

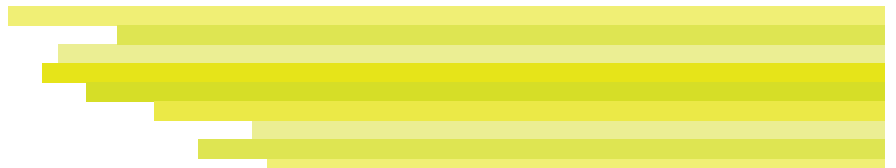


CRTC Submission to the Government of Canada's Innovation Agenda

December 21, 2016

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ISSN: BC92-91/2016E-PDF
CAT. NO.: 978-0-660-07091-9

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The Honourable Navdeep Bains, P.C., M.P.
Minister of Innovation, Science and Economic Development
Ottawa, Canada
K1A 0H5

December 21, 2016

Dear Minister:

The CRTC today issued its decision following a proceeding which examined (i) the telecommunications services Canadians require to participate in the digital economy, and (ii) the CRTC's role in ensuring the availability of basic telecommunications services.

In today's decision, the CRTC established a fund to help attain new Internet access service levels for Canadians – including speeds of at least 50 Mbps download and 10 Mbps upload and unlimited data plans for fixed broadband service as well as access to the latest mobile wireless technology not only in homes and businesses, but on major roads.

In your letter, received on October 18, 2016, you encouraged the CRTC to provide you with a summary report of our findings. Recognizing that addressing many of the comments submitted to our proceeding may fall outside of the CRTC's regulatory scope, you stated that a report drawn from the testimony of experts and a wide range of Canadians who participated would be welcome. The attached submission provides the CRTC's input to the Government's Innovation Agenda.

The CRTC recognizes the Government's leadership of collaborative action on the urgent matter of connecting Canadians in this digital era. Our decision today complements the Innovation Agenda in many ways. Looking ahead, the CRTC will continue to contribute to Canada's Innovation Agenda in ways appropriate to its mandate as the telecommunications regulator. We agree that everyone has a role to play in the Innovation Agenda.

In closing, the CRTC looks forward to the findings of the Government's public engagement efforts, and the resulting action plan that will include clear outcomes and targets to measure Canada's progress on the road to becoming a nation of innovators.

Sincerely,

Jean-Pierre Blais,
Chairman and Chief Executive Officer

CRTC Submission to the Government of Canada's Innovation Agenda

December 21, 2016

Summary

On October 18, 2016, the CRTC received a letter from the Minister of Innovation, Science and Economic Development. In it, he encouraged the CRTC to make a submission to the Government of Canada's Innovation Agenda with a summary of the CRTC's findings in the proceeding to review basic telecommunications services in Canada (BTS proceeding). This submission provides the CRTC's input to the Innovation Agenda.

Over the course of the proceeding, Canadians delivered a clear message to the CRTC: Broadband is vital, but key gaps in availability and adoption remain. The testimony of First Nations communities demonstrated that these are the most disadvantaged communities in almost all respects, but other Canadians also face significant barriers to broadband Internet access.

Many rural and remote regions of Canada lack the infrastructure needed to make high-quality fixed broadband services available to households and businesses similar to those in urban areas. As for mobile wireless broadband, there are still major transportation roads in the country that lack reliable coverage.

Perhaps most notably, many low-income Canadians told the CRTC they can afford to pay for broadband service only if they sacrifice other necessities, such as food, clothing, and healthcare. They regularly spend a higher percentage of their income on broadband service than the average Canadian household. In fact, the CRTC's 2016 Communications Monitoring Report shows that the price of broadband service is increasing faster than the rate of inflation. Yet despite broadband's importance in the lives of Canadians, provincial and territorial social assistance programs do not allocate a specific amount to cover the cost of subscribing to this service.

Meanwhile, many Canadians also struggle to participate in the digital economy and society because they lack the necessary digital skills. Digital literacy is now a necessity to participate in the workforce, but workers must consistently update their digital skills or risk falling behind in a relatively short time. As more and more government services move to online platforms, Canadians will require the digital skills to access these services.

In today's decision following the BTS proceeding, the CRTC announced measures to help ensure Canadians, regardless of where they live, have access to voice and broadband Internet access services, on both fixed and mobile wireless networks. The CRTC established a fund to help attain new Internet access service levels for Canadians – including speeds of at least 50 megabits per second (Mbps) download and 10 Mbps upload and the availability of unlimited data plans for fixed broadband service as well as access to the latest mobile wireless technology not only in homes and businesses, but also along major Canadian roads.

The CRTC's decision today complements the Government of Canada's Innovation Agenda in many ways. Looking ahead, the CRTC will continue to contribute to Canada's Innovation Agenda in a manner that is appropriate to its mandate as the telecommunications regulator.

Meeting the nation's broadband challenges will require billions of dollars over many years to come. Closing all of the gaps will require coordinated and collaborative action on the part of multiple stakeholders, including the private sector, community and non-profit organizations, the CRTC, and governments at all levels. The record of the proceeding supports the federal government's leadership of this approach.

Introduction

On April 9, 2015, the CRTC launched a proceeding to examine (i) the telecommunications services Canadians require to participate in the digital economy, and (ii) the CRTC's role in ensuring the availability of affordable basic telecommunications services (BTS proceeding).¹ While a variety of issues related to telecommunications services in Canada were reviewed, broadband Internet services became the main focus of the proceeding.

On June 14, 2016, the Honourable Navdeep Bains, Minister of Innovation, Science and Economic Development (ISED), put forward the Government of Canada's Innovation Agenda,² a vision to build Canada as a global centre of innovation. The Honourable Kirsty Duncan, Minister of Science; and the Honourable Bardish Chagger, Minister of Small Business and Tourism, supported Minister Bains' vision to make innovation a national priority. All three ministers are expected to lead specific activities as part of a government-wide approach to building an inclusive and innovative Canada. As part of the Government of Canada's Innovation Agenda, consultations were held this year on several action areas, including "Competing in a digital world."

On October 18, 2016, the CRTC received a letter from the Minister of ISED encouraging the CRTC to make a submission to the Innovation Agenda with a summary report of findings in the BTS proceeding. This document accordingly provides a summary of the views expressed in the BTS proceeding as well as the CRTC's key findings, particularly with respect to the availability and adoption of broadband Internet access service in Canada.³

Context

BTS proceeding

As part of the BTS proceeding, the CRTC examined several key issues, including the following:

- Which telecommunications services Canadians use, how they use those services and what prices they should be expected to pay for them;

¹ *Review of basic telecommunications services*, Telecom Notice of Consultation CRTC 2015-134, 9 April 2015, as amended by Telecom Notices of Consultation CRTC 2015-134-1, 3 June 2015; 2015-134-2, 22 December 2015; 2015-134-3, 14 January 2016; 2015-134-4, 9 March 2016; and 2015-134-5, 28 April 2016.

² <https://www.ic.gc.ca/eic/site/062.nsf/eng/home>

³ Additional information outside the proceeding's record has been used in preparation of this document where appropriate and as referenced.

- The availability of telecommunications services across Canada; and
- Whether there is a need for a funding mechanism to support the provision of modern telecommunications services in rural and remote areas in Canada.

Over the course of this proceeding, the CRTC accumulated a vast record of evidence:

- It received over 800 formal written interventions from civic and consumer groups, academics and experts, governments at different levels including First Nations,⁴ businesses large and small in the telecommunications industry, and over 25,000 individual Canadians.
- It contracted EKOS Research Associates Inc. (EKOS) to conduct a study of Canadians' usage of telecommunications services. EKOS administered a questionnaire to survey two sample populations: a nationally representative sample of 1,666 Canadians and a self-selected sample of almost 29,000 Canadians who completed the survey, indicating the strong interest in this topic across the country. EKOS also hosted focus groups and conducted phone interviews in rural and remote regions across Canada. A final report from EKOS was published on the CRTC's website on March 30, 2016.⁵
- It held a three-week oral hearing in April 2016 during which more than 80 interveners, including many individual Canadians, appeared in person or by videoconference.

