development (OI), brief, 25 September 2017.

89 INDU, *Evidence*, 1st Session, 42nd Parliament, 1 February 2018, 1555 (Brent Grisdale); 6 February 2018, 1555 (Dean Proctor); 8 February 2018, 1615 (Geoff Hogan); R2B2, brief, 22 February 2018.

90 INDU, *Evidence*, 1st Session, 42nd Parliament, 8 February 2018, 1640 (Geoff Hogan).

capacity from unlicensed Wi-Fi spectrum — would significantly improve the quality and extent of coverage.[91]

ISED manages cellular spectrum and grants it through auctions. It divides spectrum in different tier sizes: tier 1 is national, tier 2 is provincial and tier 4 is smaller. According to Ms. Miller, the federal government has more than doubled the amount of spectrum available for commercial mobile services.[92] As for non-cellular spectrum, providers can openly access unlicensed spectrum for fixed wireless. To address spectrum issues, Ms. Miller explained that considering the larger size of the American market, ISED tends to adopt the same approach as American regulators.[93]

> **"[S]ome of the worst broadband servicing in Canada is actually right around Toronto."**

Many witnesses criticized spectrum allocation in Canada. They disapprove of the scope of spectrum licences, considered too wide as one licence can encompass both rural and urban areas.[94] The wide scope of spectrum licences risks leaving many rural areas without service. Indeed, incumbents will seek licences only to provide services in more profitable areas:

> Likewise, Xplornet is certainly concerned about the upcoming auctions. … we're concerned that there hasn't been recognition of the fact that [spectrum allocation is] needed for rural broadband. … some of the worst broadband servicing in Canada is actually right around Toronto. It's because the spectrum is trapped in the Toronto licence. If it's worth seven million people in that area, you're buying it to serve the downtown Toronto folks. You're not serving Uxbridge, Stouffville, Milton, or some of those areas.[95]

The wide scope of spectrum licences disadvantages small ISPs or new providers who cannot afford such licences nor compete to service such large areas.[96] Additionally, Mr. Grisdale considers current spectrum pricing outdated: it relies on a cost model developed for

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91 INDU, *Evidence*, 1st Session, 42nd Parliament, 6 February 2018, 1700 (C.J. Prudham).

92 INDU, *Evidence*, 1st Session, 42nd Parliament, 30 may 201, 0910, 0940 (Pamela Miller).

93 Ibid., 0915.

94 INDU, *Evidence*, 1st Session, 42nd Parliament, 6 February 2018, 1630 (C.J Prudham).

95 Ibid.

96 INDU, *Evidence*, 1st Session, 42nd Parliament, 1 February 2018, 1600 (Brent Grisdale); 6 February 2018, 1630 (Jay Thomson, CEO, Canadian Cable Systems Alliance); ITPA, brief, 30 January 2018; ILSR, brief, 19 February 2018; Shaw, brief, 12 February 2018; EOWC & EORN, brief, 23 February 2018.

traditional telephony systems and based on providing a rate of 56 kilobits-per-second over a copper twisted pair.[97] Because non-cellular spectrum, while partly available without licence, is limited, it cannot meet the growing demand. In addition, unlicensed non-cellular spectrum encounters a lot of signal interference, preventing ISPs from using and guaranteeing a quality of service to customers.[98]

Witnesses also proposed a variety of solutions to better manage spectrum allocation. Mr. Grisdale suggests that, spectrum being an asset, its proper allocation could improve broadband access in rural and remote communities without necessitating additional funding.[99] To facilitate the participation of small ISPs to spectrum allocation, the federal government could modify its auction system.[100] The federal government could also price spectrum differently.[101] For instance, Mr. Grisdale suggested that spectrum pricing be based on the amount of population served, rather than the traditional, telephony model described above.[102] The Government of Canada could also reduce the scope of its licences, grant more licences or reserve spectrum for specific groups.[103] For instance, smaller ISPs could provide Internet services in small regions in an economically feasible manner if spectrum was broken down into smaller, more affordable tiers:

> The one area where we're probably in agreement with Xplornet and would like to see some adjustments is where one can bid, but also the size of the tiering. Maybe the tiering needs to be adjusted to favour more rural and remote area auctions.[104]

Subordinating allocated, but unused spectrum to small ISPs may face difficulties when the concerned incumbent refuses to collaborate with its competitors.[105] A few witnesses suggested adopting a “use it or lose it” approach to spectrum allocation for rural areas.[106]

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97 INDU, *Evidence*, 1st Session, 42nd Parliament, 1 February 2018, 1600 (Brent Grisdale).

98 INDU, *Evidence*, 1st Session, 42nd Parliament, 8 February 2018, 1650 (John Meldrum); SaskTel, brief, 23 February 2018.

99 INDU, *Evidence*, 1st Session, 42nd Parliament, 1 February 2018, 1615 (Brent Grisdale).

100 ITPA, brief, 30 January 2018.

101 INDU, *Evidence*, 1st Session, 42nd Parliament, 1 February 2018, 1600 (Steve Finlayson), 1600 (Brent Grisdale); 6 February 2018, 1630 (Dean Proctor).

