RURAL WIRELESS DIGITAL INFRASTRUCTURE: A CRITICAL ROLE

INTRODUCTION

On 8 May 2019, the House of Commons unanimously adopted Private Member's Motion M-208, introduced by William Amos (Pontiac) and seconded by David de Burgh Graham (Laurentides–Labelle), calling on the House of Commons Standing Committee on Industry, Science and Technology (the Committee) to study approaches to encourage wireless infrastructure deployment in rural Canada, given that this infrastructure is critical, particularly during a crisis. Specifically, in relation to this committee, the motion stated that:

> the Standing Committee on Industry, Science and Technology should be instructed to undertake a comprehensive study on rural wireless infrastructure, focusing particularly on (i) the underlying causes of, and prospective solutions to the gaps in wireless infrastructure deployment in rural Canada, (ii) the regulatory role of the Canadian Radio-television and Telecommunications Commission, (iii) the fiscal and regulatory approaches to incentivize more significant investments in rural wireless infrastructure, and report to the House at its earliest convenience.

The Committee held four meetings in May and June 2019 and heard from 15 witnesses.

CRITICAL ROLE OF WIRELESS INFRASTRUCTURE DURING A CRISIS

Witnesses told the Committee that wireless infrastructure plays a critical role during emergency situations, particularly those caused by a natural disaster. Mr. Amos explained that:

> As to public safety, it's clear that we could imagine extremely serious consequences for people who happen to be in regions where there is no signal, but it's also a matter of effectiveness, as you mentioned.
>
> It's not only about the mayors, councillors, municipal employees or first responders who are on the ground. Clearly, all of these individuals whose responsibility it is to respond to emergencies must be able to communicate. However, there are also neighbours helping each other out and communities that get together to support each other, as is the case at present. We see that these people are much less effective without cell services.

Moreover, Mr. Amos said that the day after his community was hit by a tornado in September 2018, officials and responders were unable to communicate with each other to identify and respond to immediate needs due to the lack of cellular infrastructure.

To improve communication and coordination during a crisis situation, the Federation of Canadian Municipalities (FCM) called upon the federal government to support the creation of a Public Safety Broadband Network for Canada (PSBN) (in 2017-2018, this government consulted provincial, territorial and municipal governments, first responders and other stakeholders on implementation models for a PSBN in Canada). The PSBN would be a secure network for high-speed wireless data communication used by first responders and security personnel in their daily tasks and during emergencies. However, for this network to work effectively, FCM reiterated that the federal government must develop adequate coverage and quality Internet services in rural areas.

The Honourable Bernadette Jordan, Minister of Rural Economic Development, said that she considered various options to further support wireless service during a crisis. For example, a region with wireless infrastructure may be deprived of wireless service because of an unplanned shut down of power generating station (due to a natural disaster) where backup generators may only work for a limited time. When asked whether the government should set minimum standards to ensure that cellular infrastructure can be powered independently during a natural disaster for a minimum period, the Minister replied that she was not aware of minimum standards, but she would consider its inclusion in a future national connectivity strategy.

CHALLENGES OF WIRELESS INFRASTRUCTURE DEPLOYMENT AND PROSPECTIVE SOLUTIONS

Digital Divide

Many witnesses highlighted persistent connectivity challenges for both wired and wireless technologies in rural Canada. Minister Jordan said that although nine out of ten urban households in Canada have broadband Internet access, only one out of three households have this type of access in rural areas. Christopher Seidl, Executive Director, Telecommunications, Canadian Radio-television and Telecommunications Commission (CRTC), stated that 99.4% of Canadians have access to mobile networks and that 90% of major road corridors are covered. However, the Committee has concerns whether these figures reflect the reality on the ground in rural areas. Witnesses said that for many rural households, connectivity is a major concern not only during a crisis, but also to support

daily activities. Connectivity is set within an economic context: Minister Jordan explained that while rural communities are sparsely populated, they account for roughly 30% of Canada's gross domestic product.

Wireless infrastructure in many rural communities is sometimes the only feasible economic option for broadband Internet access. According to Innovation, Science and Economic Development Canada (ISED), 98.5% of Canadians have wireless Internet broadband coverage. However, according to the CRTC Communications Monitoring Report 2018 , in 2017, for 26% of rural households, wireless technology was their only connectivity option as they did not have access to wired technology. The Committee was unable to ascertain whether these numbers reflect the reality on the ground in rural areas.