BTS decision

On December 21, 2016, the CRTC issued its decision on the BTS proceeding⁶ with several key determinations:

- Broadband Internet access services are vital to Canada's economic, social, democratic, and cultural fabric. Canadians will increasingly need to have access to broadband Internet services to participate in the digital economy.
- The CRTC established the following universal service objective: Canadians, in urban areas as well as in rural and remote areas, have access to voice services and broadband Internet access services, on both fixed and mobile wireless networks.
- The key component of this new universal service objective is mobile wireless and fixed broadband Internet access services for which the CRTC will use criteria related to speeds, capacity, quality of service, and coverage metrics⁷ to assess progress towards reaching the broadband portion of the universal service objective.

⁴ Indigenous and Northern Affairs Canada (INAC) notes that some groups now prefer the term "First Nation community" rather than "reserve" or "band" <https://www.aadnc-aandc.gc.ca/eng/1100100013800/1100100013801>.

⁵ *Let's Talk Broadband Findings Report*, EKOS Research Associates 18 March 2016. See <http://epe.lac-bac.gc.ca/100/200/301/pwgsc-tpsgc/por-ef/crtc/2016/030-15-e/index.html>.

⁶ <http://www.crtc.gc.ca/eng/archive/2016/2016-496.htm>

⁷ Canadian residential and business fixed broadband Internet access service subscribers should be able to access speeds of at least 50 Mbps download and 10 Mbps upload, and subscribe to a service offering with an unlimited data allowance. Quality of service metrics for latency, jitter, and packet loss will be established in a follow-up process. The latest generally deployed mobile wireless technology should be available in Canada not only in homes and businesses, but on as many major transportation roads as possible. Currently, this is Long Term Evolution (LTE) technology.

- The following services are basic telecommunications services within the meaning of subsection 46.5(1) of the *Telecommunications Act*:⁸ (i) fixed and mobile wireless broadband Internet access services and (ii) fixed and mobile wireless voice services. The CRTC will establish a mechanism, pursuant to subsection 46.5(1) of the *Telecommunications Act*, to assist in funding continuing access to the basic telecommunications services that form part of the universal service objective.
- The CRTC will attempt to align its funding mechanism with the broader ecosystem of current and future funding and investments; it will complement and not replace them.
- For the first year of the fund, no more than \$100 million will be distributed. This amount will increase by \$25 million annually over the following four years to reach an annual cap of \$200 million.

Key challenges to broadband access

Many Canadians still experience challenges regarding the availability and adoption of broadband Internet access services. These challenges, as set out below, were brought to the fore in the course of the BTS proceeding.

Availability of broadband access services

Fixed access

According to CRTC data, approximately 18% of Canadian households do not have access to fixed broadband Internet access services at the CRTC's target speeds of 50 Mbps download and 10 Mbps upload. These households are typically located in rural communities or areas with relatively low population density, some of them near urban areas. Many of these communities lack sufficient transport or access networks needed to provide them with broadband Internet services comparable to urban areas.

Intervenors generally agreed that this digital gap results in many Canadians not being able to effectively participate in the digital economy. They expressed their concern about the negative impact of this gap on many fronts including health care, education, public safety, culture and economic development.

Most First Nations communities are located in rural and remote areas. Several intervenors pointed to demonstrable inequities between First Nations communities and other communities in Canada related to the availability of broadband Internet access services.

Mobile access

Data collected by the CRTC shows that 97% of Canadians have access to Long Term Evolution (LTE) mobile wireless services where they live. However, intervenors to the BTS proceeding commented that this coverage is much more limited along highways and in more remote areas where, in some cases, it is non-existent.

⁸ Subsection 46.5(1) of the *Telecommunications Act* states that the CRTC may require any telecommunications service provider to contribute, subject to any conditions that the CRTC may set, to a fund to support continuing access by Canadians to basic telecommunications services.

Municipalities with rural or sparse populations expressed their concerns about reliable mobile wireless coverage and public safety, noting that universal coverage is not available in all parts of the country. In the EKOS survey, many participants indicated that a primary function of mobile wireless service is safety, yet nearly all rural residents described feeling vulnerable in the event of emergencies occurring on the road where mobile coverage is limited.

Some interveners also cited the need for Canada to support Canadians' growing reliance on the Internet of Things (IoT). Different reports estimate that, globally, between 26 and 50 billion devices will be connected to the IoT by 2020.⁹ Much of the traffic related to the IoT will be transmitted via wireless technology which will place increased demand on mobile access and transport networks, requiring in turn that Canada's mobile infrastructure evolve to include the deployment of fifth generation (5G) technology.¹⁰

Adoption of broadband access services

Affordability

Given that broadband Internet access service is vital to Canadians, the affordability of the service is a critical issue for all levels of governments and other key stakeholders to address.

The CRTC's 2016 *Communications Monitoring Report (CMR)* shows that lower-income households are spending three times more on broadband expenditures, as a percentage of their annual income, than the average Canadian household. Meanwhile, the EKOS survey found that 36% of respondents are limiting their Internet use due to cost.

During the BTS proceeding, low-income Canadians from diverse demographics drew attention to the fact that they are increasingly asked to seek government services through digital platforms, yet the calculation for the level of social assistance available from governments does not take into consideration the cost of broadband connectivity that is now becoming essential for doing routine online activities, such as scheduling appointments, education and learning, and searching for jobs.

Digital literacy

During the BTS proceeding, governments, individual Canadians, and groups representing consumers and Aboriginal peoples¹¹ articulated the importance of having a citizenry with the knowledge and ability to navigate the digital world, but they expressed concern that many people lack the necessary skills and knowledge needed to effectively use broadband Internet services. Some noted that tackling this

⁹ <https://www.gartner.com/newsroom/id/2636073>
<https://www.abiresearch.com/press/more-than-30-billion-devices-will-wirelessly-conne/>
<http://www.cisco.com/c/en/us/solutions/Internet-of-things/overview.html>

¹⁰ This technology has not yet been defined. However, 5G is expected to offer higher capacity relative to LTE, i.e., allow more traffic, more devices, and higher consumption of data. It will also bring higher speeds and reduce latency.

¹¹ "Aboriginal peoples" is a collective name for the original peoples of North America and their descendants. The Canadian constitution recognizes three groups of Aboriginal peoples: Indians (commonly referred to as First Nations), Métis and Inuit. These are three distinct peoples with unique histories, languages, cultural practices and spiritual beliefs. More than 1.4 million people in Canada identify themselves as an Aboriginal person, according to the 2011 National Household Survey. See <https://www.aadnc-aandc.gc.ca/eng/1100100013785/1304467449155>.

challenge must start with collecting more comprehensive data on the demographic groups in Canada, such as First Nations or seniors, who may be most affected by a lack of digital literacy skills. In the EKOS survey, 24% of respondents cited lack of skills as a reason for limiting their use of the Internet.

Coordination of efforts

At the BTS hearing in April 2016, the panel of Commissioners for the proceeding (the Panel) stated that a coherent national broadband strategy should be created, through an open and transparent process, based on evidence from all Canadians. The Panel specified that this strategy could be achieved (to the extent possible) through consensus, and implemented through shared responsibility – while the CRTC may take some leadership on defining the strategy, it would not be alone in implementing and financing it.

The Panel further suggested that the gaps in connectivity (geographic, technological, economic and skill-related) should be assessed, as should the best ways to close or eliminate them. In addition, the Panel raised the issue of who was in the best position to close or eliminate the gaps, and what role the CRTC should play.

According to ISED, the Innovation Agenda will be the focus of public engagement efforts intended to result in an action plan, and that central to this plan will be a call to action for all sectors of society since the Government of Canada cannot act alone if Canadians expect to see meaningful results. In this respect, the Government stated that clear outcomes and targets will be used to measure progress toward the vision of positioning Canada as a global leader in skilled talent and in the development of new products, services, business models and markets across all industries.