102 INDU, *Evidence*, 1st Session, 42nd Parliament, 1 February 2018, 1600 (Brent Grisdale).

103 INDU, *Evidence*, 1st Session, 42nd Parliament, 6 February 2018, 1630 (Dean Proctor).

104 Ibid.

105 Ibid., 1650 (Ian Stevens, Board Member, Canadian Cable Systems Alliance, and Chief Executive Officer, Execulink Telecom).

106 INDU, *Evidence*, 1st Session, 42nd Parliament, 1 February 2018, 1600 (Brent Grisdale); ITPA, brief, 30 January 2018; EOWC & EORN, brief, 23 February 2018; TELUS, brief, 26 February 2018.

Currently, companies can acquire spectrum, but are not required to use it fully. This provides an incentive to provide services to most profitable areas, leaving mostly rural and remote areas without service or with subpar service. Therefore, witnesses argued that a person that acquires spectrum should be bound to implement the service in all relevant areas. If they fail to do so, the unused spectrum should be granted or leased to another ISP.[107] Such regulatory adjustments would allow small ISPs to provide services in smaller areas in a profitable manner.[108]

Moreover, many witnesses argue that they need access to higher spectrum frequencies to provide faster speeds; for instance, 600 megahertz (MHz) would be ideal for rural coverage.[109] Ms. Prudham underlined harmonizing Canadian and American standards for spectrum allocation would avoid signal interference.[110] The Committee drew a similar conclusion in a previous report entitled *Innovation and Technology: an Exchange of Ideas*.[111]

Recommendations

The Committee recommends that:

4. **The Government of Canada take steps to address the challenges of small providers, non-profit providers, and non-incumbent providers of accessing existing infrastructures for the purpose of deploying broadband access, including easements, real servitudes, especially in regards to utility poles. Such measures could include legislative amendments, when feasible, in collaboration with provincial governments.**

5. **The Government of Canada consider ways to encourage the integration of broadband deployment within all infrastructure renewal programs.**

6. **The Government of Canada consider the spectrum allocation process for the purpose of broadband deployment. More specifically, it should focus on the scope of licences, pricing, and effective use of allocated spectrum,**

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107 INDU, *Evidence*, 1st Session, 42nd Parliament, 1 February 2018, 1600 (Brent Grisdale).

108 INDU, *Evidence*, 1st Session, 42nd Parliament, 6 February 2018, 1600, 1630 (Dean Proctor).

109 INDU, *Evidence*, 1st Session, 42nd Parliament, 1 February 2018, 1600 (Steve Finlayson); SaskTel, brief, 23 February 2018; TELUS, brief, 26 February 2018.

110 INDU, *Evidence*, 1st Session, 42nd Parliament, 6 February 2018, 1635 (C.J Prudham).

111 INDU, *Innovation and Technology: An exchange of idea*, Seventh Report, 1st Session, 42nd Parliament, June 2017.

including ensuring that small providers, non-profit providers, and non-incumbent providers have reasonable access to spectrum for broadband deployment.

C. Implementation

Broadband deployment in rural and remote areas faces many monetary and organizational challenges. In order to overcome these challenges, witnesses argue that more funding is needed as well as collaboration among all stakeholders and local participation.[112]

1. Financial challenges

Witnesses stated that current federal funding is significant, yet insufficient.[113] Indeed, considering the CRTC roughly estimates the cost to cover rural Canada and the North at $7 billion,[114] there appears to be a gap between the cost of providing broadband access to these areas and the public funds currently available.[115] Many witnesses claim that meeting the cost of providing broadband access to rural and remote areas is especially difficult considering that returns on investment are not high enough to attract private funds.[116] However, others argue that small ISPs could serve these smaller areas in a profitable manner, but only if the federal government makes adjustments to the regulatory structure of the market.[117]

[S]mall ISPs could serve these smaller areas in a profitable manner, but only if the federal government makes adjustments to the regulatory structure of the market.

112 INDU, *Evidence*, 1st Session, 42nd Parliament, 23 November 2017, 1100, 1105 (Susan Hart); NorthwesTel, brief, 19 February 2018; SaskTel, brief, 23 February 2018.

113 INDU, *Evidence*, 1st Session, 42nd Parliament, 1 February 2018, 1610 (Steve Finlayson); 6 February 2018, 1605 (James Maunder, Vice-President, Communications and Public Affairs, Xplorner Communications Inc.); FCM, brief, 20 October 2017; SWIFT, brief, 19 December 2017; SaskTel, brief, 23 February 2018.

114 INDU, *Evidence*, 1st Session, 42nd Parliament, 23 November 2017, 1150 (Susan Hart).

115 INDU, *Evidence*, 1st Session, 42nd Parliament, 23 November 2017, 1100, 1105 (Susan Hart); NorthwesTel, brief, 19 February 2018; SaskTel, brief, 23 February 2018.