André Nepton, coordinator of the Agence interrégionale de développement des technologies de l'information et des communications (Aide Tic) favoured, for rural areas, prioritizing mobile wireless internet service over residential Internet. He explained that

> When we call on elected officials in our municipalities, the priority is cell phones. Indeed, since the advent of LTE technology [Long term evolution or fourth generation (4G)], both Internet access and telephony can be offered. It is clear that, for the Internet, costs are a little higher, but telephony is the basis of safety, especially on our access roads.

The Committee heard that, in recent years, the Government of Canada committed funds to improve rural connectivity to bridge the digital divide. Minister Jordan said that Budget 2019 included $1.7 billion in new investments to improve connectivity in Canada, including new funding to expand broadband Internet and funding to top up the Connect to Innovate program which is committed to bringing high-speed Internet to an additional 300 rural and remote communities in Canada. In addition to these committed funds, Minister Jordan added that to expand broadband access in Canada, the Canada Infrastructure Bank will seek to invest up to $1 billion over the next 10 years and attract at least $2 billion in private capital. FCM cautioned that allocations from the Infrastructure Bank funds should be driven by local priorities so that expanding broadband services does not prevent the deployment of other basic local infrastructure needs.

Although funding has been announced to support rural connectivity in Canada, some witnesses expressed concern regarding how these investments will be coordinated and used. For example, C. J. Prudham, Executive Vice-President and General Counsel at Xplornet Communications Inc., stated that the government should use caution when deploying various investments, as "there is a risk of multiple well-meaning government

agencies rushing to fund projects and crowding out sustainable private investment." In addition, Mr. Nepton argued that it is important not to let large telecommunications companies dictate Canada's connectivity priorities by giving them funding since they only invest in profitable communities. Finally, Mr. Amos said that clarification is needed as to how this funding will be used to specifically develop Canada's cellular infrastructure.

Several witnesses suggested that the Committee study the role of the CRTC in improving connectivity in Canada, particularly regarding the deployment of wireless infrastructure. For example, Mr. Amos stated that it would be important to consider whether the various initiatives put in place by the CRTC to improve rural connectivity are optimal, including the ongoing review on the implementation of a regulatory framework for mobile wireless services. Mr. Amos said that it would be important "that a critical eye be brought, with regard to the role of the CRTC and its regulatory and incentive-creating functions, to help generate a greater impetus towards Internet and cell phone infrastructure development." Moreover, witnesses claimed that the CRTC should improve its data collection methods to have a better understanding of connectivity in Canada, an issue that was also raised during the Committee study on rural connectivity (More details can be found on pages 32-24 and in recommendation 12 of the Broadband Connectivity in Rural Canada: Overcoming the Digital Divide report). Also, there are concerns about the Telecom Regulatory Policy CRTC 2018-377, published on 27 September 2018, which provides a reduced service for rural and remote communities—reduced from 50 Megabits per second (Mbps) to 25Mbps—and vague timing for implementing corrections going forward.

Robert W.J. Ghiz, President and Chief Executive Officer, Canadian Wireless Telecommunications Association, expressed caution regarding the consideration of significant changes to the CRTC's current regulatory framework. He explained that as part of its review of the wireless industry regulatory framework, the CRTC appears to be considering mandatory wholesale access to Internet service providers' (ISP) wireless networks to mobile virtual network operators (MVNOs). According to him, this would lead to a significant decrease in investment in wireless networks in Canada. He added that the CRTC's current regulatory model is adequate because it encourages competition by supporting the participation of regional ISPs, but more time is needed to achieve optimal results where all Canadians would have Internet connectivity.

The Committee heard that new technologies may have a role to play in improving rural connectivity, for example:

- John Lyotier, Co-Founder and Chief Executive Officer (CEO), RightMesh Project, Left, explained that his organization has been working for several years on Right Mesh technology:

  Really from a technology standpoint, what we've created is a mesh networking software protocol that allows phones to talk to each other, so it's phone-to-phone communication. Should one person have connectivity, the entire network can have connectivity from that one person.

Chris Jensen, co-founder and CEO, RightMesh Project, Left, said the technology demonstrates that it is not only large, expensive infrastructure that can solve rural connectivity problems. This technology would be useful in natural disasters where basic infrastructure is sometimes unusable.

- Daniel S. Goldberg, President and Chief Executive Officer, Telesat Canada, explained that Telesat Canada is working on developing

  a constellation of roughly 300 highly advanced satellites flying approximatively 1,000 kilometres above the Earth (...) connected to each other using optical laser technology are in a patent-pending, low-earth orbit architecture—hence the term LEO [low earth orbit].