How the BTS decision complements the Innovation Agenda

The Government of Canada has indicated that its Innovation Agenda will target a number of areas for action. One of these, “Competing in a digital world,” focuses on “maximizing the benefits of current and emerging digital technologies. ... Canada must also do more to give rural communities and low-income Canadians affordable access to high-speed Internet so that they can participate fully in a digital and global economy for a better quality of life.”

The BTS decision issued today will contribute in this action area in the following ways:

- The CRTC’s universal service objective will foster the further development of Canada’s digital infrastructure to meet Canadians’ needs, fuelling further economy-wide digital development and adoption.
- The CRTC’s broadband funding mechanism will complement the efforts of the public and private sectors to further develop Canada’s digital infrastructure, particularly in regions of the country that are uneconomic to serve. Improved access to broadband Internet in rural and other communities will, in turn, support economic, social and cultural development in these areas.
- The CRTC set out additional measures intended to enhance Canadians’ ability to participate in the digital and global economy for a better quality of life. They include measures to improve the access of Canadians with disabilities to broadband Internet services, and to empower

consumers with the tools and information they need to purchase, understand and manage their broadband Internet services.

Since broadband connectivity is an important enabler of innovation, the effects of the BTS decision will also benefit the Innovation Agenda more generally. According to the International Telecommunication Union, in recent decades, information and communication technologies (ICTs) “have come to dominate global innovation and business value-addition. Within ICTs, broadband now plays a major role in enabling innovation, perhaps more so than other computer and communications technologies.”¹² In fact, a statistically significant correlation exists between broadband penetration and the number of registered patents in major world economies: “one percentage point in a nation’s broadband penetration correlates with seven additional patents for that nation in that year, or roughly a 5% jump.”¹³

For reasons such as this, broadband is an important contributor to innovation, economic development, and spinoff benefits that improve quality of life for citizens and consumers alike.

Conclusion

Broadband is a transformative enabling technology, and key stakeholders in Canada are taking important steps to ensure that it is universally available and adopted. Over the course of the BTS proceeding, however, the CRTC heard from Canadians forced to make difficult spending decisions due to the cost of broadband Internet access services. Given the economic, socio-cultural and civic importance of broadband, the CRTC concluded that any Canadian left behind in terms of broadband access is profoundly disadvantaged, and that coordinated national action is necessary to address this problem. The risks of non-action are too great: missed opportunities for innovation, creativity and engagement; reduced competitiveness; weakened domestic prosperity; and diminished prospects for Canadians.

While the *Telecommunications Act* gives the CRTC broad powers to regulate the provision of telecommunications services, other stakeholders in some cases are better positioned to implement solutions to address some of the above-mentioned gaps. For example, fixed-wireless service providers require access to spectrum to provide high-quality broadband Internet access services in rural areas and this spectrum is licensed by ISED under the *Radiocommunication Act*.

Another example is the issue of affordability. The CRTC heard a week’s worth of testimony from diverse Canadians detailing the difficulties they encounter because they find broadband Internet access services unaffordable. Individual Canadians came to testify that they did not choose to face life in poverty, or challenged by physical or mental disabilities; yet governments, at all levels, have chosen to ask these citizens to seek government services through digital platforms. This has had consequences. These vulnerable individuals, burdened by social and economic insecurity, came to testify that the level of social assistance available from governments does not take into consideration the cost of connectivity that is nevertheless essential to schedule medical appointments, ensure success in school for their

¹² International Telecommunication Union (ITU), *Global Industry Leaders’ Forum 2011 Discussion Paper: Broadband Enabled Innovation*, October 7, 2011 [accessed June 2016]: <https://www.itu.int/ITU-D/treg/Events/Seminars/GSR/GSR11/documents/GILF01-Broadband-E.pdf>

¹³ *Ibid.*

children, facilitate searching for a job, and to do many of the online activities many others take for granted.

The CRTC considers that, in light of its necessity to participation in so many aspects of life, broadband access should be considered more holistically as part of the social safety net for vulnerable Canadians. The development of initiatives related to the affordability of broadband Internet access service for Canadians is of considerable concern and will require concerted efforts from a variety of stakeholders.

Indeed, the Government of Canada is now examining affordability issues in the context of its Innovation Agenda and has stated that everyone has a role to play. The Innovation Agenda specifies that Canada must “do more to give rural communities and low-income Canadians affordable high-speed Internet access services so that they can participate fully in the digital and global economy for a better quality of life.” The Commission supports concerted efforts from a variety of stakeholders as essential to making progress in this area and encourages other stakeholders to follow suit.

Similarly, there are multiple stakeholders in the area of digital literacy in Canada. The provinces and territories are primarily responsible for education and the federal government, together with them, play an important role in the area of employment skills, including those related to digital literacy.

Overall, most parties to the BTS proceeding agreed that a national broadband strategy requires a holistic consultative approach, with participation from various stakeholders such as the CRTC; different levels of government including First Nations; the telecommunications industry; and non-governmental organizations. At the same time, some interveners, while supporting a national broadband strategy, considered that taking action should not be delayed, given the urgency of the needs of low-income households and those in rural and remote regions. In general terms, however, the BTS record supports the federal government’s leadership of a multi-stakeholder approach to meet the challenges outlined above. This suggests that the federal government is best placed to assume this leadership role.

The determinations in the BTS decision complement the Government of Canada’s Innovation Agenda. Looking ahead, the CRTC will contribute in ways appropriate to its mandate as the nation’s telecommunications regulator. As the federal government has stated, everyone has a role to play in the Innovation Agenda. The CRTC looks forward to the findings of the federal government’s public engagement efforts and the resulting action plan that will include clear outcomes and targets to measure progress on the road to becoming a nation of innovators.

Annex: Key challenges to broadband access in Canada

This annex supports the CRTC's submission to the Government of Canada's Innovation Agenda. It outlines the key challenges to broadband access in Canada, as identified during the BTS proceeding. These are viewed through the "lenses" below:

1. **"Availability"** concerns the technical reach of broadband, both fixed and mobile, over the entire Canadian territory. This lens is focused on the "supply side" of broadband access services and considers mainly network deployment and capability.
2. **"Adoption"** concerns the take-up of broadband by households in areas where service is available, and the factors that affect the rate of take-up. This lens is focused on the "demand side" of broadband access services and considers the following:
 - i. *Affordability*, or the proportion of income that consumers have to spend in relation to a) broadband services prices, and b) household income levels; and
 - ii. *Digital literacy*, or the knowledge, skills and behaviours needed to benefit from broadband Internet access and the importance of information and education in encouraging further adoption.

1. Availability

Introduction

Broadband Internet access service is offered in Canada by numerous providers, each through a variety of service offerings. While these vary across the country, a definitive link exists between the population density of a region and the services available within it. Companies are more likely to build high-quality, high-capacity infrastructure in areas with a greater population density (i.e. urban areas) because it is more economic to do so. A consequence is that Canadians in urban areas typically receive wireline and wireless broadband Internet access services using the latest technologies, which provide higher speeds and higher data allowances (including unlimited offerings) than in rural and remote areas. Moreover, while many rural and remote areas may be covered by the latest wireless services, the coverage may not be sufficient, particularly along highways in more remote areas.

This disparity in broadband availability is a significant challenge. Since our society increasingly depends on digital services, Canadians expect that they will have Internet access that enables them to take full advantage of the range of applications now available. However, in the current circumstances, Canadians living in small population centres have limited choice and typically have access to a lower level of Internet access service than what is available to their urban counterparts. When Canadian households only have access to lower-speed lower-quality Internet service, they may not be able to use bandwidth-intensive Internet applications due to speed limitations, they may experience service interruption due to poor quality of service, or they may simply consume more data than is allowed without overage charges, driving up their expenses.

The record of the BTS proceeding indicates that First Nations communities are generally among the more disadvantaged communities in Canada with regard to broadband availability. They experience persistent challenges, particularly with respect to bandwidth constraints and reliability.