116 CCC, brief, 25 October 2017; PC, brief, 20 October 2017; CRRF et al., brief, 13 December 2017.

117 INDU, *Evidence*, 1st Session, 42nd Parliament, 6 February 2018, 1600, 1630 (Jay Thomson), 1630 (C.J. Prudham).

a. Funding

Some witnesses argue that since the CRTC considers broadband Internet an "essential service,"[118] infrastructure should receive the same funding support as roads, water or street lights.[119] Others contend that the federal government should design flexible programs, with various amounts granted according to needs and various forms of support, as some communities might need one-time capital investments and others might need ongoing funding support.[120] The federal government should also consider affordability for the end-user when designing funding programs to ensure that communities can effectively access Internet services.[121]

Witnesses proposed a variety of ways to improve federal funding programs. Some witnesses would like programs to focus on specific areas, prioritizing those that are the most difficult to serve.[122] Others contend that these programs should also prioritize underserved and sparsely populated areas in proximity to urban centers.[123] Still others suggested that the federal government create separate funding envelopes for rural and remote areas.[124] The government could also offer specific financing opportunities for non-traditional providers,[125] such as municipalities, non-profit organizations, cooperatives or Indigenous communities.[126] Some witnesses also stated that funding initiatives could support projects joining harder-to-serve areas to more profitable urban areas.[127]

Shaw Communications Inc. claims that focusing public investment on connecting communities, as opposed to focusing on individual households, maximizes the potential for

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118 CRTC, CRTC establishes fund to attain new high-speed Internet targets, 21 December 2016.

119 INDU, *Evidence*, 1st Session, 42nd Parliament, 6 February 2018, 1545 (Jay Thomson); EOWC & EORN, brief, 23 February 2018.

120 CCSA, brief, 27 September 2017; FCM, brief, 20 October 2017; EOWC & EORN, brief, 23 February 2018.

121 INDU, *Evidence*, 1st Session, 42nd Parliament, 23 November 2017, 1205 (Luc Delorme); 30 November 2017, 1105 (Ray Orb).

122 FCM, brief, 20 October 2017.

123 CCSA, brief, 27 September 2017; SWIFT, brief, 19 December 2017.

124 EOWC & EORN, brief, 23 February 2018.

125 Cybera, brief, 13 October 2017.

126 INDU, *Evidence*, 1st Session, 42nd Parliament, 23 November 2017, 1135 (Susan Hart); 8 February 2018, 1555 (William Chen); FMCC, brief, 13 October 2017.

127 INDU, *Evidence*, 1st Session, 42nd Parliament, 8 February 2018, 1640 (Geoff Hogan); ILSR, brief, 19 February 2018.

choice and sustainable competition in the mid-to-long run.[128] For instance, funding could be given to libraries to provide high speed access to the community.[129]

Many witnesses argue that the Government of Canada could better involve small ISPs by changing the way it awards funding to them. More specifically, the government could reduce risk for those providers by committing to long-term and predictable funding for broadband Internet access in rural and remote communities.[130] This strategy would not only facilitate long-term planning, but may also reduce subsidies over time.[131] Also, some stated that allocating funding mainly to incumbents can make new providers uncompetitive.[132] Rather, all providers should be eligible to apply for federal funding, which should be allocated in a transparent manner.[133] A rigorous application and reporting process is important to ensure accountability,[134] but the complexity of these processes can increase costs for small ISPs.[135] The government could adapt these processes to the means of small ISPs in order to encourage them to compete for funding.[136]

Like its predecessor Connecting Canadians and as supported by some witnesses,[137] Connect to Innovate allocates funds on a technologically neutral basis. [138] The latter program, however, focuses on backbone infrastructure projects.[139] According to some witnesses, the federal government could grant its funding according to the specific needs of each community, rather than according to types of infrastructure (backbone vs. last-mile)

128 AAMDC, brief, 6 October 2017; Shaw, brief, 12 February 2018.

129 CRRF et al., brief, 13 December 2017.

130 INDU, *Evidence*, 1st Session, 42nd Parliament, 8 February 2018, 1550 (William Chen); FCM, brief, 20 October 2017.

131 INDU, *Evidence*, 1st Session, 42nd Parliament, 8 February 2018, 1630 (Geoff Hogan).

132 INDU, *Evidence*, 1st Session, 42nd Parliament, 23 November 2017, 1150 (Susan Hart); 6 February 2018, 1605 (James Maunder), 1620 (C.J. Prudham); EOWC & EORN, brief, 23 February 2018.

133 INDU, *Evidence*, 1st Session, 42nd Parliament, 6 February 2018, 1600 (Dean Proctor).

134 Ibid., 1645 (Dean Proctor).

135 INDU, *Evidence*, 1st Session, 42nd Parliament, 1 February 2018, 1535 (Brent Grisdale).

136 CCSA, brief, 27 September 2017; EOWC & EORN, brief, 23 February 2018.

137 INDU, *Evidence*, 1st Session, 42nd Parliament, 6 February 2018, 1555 (Dean Proctor); SaskTel, brief, 23 February 2018; TELUS, brief, 26 February 2018.

138 In the present context, a technology neutral approach does not privilege one technology over another in the pursuit of policy goals, leaving to stakeholders the task of devising and implementing means to reach these goals. For example, a federal program could set performance targets for the provision of Internet services, leaving to Internet service providers the freedom to choose which technology (e.g., fibre cable, fixed wireless, satellite, etc.) should be employed to meet these standards.

139 INDU, *Evidence*, 1st Session, 42nd Parliament, 23 November 2017, 1100 (Susan Hart).

or technology.[140] In contrast, a few witnesses, support targeted funding for fibre only projects.[141] Funding could also only be awarded to ISPs that have been successful in the past.[142] More generally, Bell Canada claimed that the federal government should award its funding for ISPs through a reverse auction to favour the most cost-efficient proposals. Such auctions could devote "envelopes" to specific policy considerations.[143]

b. Public–private partnerships

Although the private sector is the principal driver of telecom investment in Canada ($13 billion in 2015),[144] many ISPs do not invest in rural and remote communities. First Mile Connectivity Consortium explained the lack of private investment in the following terms:

> [P]olicy and regulatory frameworks … are designed to support private-sector business cases in regions where such opportunities simply do not exist. Private sector-driven innovation has proven successful across approximately 5% of Canada's territory, where billion-dollar investments are connecting whole cities to fibre-to-the-home infrastructure, serving 95% of Canada's urban and southern populations. But this approach simply does not work across the remaining 95% of the country.[145]

Unless changes are made to the regulatory structure of the provision of Internet services to allow small ISPs to provide services to small areas in a profitable manner, governments may have to provide incentives for private entities to invest to establish or maintain Internet access in these areas.[146]

Witnesses stated that several municipalities from rural and remote areas would partner with all levels of governments to deploy broadband, but face difficulties when trying to do so.[147] Everything is more expensive in rural and remote areas, considering both their

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140 INDU, *Evidence*, 1st Session, 42nd Parliament, 6 February 2018, 1555 (Dean Proctor); FCM, brief, 20 October 2017; Bell, brief, 30 January 2018; EOWC & EORN, brief, 23 February 2018.

141 VHI, brief, 24 November 2017; SWIFT, brief, 19 December 2017.

142 ILSR, brief, 19 February 2018; TELUS, brief, 26 February 2018.

143 Bell, brief, 30 January 2018.

144 INDU, *Evidence*, 1st Session, 42nd Parliament, 30 May 2017, 0845 (Pamela Miller).

145 FMCC, brief, 13 October 2017. See also Rural Ontario Municipal Association (ROMA), brief, 12 September 2017; OI, brief, 25 September 2017; AAMDC, brief, 6 October 2017; CCC, brief, 25 October 2017; BLC, brief, 24 November 2017; VHI, brief, 24 November 2017; CRRF et al., brief, 13 December 2017; SWIFT, brief, 19 December 2017.

146 EOWC & EORN, brief, 23 February 2018.

147 INDU, *Evidence*, 1st Session, 42nd Parliament, 8 February 2018, 1540 (Geoff Hogan); OI, brief, 25 September 2017; Cybera, brief, 13 October 2017.

remoteness and often, complex geography.[148] These generalized increased costs make it onerous for municipalities to deploy broadband and for customers to subscribe to the services.[149] Municipalities have few public funding options and often neither have the knowledge nor the experts on site to implement or manage such complex projects.[150]

For instance, in 2013, the municipality of Olds in Alberta established a non-profit organization that developed O-net, the first community-owned, open fibre utility infrastructure network in Canada. In 2017, the network reached 40% of the market of the municipality, where it could deliver speed of up to 2,400 Mbps and minimally of 140 Mbps.[151] Olds faced many challenges in the implementation of O-net due to their lack of expertise and funding. Based on their experience, they argue that governments should more effectively organize partnerships and funding to encourage other municipalities to develop their own network:

> This is a very clear situation where our Federal Government can assist and support an innovative, replicable model of a rural community facilitating and ensuring its own sustainable future, instead of the government being expected to do it. Our MP, Earl Dreeshen, has been very supportive in keeping us aware of existing programs that we could access both for enhancement of the network but also to help make our citizens intelligent users of technology. Unfortunately, we have yet to qualify for any federal funds.[152]

Witnesses also told the Committee that the federal government should support public-private partnerships (P3s) between private entities and all levels of government in order to invest in rural and remote communities.[153] Many witnesses even stated that considering costs and other challenges, P3s are essential to successfully deploy broadband Internet in these communities.[154] Therefore, they argued that the Government of Canada should put in place a framework to support P3s.[155]

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148 ROMA, brief, 12 September 2017; FMCC, brief, 13 October 2017; NorthwesTel, brief, 19 February 2018.

149 Cybera, brief, 13 October 2017.

150 Ibid.; OI, brief, 25 September 2017.

151 Ibid.

152 Ibid.

153 ROMA, brief, 12 September 2017.

154 INDU, *Evidence*, 1st Session, 42nd Parliament, 30 November 2017, 1110 (Ray Orb); FCM, brief, 20 October 2017; NorthwesTel, brief, 19 February 2018.