Analysis

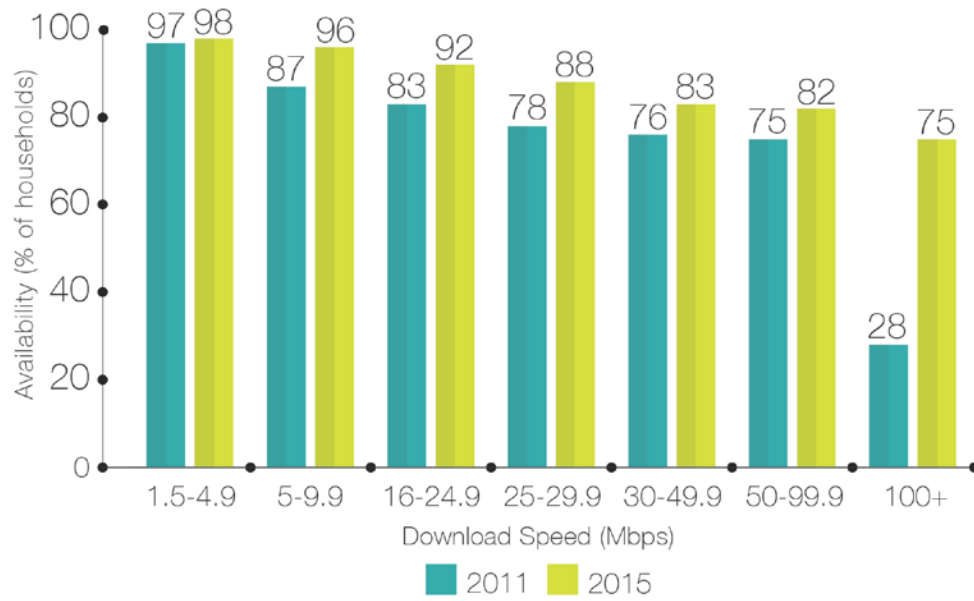
Wireline and fixed wireless access infrastructure

In some underserved areas, the technology is not typically sufficient to deliver the highest tiers of broadband service. In many suburban and rural areas, wireline broadband equipment may not be capable of providing the CRTC's new target speeds of 50 Mbps download and 10 Mbps upload. In fact, approximately 2.4 million Canadian households do not have access to broadband Internet access services at the CRTC's newly established target speeds. In cases where a community is served by a fixed wireless access network, the service provider may not have access to sufficient spectrum to deliver higher speed services, or the wireless signal may vary depending on the user's distance from the tower, or on geographic features such as trees or mountains that may obstruct signals.

In 2011, the CRTC set target broadband speeds at 5 Mbps download and 1 Mbps upload. Since that time, as shown in the graph below, wireline broadband availability at speeds of 5 Mbps download grew from 87% in 2011 to 96% in 2015.¹⁴ However, only about 82% of Canadian households had access to speeds of at least 5 Mbps download that same year.

¹⁴ When wireless availability is included, approximately 98% of Canadian households had access to download speeds of at least 5 Mbps in 2015 (Source: CRTC's 2016 CMR).

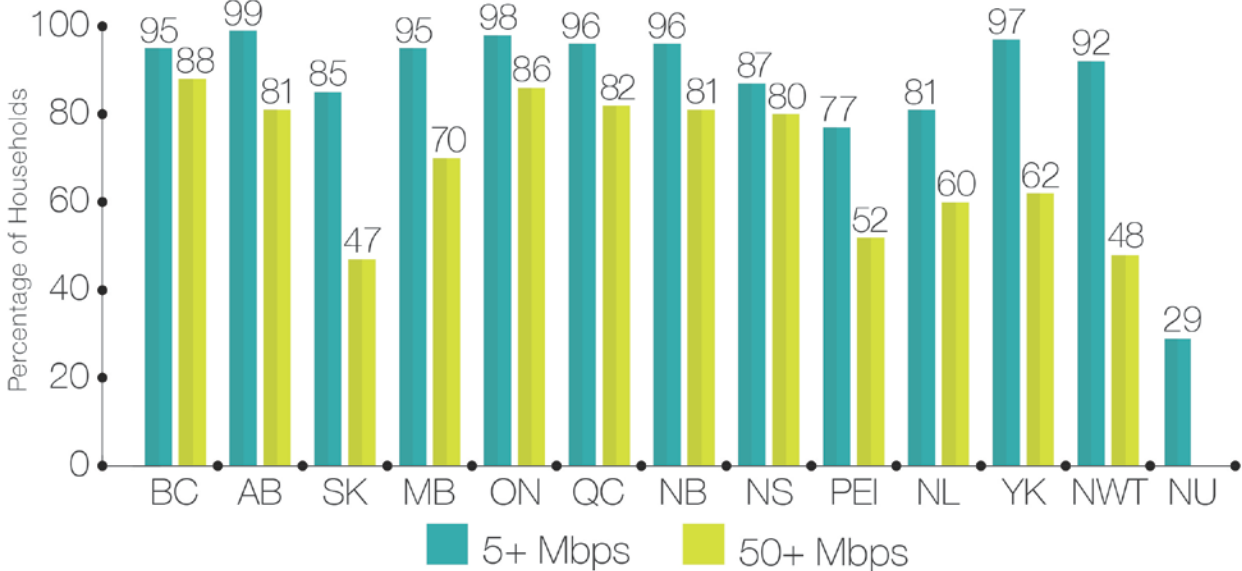
National Wireline Broadband Availability By Speed Tier



Source: CRTC Data Collection

At the end of 2015, broadband availability at download speeds of at least 5 Mbps and 50 Mbps varied by province/territory (PT) as shown in the graph below. In general, wireline broadband coverage at 5+ Mbps download was more limited in parts of the Atlantic region and in Nunavut. At 50+ Mbps download, limitations were evident again in the Atlantic region, as well as in the Territories, Saskatchewan and Manitoba.

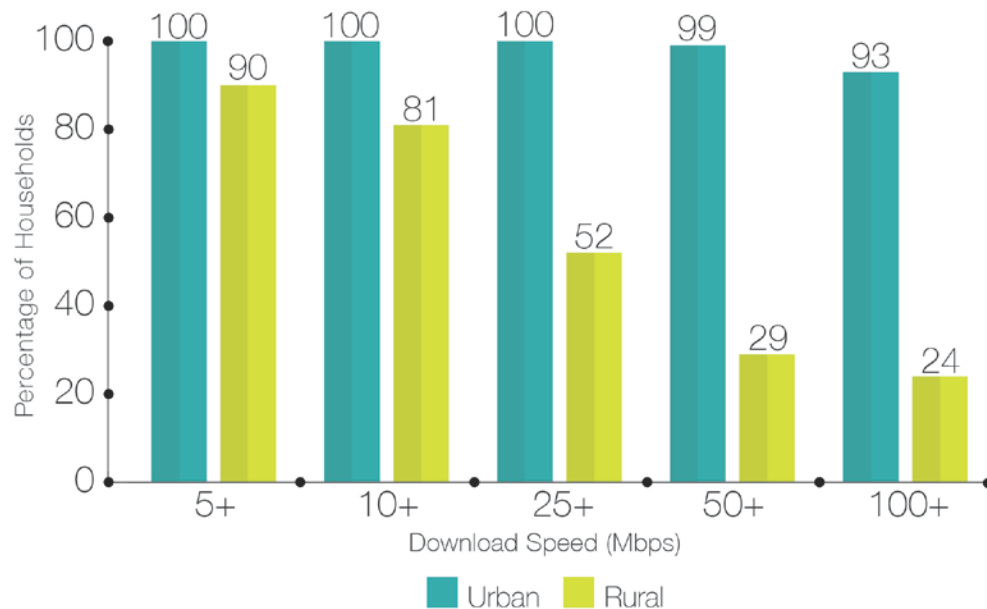
Wireline Broadband Availability
at 5+ and 50+ Mbps Download, by PT, 2015



Source: CRTC Data Collection

At the end of 2015, as shown in the graph below, the higher the download speeds, the wider the service availability gap between urban and rural areas.