155 INDU, *Evidence*, 1st Session, 42nd Parliament, 30 November 2017, 1145 (Ray Orb); VHI, brief, 24 November 2017.

Stakeholders can learn from successful Canadian P3 ventures. For example:

- In the Northwest Territories, the P3 project "Mackenzie Fibre Line" brought fibre connection to communities along the Mackenzie Valley Highway;[156]

- In Ontario, SWIFT persuaded private entities to provide broadband in rural and urban areas by connecting communities through ingenious P3s, with partners that include the federal government, Indigenous communities and University of Guelph through their Regional and Rural Broadband project (R2B2);[157] and

- A decade ago, the Eastern Ontario Warden's Caucus, regrouping 750,000 residents from 13 county and Single Tier municipalities on a region of 50,000 km^2, worked with federal and provincial governments to develop the Eastern Ontario Regional Network (EORN). EORN collaborated with six ISPs owning and operating the network to provide 89% of their households, access to Internet services capable of reaching downloading speeds of up to 10 Mbps. The project was technology neutral: EORN limited its investment to $175 million by using multiple technologies, compared to the $1 billion it would have required if only fibre had been used in the deployment of broadband access.[158]

Given these successes, it is reasonable to contend that encouraging broadband deployment by incentivizing P3s could support the deployment of broadband Internet in rural and remote areas.

Recommendations

The Committee recommends that:

7. The Government of Canada consider ways to further encourage non-traditional network operators to apply for federal funding, including, but

156 INDU, *Evidence*, 1st Session, 42nd Parliament, 23 November 2016, 1605 (Robert C. McLeod, Deputy Premier, Minister of Environment and Natural Resources, Minister of Finance, and Minister of Human Resources, Government of the Northwest Territories).

157 INDU, *Evidence*, 1st Session, 42nd Parliament, 8 February 2018, 1550 (Geoff Hogan); SWIFT, brief, 19 December 2017.

158 EOWC & EORN, brief, 23 February 2018.

not limited to, cooperatives, non-profits, partnerships, and local governments.

8. **The Government of Canada consider ways to increase the accessibility of funding programs for small providers, non-profit providers, and non-incumbent providers. This may include various means, such as simplifying the application and reporting process for these providers.**

9. **The Government of Canada ensure funding programs support both backbone and "last-mile" infrastructure, and remain technology neutral.**

10. **The Government of Canada incentivize and encourage investments and partnerships for broadband deployment in rural and remote regions.**

2. Governance

Witnesses stated that a collaborative and inclusive strategy involving all levels of government, and encouraging and supporting local stakeholders need to be implemented.[159]

a. Local empowerment

Witnesses told the Committee that an approach involving all levels of government is important to effectively deliver broadband to all rural Canada.[160] Provinces can play various roles. For instance, the government of Saskatchewan is gathering data to have a better understanding of broadband coverage in the province.[161] As noted earlier, municipalities could also make a positive contribution in a multi-government collaboration, but they need more financial resources to do so.[162] In fact, SWIFT spoke of provinces and municipalities matching funds with the federal government:

> So, what if every federal department contributed 1% of the $120 billion federal infrastructure budget over the next 10-years and every province and municipality matched those funds out of their infrastructure budgets to ensure every home, farm, business and public-sector site/asset and fixed and mobile wireless tower had a fibre connection. We could have every person, place and thing connected to fibre, WiFi and

159 VHI, brief, 24 November 2017; CCRF et al., brief, 13 December 2017; SWIFT, brief, 19 December 2017.

160 CCRF et al., brief, 13 December 2017.

161 SARM, brief, 11 December 2017.

162 BLC, brief, 24 November 2017.

> LTE by 2025 to surf the wave of the Internet of Things, rather than being overwhelmed by the coming tsunami.[163]

Other stakeholders could also be involved, such as First Nations communities. These communities are directly affected by broadband Internet access, or lack thereof, and would require resources and representation in the management of its deployment.[164]

Witnesses stated that local stakeholders, including ISPs and non-traditional providers such as co-operatives as well as municipalities, can play an important and beneficial role in broadband deployment. These entities tend to focus more on the concerns of their communities and better understand their needs.[165] For instance, fibre optic is expensive, but this cost can be mitigated by empowering communities to develop local solutions.[166] As Chris Mitchell, Director, Community Broadband Networks for the Institute for Local Self-Reliance, explains:

> [I]n North Dakota, the vast majority of the territory is covered with fibre optics. In fact, if you're on a farm in North Dakota, you're far more likely to have high-quality Internet access than if you're in one of the population centres. That was done almost entirely with co-operatives but also with local, independently owned companies that reinvested in their communities because they are local communities ….[167]

Witnesses thus suggested that the federal government should support and involve local talent toward developing solutions for broadband deployment.[168] A local-focused approach may also make public spending more efficient in terms of subsidy targeting, cost control and democratic accountability.[169]

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163 SWIFT, brief, 19 December 2017.

164 Assembly of First nations, reference document, 26 February 2018.

165 INDU, *Evidence*, 1st Session, 42nd Parliament, 6 February, 1545 (Jay Thomson); CCSA, brief, 27 September 2017; FCM, brief, 20 October 2017.