National Broadband Availability,
Urban and Rural Population Centres, 2015



Source: CRTC Data Collection

Finally, the small size of First Nations communities,¹⁵ combined in many cases with their rural, remote or isolated locations, typically make it uneconomical for telecommunications companies to provide high-quality broadband Internet access service, leaving most First Nations communities underserved at the CRTC’s target speeds. In its submission during the BTS proceeding, Manitoba Keewatinowi Okimakanak Inc. underscored the challenge, saying, “It is hard for the regulator to respond to market-driven change where there is no market.”

Terrestrial transport infrastructure

In many underserved areas, lack of sufficient transport services means limited broadband availability. For example, many underserved communities are covered by a fixed wireless access network capable of delivering higher tier broadband service. However, due to insufficient availability of fibre or microwave

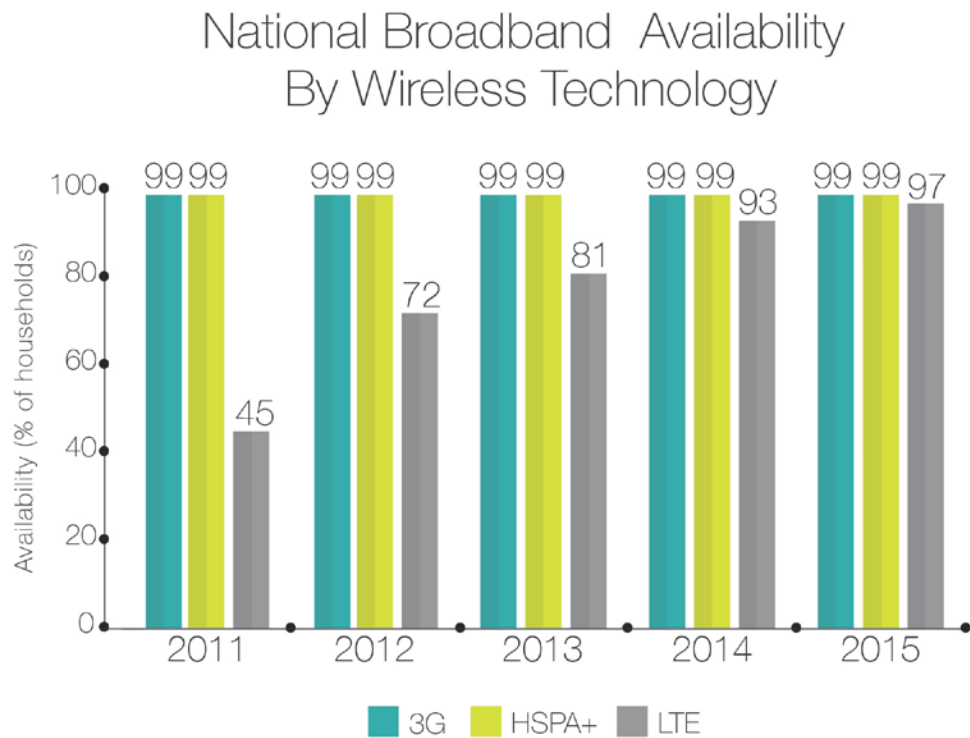
¹⁵ According to Statistics Canada’s 2011 National Household Survey, Canada was home to 859,970 First Nations people. Of those who identified as First Nations people in 2011, three-quarters (75% or 645,940) reported being a Treaty Indian or a Registered Indian as defined by the *Indian Act of Canada*. Over one-third (38% or 328,445) of all First Nations people (50% of First Nations people who were Treaty or Registered Indians, or 322,650 individuals) lived in a First Nations community. According to INAC, there are more than 600 First Nations communities in Canada. See <https://www.aadnc-aandc.gc.ca/eng/1100100013800/1100100013801>.

transport, speeds and capacity offered to end-users are lower than the new objective set by the CRTC in the BTS decision.

Mobile wireless infrastructure

Data collected by the CRTC indicates that 99% of Canadian households are covered by third generation (3G) and High Speed Packet Access Plus (HSPA+) mobile wireless services, while 97% are covered by LTE mobile wireless services.

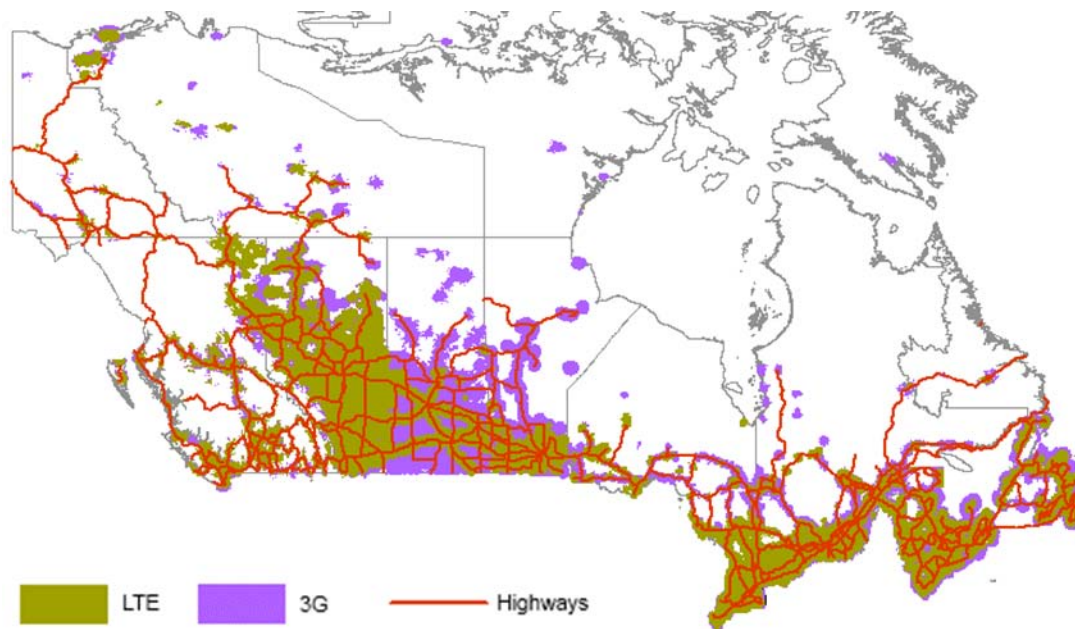
Between 2011 and 2015, LTE coverage grew rapidly such that today virtually all Canadian households have access to LTE services. Compared to 3G, LTE makes more efficient use of spectrum and typically offers higher data transfer speeds.



Source: CRTC Data Collection

However, 3G, HSPA+ and, in particular, LTE coverage is more limited along highways and in more remote areas due to the lack of electrical power service in these areas and the absence of towers, as well as fibre or microwave transport to connect to the broader communications networks.

Wireless Coverage in Canada, 2015



Source: CRTC Data Collection

Satellite infrastructure

Communities in the remotest parts of Canada are located hundreds of kilometres from the nearest terrestrial transport infrastructure. They therefore depend on satellite service for their communications needs. However, there are some limitations associated with satellite service delivery:

- Current satellite services are subject to a higher degree of latency than wireline-based services. Higher latency results in a lower quality of service.
- Some services are susceptible to signal interruption due to atmospheric conditions (i.e. weather).
- Satellite capacity is typically shared among multiple earth stations across multiple communities. As a result, the overall capacity available to any one community is reduced.

Examples of current efforts

In Budget 2016, the Government of Canada announced its plan to increase broadband coverage by investing up to \$500 million over five years for a new program to extend and enhance broadband service in rural and remote communities. It also announced the First Nations Infrastructure Fund of \$255 million over two years to support investments in a range of complementary infrastructure including

broadband connectivity.¹⁶ Over the years, provincial and territorial governments have also initiated policies and programs, including ones focussed on Aboriginal communities, to advance broadband access across Canada.

Some First Nations are tackling broadband access challenges on their own and developing innovative solutions:

- First Nations-owned KNET Services, for instance, provides high-speed Internet access to remote communities in Northern Ontario via a satellite network it co-owns with other Indigenous organizations serving First Nations and Inuit communities in Northern Ontario, Quebec and Manitoba.
- The First Nations Education Council, which serves 29 remote communities in Northern Quebec, built its own infrastructure to create a wireless satellite network that provides residential services. The Council recently obtained the necessary financing to build its own 165-km fibre-optic network.
- The Cree Nation Government, along with five non-Aboriginal towns in the James Bay area of Northern Quebec, have developed a plan to provide high-speed Internet throughout the region using the services of the Eeyou Communications Network (ECN), a First Nation non-profit telecom service provider. Through a local fibre loop, the ECN serves 14 communities with a combined population of 30,000.

Despite these efforts, however, the record of the BTS proceeding shows that First Nations communities generally continue to experience a deep digital divide in contrast to other communities in Canada.

Conclusion

The CRTC recognizes that achieving the universal service objective for Canadians is a major undertaking with multiple complex challenges, requiring billions of dollars in new investments. The combined efforts of all governments, along with industry and other stakeholders, are critical to achieving this goal. The BTS decision, in its creation of a new funding mechanism to support broadband deployment in underserved areas of the country, is only one part of what must be a collaborative effort to bring universal broadband availability to Canadians.

2. Adoption

i) Affordability

Introduction

If broadband services are available where a person lives, but the person cannot afford them, then affordability is a barrier to access. This barrier impacts Canadians across all segments of the population.

Affordability is typically measured as the proportion of income that consumers have to spend on particular goods and services. A multitude of macro- and micro-economic factors can be used to assess

¹⁶ Government of Canada, *Budget 2016: Growing the Middle Class*, March 22, 2016 [accessed July 2016]: <http://www.budget.gc.ca/2016/docs/plan/budget2016-en.pdf>. On December 15, 2016, the Government announced details of the broadband funding program.

the affordability of a particular good or service. For the purpose of this analysis, we look at affordability in relation to a) broadband services prices and b) household income levels.

Analysis

a) Broadband services prices

During the BTS proceeding, hundreds of Canadians, as well as groups representing consumers, raised concerns about the affordability of broadband services in Canada. Moreover, the EKOS survey highlighted that 48% of respondents in the representative survey and 75% of respondents in the open survey are dissatisfied with the price of their broadband service. Among the 21% of Canadians in the representative survey and 50% in the open survey who reported limiting their use of broadband services, 36% and 28% respectively pointed to cost as the main factor. The Affordable Access Coalition (AAC) noted that prices have generally increased for the most affordable level of services, often faster than the inflation rate. OpenMedia added that, in comparison to other countries belonging to the Organization for Economic Cooperation and Development (OECD), the range of low-priced competitive options appears to be quite limited in Canada.

In fact, the CRTC's 2016 CMR shows that overall prices of communications services have been trending upwards: the average household spent approximately \$214/month on communications services in 2014, an increase of \$3.00 (1.4%) over the previous year. As well, prices for broadband services have increased faster than inflation: while the average inflation rate in Canada was 1.1% in 2015, prices for broadband services increased by 5% between 2014 and 2015.

The 2016 Price Comparison Study¹⁷ shows that, since 2012, average prices have increased for entry-level services (basket level 1 and 2) and decreased for higher levels of services (basket level 3 and 4).¹⁸

Average Canadian Internet Services Prices

Basket Level	2012	2013	2014	2015	2016	Difference (%)
1	\$39.37	\$38.91	\$50.00	\$47.51	\$41.95	6.55%
2	\$54.31	\$51.20	\$55.10	\$56.66	\$58.88	8.41%
3	\$67.94	\$65.18	\$68.60	\$67.81	\$63.48	-6.56%
4	\$94.39	\$82.88	\$86.46	\$80.63	\$78.77	-16.55%

Source: 2016 Price Comparison Study of Telecommunications Services in Canada and Select Foreign Jurisdictions, Tables C.3.1, C3.2, C3.3 & C3.4

¹⁷ 2016 Price Comparison Study of Telecommunications Services in Canada and Select Foreign Jurisdictions, NGL Nordicity Group Ltd., 22 March 2016.

¹⁸ The amount consumers pay depends on a variety of charges, such as subscription and usage fees. The Price Comparison Study uses a methodology based on "baskets" intended to be representative of the usage various consumer segments make of the service (e.g., basket level 1 refers to an entry-level or low-volume usage service). Baskets are routinely updated to reflect changes in usage pattern, and as such, price increases may partly reflect better service levels offered to consumers.

The 2016 Price Comparison Study also provides a comparison of the Internet service prices charged by incumbent service providers versus competitors. The following table shows that prices vary widely for the Internet services provided by the different service providers. Depending on the degree of competition present in the different markets, many consumers are able to enjoy the benefits of competitive price offerings.

Service Provider Type	Level 1	Level 2	Level 3	Level 4	Level 5
Incumbent	\$52.89	\$61.30	\$62.78	\$79.13	\$112.47
Competitor	\$34.05	\$36.10	\$44.64	\$66.10	n/a
Difference	-35.61%	-41.11%	-28.89%	-16.47%	n/a

Unweighted averages of prices offered in the select cities of Halifax, Montreal, Toronto, Winnipeg, Regina and Vancouver
 Source: 2016 Price Comparison Study of Telecommunications Services in Canada and Select Foreign Jurisdictions, Table C.4

b) Household income levels

The EKOS survey found that cost of service was one of the main reasons reported by respondents for limiting their use of broadband. The report noted that “cost plays a more prominent role for households with incomes under \$80,000.”¹⁹ On the record of the BTS proceeding, the AAC indicated that broadband services are extremely important for low-income users and that many struggle to afford the related expenses, “regularly spending a higher percentage of their income on these services than the average Canadian household.” The AAC also noted that low-income Canadians are generally unwilling to cancel their broadband subscription, instead foregoing other expenses.

In this regard, certain low-income Canadians reported at the BTS hearing that they must sacrifice essential household expenditures such as food, clothing and healthcare in order to continue subscribing to broadband services. Others indicated that, to manage their costs, they are using strategies such as bundling services, only subscribing during promotional periods, and using public hubs (e.g. libraries, coffee shops) to access broadband services.

Indeed, analysis of pricing and income-related data from the CRTC’s 2016 CMR suggests that low-income households are experiencing issues related to the affordability of their broadband services. The following table shows that where most Canadian households have Internet access at home (84.9% in 2014), only 63.5% of households in the lowest income quintile²⁰ subscribe to home Internet services.

¹⁹ Moreover, the EKOS survey also revealed that Canadians with lower monthly data allowances were more likely to limit their use of Internet services when compared to those with high monthly data allowances, with 36% stating that this is largely due to cost.

²⁰ Income quintiles refer to a grouping of the population by average household income, where each grouping represents 20% of the population and is ordered from lowest to highest income.

Home Computers and Internet Use from Home, by Income Quintile (2014)

	First quintile	Second quintile	Third quintile	Fourth quintile	Fifth quintile	Average of all quintiles
Have home computer	64.3%	78.1%	87.7%	94%	97.4%	84.3%
Have Internet access at home	63.5%	78.5%	88.7%	95.5%	98.3%	84.9%

Source: CRTC 's Communications Monitoring Report, Table 2.0.8

The CRTC's 2016 CMR also highlights that while households in the lowest income quintile spent the least on broadband services, they experienced the biggest increase in prices between 2013 and 2014.