166 VHI, brief, 24 November 2017.

167 INDU, *Evidence*, 1st Session, 42nd Parliament, 6 February 2018, 1550 (Chris Mitchell).

168 Ibid., 1555 (Dean Proctor).

169 EOWC & EORN, brief, 23 February 2018.

b. Data collection

The CRTC gathered information with ISED to put in place a map depicting broadband coverage in Canada (as of 2014). This map uses a hexagonal system to classify "served" and "underserved areas."[170] The map classifies an entire territory covered by a hexagon area of 25 km^2 as "served" if at least one household has access to speeds of 5/1 Mbps.

The map classifies an entire territory covered by a hexagon area of 25 km^2 as "served" if at least one household has access to speeds of 5/1 Mbps.

ISED uses the same hexagon mapping system to determine the eligibility of communities to federal programs designed to promote access to broadband Internet, such as Connect to Innovate.[171] Organizations can go online and use another map based on this system to see if their area is eligible for funding.[172] On this map,

> [r]ural communities that are more than 2 km from an access point to high-capacity backbone are eligible for new backbone funding… Areas (shown as hexagons) which do not have any existing broadband service of 5 Mbps or greater are eligible for new last-mile funding.[173]

The second map uses the same data as the first one, although it only presents information relevant to whether or not a community is eligible for federal funding for the purpose of extending broadband access.

Many witnesses deem the federal government mapping system inaccurate.[174] Blue Sky argues that ISED and CRTC assume households are evenly distributed throughout the hexagon, which is not the case. This assumption makes ISED and the CRTC's information about service within a hexagon inaccurate since it fails to reflect the actual location of

170 CRTC, Broadband Internet Service Coverage in Canada (https://crtc.gc.ca/eng/internet/internetcanada.htm), 20 April 2016.

171 BSEGC, brief, 2 November 2017.

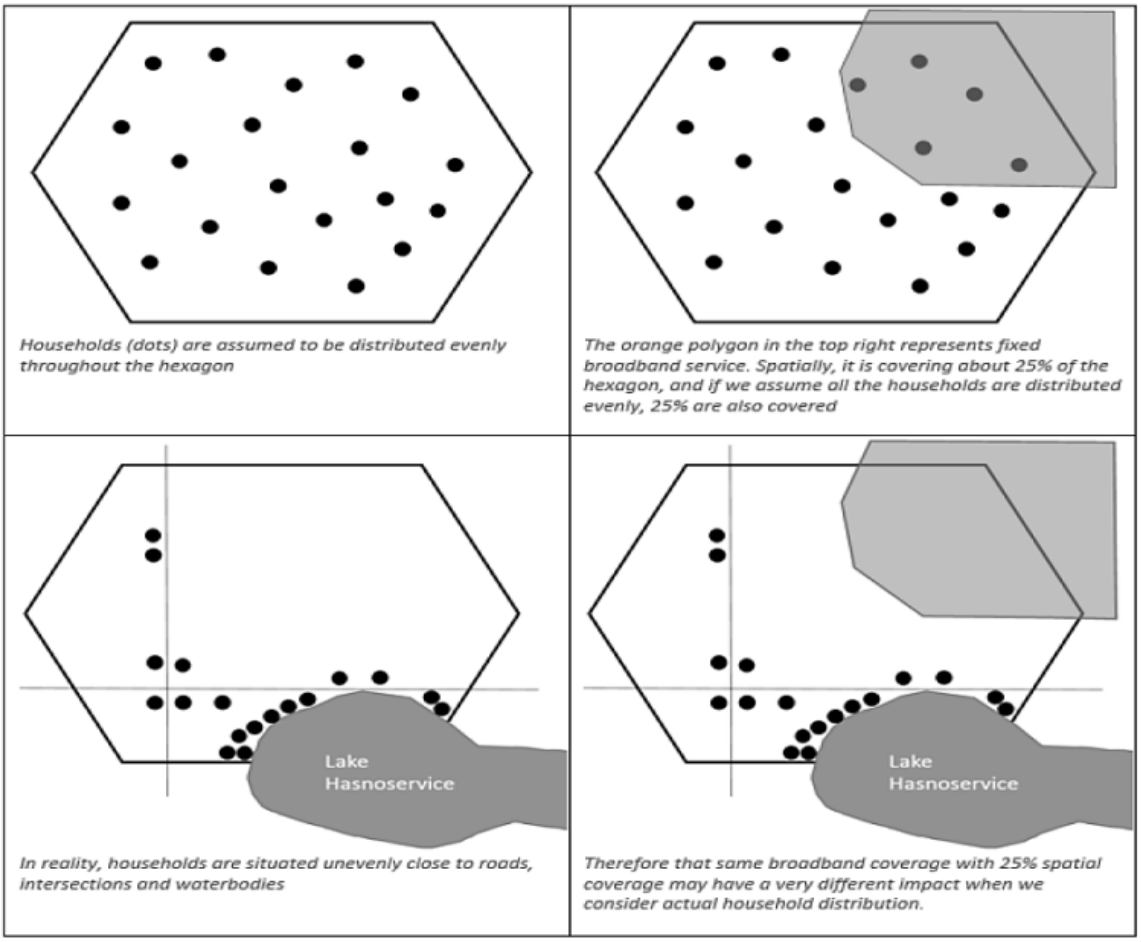
172 Readers can consult this map here (http://www.ic.gc.ca/app/sitt/ibw/hm.html?lang=eng).

173 ISED, Areas eligible for funding to enhance broadband access, 16 February 2017.

174 FCM, brief, 20 October 2017; BSEGC, brief, 2 November 2017.

households (Figure 2). In consequence, many communities have to collect their own data and gather local knowledge when starting a project.[175]

Figure 2 – The Hexagon Mapping System



Source: Blue Sky Economic Growth Corporation, Broadband Connectivity in Rural Canada.

For instance, Mr. Collins explained that when his organization started one project,

> [t]he RCM [Regional County Municipality of Montcalm] did a detailed study to find out the number of residents and residences in its territory that were underserved. That turned out to be 7,100 of 22,000 residences. Those figures were very different from the ones that the Government of Canada had. Local service providers claimed that the

175 INDU, *Evidence*, 1st Session, 42nd Parliament, 30 November 2017, 1105 (Ray Orb); FCM, brief, 20 October 2017; SWIFT, brief, 19 December 2017; R2B2, brief, 22 February 2018.

> region was being well served, but our audit of the municipality's residents showed us that the minimum speed was not being achieved.[176]

According to witnesses, there is a discrepancy between effective access and access as reported by ISED and the CRTC.[177]

The federal government can improve data collection in various ways.[178] Blue Sky recommends replacing the current hexagon mapping system with a geographic information system (GIS) called Broadband and Associated Infrastructure Mapping and Analysis Project (BAIMAP).[179] An initiative funded by FedNor, BAIMAP uses data collected by Blue Sky and provided by ISPs that operate broadband networks in northern Ontario.[180] The federal government could prioritize funding allocation by narrowing the definition of rural areas:[181] the CRTC uses Statistics Canada's definition for "rural," which is a community of less than 30,000 persons, but many rural communities are much smaller than that.[182]

Since 2012, SWIFT, in collaboration with R2B2, has been conducting a longitudinal study to "measure how effective public investment is in providing incentives for private sector to improve broadband."[183] Thus, the study does not assess coverage, but rather, the various broadband economic benefits, such as the net benefit to consumers or the social net benefits.[184] For this study, SWIFT and R2B2 collect data from three data sets: municipalities, universities, schools and hospitals data; provider data (mapped in a GIS system); and residential, business, and farm data.[185]

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176 INDU, *Evidence*, 1st Session, 42nd Parliament, 8 February 2018, 1530 (Pierre Collins).

177 PC, brief, 20 October 2017; FCM, brief, 20 October 2017; BSEGC, brief, 2 November 2017.

178 INDU, *Evidence*, 1st Session, 42nd Parliament, 8 February 2018, 1630 (John Meldrum); FCM, brief, 20 October 2017; R2B2, brief, 22 February 2018.

179 BSEGC, brief, 2 November 2017.

180 Ibid.

181 SARM, brief, 11 December 2017.

182 INDU, *Evidence*, 1st Session, 42nd Parliament, 30 may 2017, 0950 (Susan Hart).

183 INDU, *Evidence*, 1st Session, 42nd Parliament, 8 February 2018, 1540 (Geoff Hogan).

184 Ibid., 1550 (Donghoon Lee, Research Partner, Economist, R2B2, University of Guelph, SouthWestern Integrated Fibre Technology).

185 Ibid.

c. Developing a national strategy

Witnesses told the Committee of the need to facilitate and coordinate broadband deployment across Canada by involving all key stakeholders. To do so, most witnesses pleaded for the federal government to develop a "national broadband strategy."[186] This strategy could involve all levels of government, federal agencies and other stakeholders such as northern and Indigenous communities.[187] The strategy could also include a specific strategy for data collection, since it is fundamental to planning.[188] The strategy could address other concerns, such as digital literacy.[189] One witness added that the strategy should also commit to meaningful consultations with Indigenous communities to ensure that these communities have equal access to jobs and education opportunities associated with broadband deployment.[190] The Assembly of First Nations requested a strategy specific to the needs and concerns of Indigenous communities.[191]

There are other possible approaches to support broadband deployment. Some witnesses argue that the federal government could implement a multi-stakeholder council to oversee broadband policy implementation. The Government of Canada could also establish a rural broadband advisory committee involving key stakeholders from all sectors to, notably, guide future minimum speed requirements and identify gaps in service availability.[192] The Olds Institute for Community and Regional Development suggested that the federal government increase the number of consumers subscribing to broadband services by giving them a tax credit. Knowing they have a bigger customer pool, ISPs and network operators would be incentivized to build high-speed networks.[193]

Recommendations

The Committee recommends that:

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186 Cybera, brief, 13 October 2017; FMCC, brief, 13 October 2017; VHI, brief, 24 November 2017; EOWC & EORN, brief, 23 February 2018.