Monthly Household Spending on Broadband Services, by Income Quintile (2014)

	First quintile	Second quintile	Third quintile	Fourth quintile	Fifth quintile	Average of all quintiles
2013	\$25.58	\$35.25	\$42.08	\$48.00	\$52.42	\$40.67
2014	\$29.50	\$37.17	\$44.17	\$48.75	\$52.67	\$42.42
Growth	15.31%	5.44%	4.95%	1.56%	0.48%	4.3%

Source: CRTC 's Communications Monitoring Report, Table 2.0.4

Over the years, various organizations have put forward different target thresholds that can be used to estimate how affordable broadband services are as a proportion of disposable income. For example, in *No Consumer Left Behind* (a report placed on the record of the BTS proceeding), the Public Interest Advocacy Centre (PIAC) suggested that communications expenditures as a whole should not exceed 4% to 6% of a household's annual income. Elsewhere, the Broadband Commission for Digital Development and the International Telecommunications Union (ITU) similarly estimate an affordability threshold at less than 5% of average monthly income for entry-level broadband services alone²¹ – however, this estimate is based on data compiled from a broad cross-section of countries which takes into account that broadband access can amount to as much as 30% of average income in certain developing countries.

²¹ *Broadband Targets for 2015*, Broadband Commission for Digital Development, ITU and UNESCO, 2011 http://www.broadbandcommission.org/Documents/Broadband_Targets.pdf; and *Measuring the Information Society Report*, ITU, 2015 <http://www.itu.int/en/ITU-D/Statistics/Documents/publications/misr2015/MISR2015-w5.pdf>.

In comparing the data in the CRTC's 2016 CMR with these guidelines, expenses related to broadband services for Canadians in all income quintiles would meet the thresholds.

Household Broadband Expenditures, by Income Quintile (2014)

Characteristics	1st quintile (income less than \$30,519)	2nd quintile (income between \$30,520 and \$53,274)	3rd quintile (income between \$53,275 and \$81,294)	4th quintile (income between \$81,295 and \$124,838)	5th quintile (income over \$124,839)	Average of all quintiles
Average annual household income	\$19,664	\$42,122	\$67,083	\$101,177	\$201,752	\$86,360
Broadband expenditures	\$354	\$446	\$530	\$585	\$632	\$509
Broadband expenditures as % of annual income	1.8%	1.1%	0.8%	0.6%	0.3%	0.6%

Source: CRTC's Communications Monitoring Report, Tables 2.0.3 and 2.0.4

However, while these target thresholds can help quantify the affordability of broadband services, analysis of this issue must also take into account a variety of other factors, such as spending decisions for other expenses (e.g. food, shelter, clothing, etc.), control over these expenses, as well as the proportion of income spent on such expenses.

The table above illustrates that expenditures related to broadband services take up almost twice as much of the annual income of Canadian households in the first income quintile compared to households in the second quintile, and triple their income when compared to the average of all households. Households in the lowest income quintile spend about 44% less on broadband services annually than the average of all quintiles. Overall, lower income households are often faced with difficult financial choices in maintaining their subscription to broadband services.

Examples of current efforts

A number of efforts are currently under way to improve the affordability of broadband services in Canada.

a) Broadband services prices

The CRTC does not regulate the retail rates for broadband access Internet services, with the exception of those provided by Northwestel over terrestrial facilities. However, the CRTC has put in place wholesale and retail policies to foster a dynamic marketplace for broadband Internet access services.

For example, in Telecom Regulatory Policy 2015-326, the CRTC established a wholesale wireline services framework to provide Canadians with increased choice and reasonable prices for their telecommunications services. Notably, through this decision, competitors can access certain telecommunications facilities and network components from incumbent carriers, including optical fibre facilities.

In addition, in Telecom Regulatory Policy 2015-177, the CRTC established regulatory measures to foster sustainable competition, innovation and investment in the wireless services market. Specifically, the

CRTC began regulating the rates charged by the national wireless companies for the wholesale roaming services they provide to their competitors. The CRTC also reduced certain barriers faced by mobile virtual network operators.

Further, in Telecom Regulatory Policy 2013-271, the CRTC established the Wireless Code, a mandatory code of conduct for providers of retail mobile wireless voice and data services. The Wireless Code sets out basic rights for all wireless consumers, including protections against bill shock. These wholesale and retail policy initiatives have facilitated, and will further facilitate, sustainable competition, resulting in innovative service offerings and more competitive prices for consumers.

Over the years, a number of market players have developed solutions aimed at providing affordable options to various segments of Canadian consumers. For example, some ISPs offer an entry-level tier for broadband Internet access services. While these offerings may help alleviate affordability concerns for some Canadians, pricing and service levels differ greatly among ISPs, and plans are only available within the ISP's specific service area and may not always be well promoted. The following table presents examples of entry-level offerings for broadband Internet access services.

Sample of Entry-level Broadband Internet Access Service Offerings

ISP	Speed	Monthly price
Bell	3Mbps/680 Kbps	\$24.99
Rogers	5Mbps/1 Mbps	\$24.99
Teksavvy	5 Mbps (cable)	\$24.99
Teksavvy	6-7 Mbps (DSL)	\$29.99
Videotron	5Mbps/1 Mbps	\$37.95
VMedia	6 Mbps	\$29.95
Yak	6 Mbps	\$29.95

Sources: ISPs' websites (accessed July 2016)

In addition, the Government is currently examining issues related to the affordability of broadband services in the context of its Innovation Agenda.

b) Assistance to low-income Canadians

Provincial and territorial governments do not allocate a specific amount for expenses related to broadband services as part of their social welfare or social assistance programs. Among these governments that consider the cost of communications services when determining the amount of income assistance provided to an individual or household, eligible expenses are limited to telephone service.

Further, some ISPs and other organizations have implemented programs to provide an affordable Internet service to low-income Canadians, but those programs are not available to everyone. For instance:

- The Toronto Public Library, in partnership with Google, has set up a pilot project in library branches located in low-income neighbourhoods of Toronto. Individuals can borrow a WiFi hotspot connection for six months, which allows them to access the Internet and download up to 10 GB/month, free of charge.

- Chebucto, a registered non-profit charitable society based in Halifax, Nova Scotia, provides free and low-cost Internet access to publicly-owned low income housing. Service is provided at speeds of 10 Mbps download and upload for an annual society membership of \$125.00 with no other charges.
- Rogers, through its *Connected for Success* program in Toronto, is providing qualified residents of non-profit housing with access to 10/1 Mbps service for \$9.99/month. Rogers recently announced expanding this program to qualified subsidized tenants in another 533 non-profit housing companies located in Ontario, New Brunswick and Newfoundland.²²
- TELUS launched a pilot program in British Columbia and Alberta to provide a \$9.95/month Internet package targeted at single-parent families receiving income or disability assistance from the provincial government.²³

c) Other initiatives

A number of initiatives aimed at providing affordable – and sometimes free – access to broadband services are already in place in various locations across the country. These include:

- In the National Capital Region, NCFreeNet offers DSL Internet to individuals and community groups. It is supported by subscription fees and member donations. Offerings range from 2 Mbps to 50 Mbps download speed, with upload speeds from 0.8 Mbps to 10 Mbps. Prices range from \$20.95/month for dial-up to \$49.95/month for 50/10 Mbps package. Packages offer about 322 GB of bandwidth per month. Users who go over that amount are requested to make a donation for additional capacity.
- In the Greater Toronto Area, Toronto Free-Net offers dial-up and DSL broadband services to individuals. It is supported by subscription fees and member donations. DSL offerings range from 6 Mbps to 25 Mbps download speeds, with upload speeds ranging from 0.8 Mbps to 10 Mbps, and offer either 300 GB of bandwidth per month or unlimited usage. Prices range from \$32/month to \$41/month, depending on the level of service purchased.
- In Fredericton, NB, the city has extended free Wi-Fi coverage throughout a variety of locations, ranging from the business district to public spaces such as city parks, arenas and malls.
- In Montreal, QC, the project *Île Sans Fil* is led by a not-for-profit organization seeking to bring Wi-Fi to all public locations.