187 FMCC, brief, 13 October 2017; PC, brief, 20 October 2017.

188 BSEGC, brief, 2 November 2017.

189 EOWC & EORN, brief, 23 February 2018.

190 FMCC, brief, 13 October 2017.

191 Assembly of First nations, reference document, 26 February 2018.

192 CRRF et al., brief, 13 December 2017.

193 OI, brief, 25 September 2017.

11. Innovation, Science, and Economic Development Canada develop a comprehensive rural broadband strategy in collaboration with key stakeholders including, but not limited to, all levels of government, civil society, Internet services providers, First Nations, and non-profit organizations.

12. The Government of Canada consider new ways of collecting service and performance data in addition to the speed of Internet services, including, but not limited to, adding new indicators, using local knowledge, and reconsidering the conclusions drawn from the current hexagonal mapping system.

D. Conclusion

The digital divide harms all Canadians by preventing a share of the population to benefit from the same opportunities and services, and thus to fully participate in the economy. Small providers, non-profit providers, and non-incumbent providers could provide service in unserved or underserved areas if the current broadband deployment framework was modified.

In order for rural and remote communities to have on par service with urban centers, it is important for the Government of Canada to adjust the regulatory framework of broadband deployment (e.g., performance targets, spectrum and network management, funding, etc.) to make it economically feasible for these providers to offer services in their communities. Considered an essential service, all Canadians should have access to broadband Internet, regardless of where they live.

APPENDIX A
LIST OF WITNESSES

Organizations and Individuals	Date	Meeting
Government of the Northwest Territories	2016/11/23	35
Hon. Robert R. McLeod, Premier		
Canadian Radio-television and Telecommunications Commission	2017/05/30	63
Christopher Seidl, Executive Director Telecommunications		
Alastair Stewart, Senior Legal Counsel		
Department of Industry		
Luc Delorme, Acting Director Connecting Canadians Branch, Program and Engineering		
Susan Hart, Director General Connecting Canadians Branch		
Pamela Miller, Director General Strategic Policy Sector, Telecommunications Policy Branch		
Canadian Radio-television and Telecommunications Commission	2017/11/23	85
Christopher Seidl, Executive Director Telecommunications		
Department of Industry		
Andre Arbour, Acting Director Telecommunications, Internet, Policy Branch		
Luc Delorme, Acting Director Connecting Canadians Branch, Program and Engineering		
Susan Hart, Director General Connecting Canadians Branch		
Adam Scott, Acting Director General Spectrum Licensing Policy Branch		

Organizations and Individuals	Date	Meeting
Federation of Canadian Municipalities	2017/11/30	87
Sara Brown, Member		
Ray Orb, Chair Rural Forum		
NetWisper Inc.	2018/02/01	92
Steven Finlayson		
Rigstar Industrial Telecom		
Brent Grisdale, Founder and Vice-President Business Development		
Canadian Cable Systems Alliance	2018/02/06	93
Ian Stevens, Board Member Chief Executive Office of Execulink Telecom		
Jay Thomson, Chief Executive Officer		
Institute for Local Self-Reliance		
Christopher Mitchell, Director Community Broadband Networks		
SSi Micro Ltd.		
Dean Proctor, Chief Development Officer		
Xplornet Communications Inc.		
James Maunder, Vice-President Communications and Public Affairs		
Christine J. Prudham, Executive Vice-President General Counsel		
Montcalm Télécom et fibres optiques	2018/02/08	94
Pierre Collins, Project Manager		
Louis-Charles Thouin, President Warden, Regional County Municipality of Montcalm		
SaskTel		
John Meldrum, Vice-President Corporate Counsel and Regulatory Affairs		

Organizations and Individuals	Date	Meeting
SouthWestern Integrated Fibre Technology Geoff Hogan, Chief Executive Officer Donghoon Lee, Research Partner Economist, R2B2, University of Guelph	2018/02/08	94
Wubim Foundation William Chen, Director		

APPENDIX B
LIST OF BRIEFS

Organizations and Individuals

Alberta Association of Municipal Districts and Counties

Association of Equipment Manufacturers

Bell Canada

Big Lakes County

Blue Sky Economic Growth Corporation

Canadian Cable Systems Alliance

Canadian Rural Revitalization Foundation

Clearwater County Council

Cybera Inc.

Eastern Ontario Regional Network

Eastern Ontario Wardens' Caucus

Federation of Canadian Municipalities

First Mile Connectivity Consortium

Independent Telecommunications Providers Association

Institute for Local Self-Reliance

NorthwesTel

Olds Institute for Community and Regional Development

Organizations and Individuals

Parkland County

R2B2

Rural Development Institute

Rural Ontario Municipal Association

Rural Policy Learning Commons

Saskatchewan Association of Rural Municipalities

SaskTel

Shaw Communications Inc.

SouthWestern Integrated Fibre Technology

SSi Micro Ltd.

TELUS

Van Horne Institute

REQUEST FOR GOVERNMENT RESPONSE

Pursuant to Standing Order 109, the Committee requests that the government table a comprehensive response to this Report.

A copy of the relevant *Minutes of Proceedings* (Meetings Nos. 35, 63, 84, 85, 87, 90, 92 to 94, 96, 98 and 100) is tabled.

Respectfully submitted,

Dan Ruimy
Chair