Conclusion

While the *Telecommunications Act* gives the CRTC broad powers to regulate the provision of telecommunications services, other parties are likely better placed to implement targeted solutions to address the gaps in affordability. A comprehensive solution to affordability issues will require a multi-faceted approach, including the participation of other stakeholders. In this regard, the record of the BTS proceeding demonstrates that various stakeholders, including ISPs and community organizations, have

²² <https://www.thestar.com/news/gta/2016/04/07/rogers-to-expand-low-cost-internet-to-social-housing-tenants.html>

²³ https://about.telus.com/community/english/news_centre/news_releases/blog/2016/10/14/telus-launches-internet-for-good-pilot-to-support-18000-british-columbian-families
http://about.telus.com/community/english/news_centre/news_releases/blog/2016/11/24/telus-launches-internet-for-good-pilot-to-support-15000-alberta-families

begun to implement solutions to meet the wide-ranging needs of these consumers. The CRTC is supportive of these initiatives and encourages all stakeholders to follow suit.

Additional initiatives can be undertaken to ensure access to affordable broadband Internet access services for Canadians. The compelling case made by interveners in the BTS proceeding supports the Innovation Agenda's assertion that it is in the best interests of Canadians to "do more to give low-income Canadians affordable access high-speed Internet so that they can participate fully in a digital and global economy for a better quality of life."

ii) Digital literacy

Introduction

Digital literacy is the set of knowledge, skills, and behaviours that enable people to understand and use digital systems, tools and applications, and to process digital information. These capabilities and aptitudes link strongly with a population's capacity to be innovative, productive and creative, and to participate in democracy, the digital economy, and other spheres of life.

Given that the Internet is increasingly the platform of choice for providing access to core services, including health care, banking, and government services, digital literacy becomes increasingly important for facilitating meaningful access to these services. Even where broadband Internet services are available, Canadians may not be able to use the service to its fullest potential based on their level of digital literacy.

Analysis

Internationally, Canada ranks at or above the OECD average on three key aptitudes of digital literacy: literacy, numeracy, and problem solving in technology-rich environments (although notable variations exist in scores across provinces and territories). According to Statistics Canada, Employment and Skills Development Canada, and the Council of Ministers of Education Canada, these aptitudes have profound consequences for different groups related to economic disparities, health outcomes, levels of political engagement, and social integration. Relative to other OECD countries, Canada shows a larger proportion of its population at both the highest and lowest levels of literacy: 16.4% of Canadian adults have very low literacy and 22.4% score low in numeracy.²⁴ These numbers are generally consistent with the results of the EKOS survey: 24% of respondents cited lack of skills as a reason for limiting use of the Internet.

During the BTS proceeding, a number of parties including individual Canadians, consumer groups, and governments including First Nations noted that citizens require not only access to broadband Internet services, but also the appropriate skills to use these services effectively. These parties underlined the importance of digital literacy to ensuring that Canadians fully benefit from the investments already made in telecommunications infrastructure.

²⁴ Statistics Canada, Employment and Social Development Canada, and Council of Ministers of Education Canada, [Skills in Canada: First Results from the Programme for the International Assessment of Adult Competencies \(PIAAC\)](#). This report presents the first results of the PIAAC, an initiative of the OECD.

A study by the Information and Communications Technology Council, titled *Skills in the Digital Economy: Where Canada Stands and the Way Forward*,²⁵ indicates that digital literacy and digital skills are now necessary for a modern-day working professional. However, with the fast pace of technological advances, these skills decrease in relevance by 50% in approximately 2.5 to 5 years. This means that citizens are required to consistently update their digital skills or risk falling behind in a relatively short time.

A telephone survey, *Participation in the Digital Economy*,²⁶ produced by Ipsos Public Affairs and submitted by Rogers during the BTS proceeding, indicated that among respondents, 5% did not use the Internet at all, and among those, 22% noted a personal inability to use technology as the reason why. The portion of those who do not use the Internet at all increased to 15% within the 60+ age group.

Although digital literacy is incorporated into the curriculum in some provinces and territories, MediaSmarts reported that schools face barriers in successfully integrating networked communications technologies into their curriculums and teaching practices. This is specifically due to the speed at which change occurs in today's digital landscape. The result is that school systems are left scrambling to catch up with new technologies.

Examples of current efforts

Several federal government departments offer funding for research, targeted digital literacy initiatives, and assessment tools to encourage digital literacy. These departments include but are not limited to:

- **Employment and Social Development Canada (ESDC)**
 - The **Office of Literacy and Essential Skills (OLES)** includes computer use/digital skills among the essential skills needed for work, learning and life, and as a foundation skill for learning other skills. ESDC offers funding for organizations to aid their employees in developing their essential skills, including digital skills. OLES also offers informal assessments to help users identify their digital capabilities, including strengths and areas for improvement.
 - The **Open Government Initiative** has committed to the sponsorship of projects to increase the relationship between digital skills and relevant labour markets, the development of online tools and resources to help Canadians improve their digital skills, and the funding of initiatives to improve the digital skills of Canadians.
- **Public Safety Canada** provides consumer education materials about cybersecurity, including videos and fact sheets, to help Canadians better understand how to protect themselves and their families online in terms of, for example, cyberbullying, social media usage, and privacy.
- The **Privacy Commissioner of Canada** provides Canadians with information on how to maintain privacy online.

Provincial and territorial governments are also active in increasing digital literacy skills, with some offering targeted digital literacy initiatives to their citizens and many including digital literacy in their

²⁵ <http://www.ictc-ctic.ca/wp-content/uploads/2016/05/Skills-in-the-Digital-Economy-Where-Canada-Stands-and-the-Way-Forward-.pdf>

²⁶ <http://www.ipsos.ca/en/products-tools/public-affairs/syndicated-studies/participation-digital-economy.aspx>

teaching curricula for school-aged children. Some provinces and territories submitted during the BTS proceeding a sample of the programs they offer:

Provincial Government	Digital Literacy Programs	
	For Children	For Adults
British Columbia	<ul style="list-style-type: none"> • The BC Ministry of Education has a digital literacy framework, which provides a clear and detailed sense of what digitally literate students should understand and be able to accomplish at various levels of their development. 	<ul style="list-style-type: none"> • The Ministry of Advanced Education provides funding for Community Adult Literacy Program, including funding for digital literacy programs. • The Employment Program of BC offers employment services and employment-ready training to low income residents, many of which include essential elements of digital literacy.
Northwest Territories	<ul style="list-style-type: none"> • Digital literacy is integrated into school curriculum for grades K-12. • A subscription to access MediaSmarts' digital literacy, online safety, and media awareness resources is made available to students, parents, and teachers. 	<ul style="list-style-type: none"> • The Department of Executives offers in-person assistance to residents who would like to access online services but do not have the skills, equipment or access to an Internet connection to do so. • Education, Culture and Employment Service Centres offer computers for public use and Client Service Officers are available to help clients to access programs and use the computers.
Nunavut	<ul style="list-style-type: none"> • Although not specifically included in the curriculum, digital literacy is incorporated into other learning areas. 	<ul style="list-style-type: none"> • Adult educators are available to support users accessing computer services through college campuses and community learning centres.
Yukon	n/a	<ul style="list-style-type: none"> • The E-Commerce Yukon program provides consulting services to community groups to support the development of e-commerce related activities in communities to promote economic activity.

Several First Nations organizations have also undertaken initiatives to promote digital literacy. For example, the First Nations Technology Council of British Columbia works to ensure that First Nations communities can benefit from increased connectivity and technological advancements. Among other things, the Council provides programs under the Province of British Columbia's Indigenous Technology Talent Development Strategy, which focuses on training and digital skills development.²⁷

Finally, the not-for-profit organization MediaSmarts strives to ensure that children and youth have the fundamental skills to appropriately interact with media and digital technologies. It offers an array of resources to children, parents, and teachers to help educate them about issues related to Internet use. It has also developed tools and materials to support the integration of digital literacy into curricula for children in kindergarten to grade 12.

²⁷ <http://www.technologycouncil.ca>

Conclusion

While the *Telecommunications Act* gives the CRTC broad powers to regulate the provision of telecommunications services, other parties are better placed to implement solutions to address the gaps in digital literacy. The CRTC considers that a comprehensive solution to digital literacy issues will require a multi-faceted approach, including the participation of other stakeholders. The persuasive case made by interveners in the BTS proceeding indicates that taking concrete actions to increase digital literacy is in the best interest of all Canadians.