In addition to offering faster Internet speeds, by being located much lower than traditional GEO satellites, these satellites offer much lower latency.

Spectrum Access

Witnesses highlighted the importance of spectrum access in rural areas. Mr. Lyotier said that the most useful regulatory change to improve rural connectivity would be to provide better access to spectrum bands. According to Ms. Prudham, in recent years, the federal government has prioritized spectrum frequency allocation for cellular needs while the demand for Internet access is steadily increasing, particularly in rural areas where most of the Internet services offered are wireless. M. Ghiz claimed that the cost of spectrum licences is too high and should be reviewed, or at least, the funds raised from spectrum auctions–estimated at $20 billion–should be reinvested in communities to improve connectivity. Appendix A provides further details more details on spectrum auctions over the past 18 year, totalling close to $18 billion.

During the study on broadband connectivity in rural Canada, the Committee found that the spectrum licensing structure hinders Internet Service Providers (ISPs) ability to deliver wireless services in rural areas. For example, the Committee's report *Broadband Connectivity in Rural Canada: Overcoming the Digital Divide*, released in April 2018,

highlighted the broad coverage of spectrum licences as a concern since they often include both rural and urban areas. Witnesses claimed that ISPs purchasing these licences focus their attention on profitable urban markets at the expense of rural areas which could then end up un-serviced. Additionally, small or new ISPs are unable to compete in these markets, since the broad scope of the licences puts them financially out of reach. During the rural digital infrastructure study, Ms. Prudham supported reducing the geographic coverage of the licenses as a way of increasing spectrum access. She also said that 5G technology will see "merging of the fixed wireless and mobile configurations" and therefore that the convergence of fixed and mobile wireless is "highly, highly likely".

ISED held spectrum auctions in spring 2019 and said that these and future auctions could help mitigate this issue. The 600-Megahertz (MHz) spectrum auction took place between 12 March 2019 and 4 April 2019. According to ISED,

> The auction was designed to promote more competition by setting aside 43% of the spectrum for regional providers. ... Through the auction, regional providers more than doubled their share of low-band spectrum, strengthening their ability to offer competitive services to Canadians.

As well, Lisa Setlakwe, Senior Assistant Deputy Minister, Strategy and Innovation Policy Sector, ISED, said that the Department is in a consultation process to auction licences covering smaller geographical areas so that small or new ISPs can participate in future spectrum auctions.

Finally, ISED is currently consulting stakeholders regarding the potential reallocation of the 3,500 MHz spectrum band. Currently, this spectrum band is often used for fixed wireless service, particularly in rural areas, but is now coveted for 5G deployment. Ms Prudham told the Committee that ISED should not withdraw these spectrum licences from rural areas as they are necessary for rural connectivity. She explained that the scope of the spectrum band required for fixed wireless services is wider than 3,500 MHz and thus some frequency bands could be set aside, and some could be granted for 5G:

> The international band that is being designated, which is referred to as the "the 3,500" actually goes from 3,400 megahertz up to 3,800 megahertz. Currently, we're using only 175 megahertz of that. They [ISED] don't need to actually displace the existing licensees. They can look at what the government has already identified as 75 megahertz below the existing band that could be made available, and 100 megahertz of what is currently referred to as the "C band"– 3,700 megahertz to 3,800 megahertz– and make that available. It's currently used for satellite, but it is not fully utilized, and arguably could be shifted up into the 3,800 megahertz to 4,200 megahertz range.

On June 5, 2019, ISED announced next steps in preparation of the arrival of 5G services, which namely include "a decision paper outlining changes to the 3500 MHz band supporting an auction in 2020" and "a public consultation on the 3500 MHz auction design with measures to support competition and lower prices."

Affordability

The witnesses agreed that it is important to consider not only broadband availability across Canada, but also its affordability. In rural areas, while some households have access to broadband Internet, its high cost makes it prohibitive to use. Mr. Amos said that broadband affordability is just as important as rural connectivity itself, especially considering that the median per capita incomes are lower in rural areas. According to Mr. Ghiz, overall Internet cost is declining in Canada which will eventually improve affordability of Internet services across Canada: he said that between 2014 and 2018, the price of a gigabyte of data decreased by 53.6%.

Some witnesses told the Committee that the CRTC and ISED are working on addressing issues related to competition among ISPs and affordability of broadband Internet services. As mentioned above, the CRTC has undertaken a review of the regulatory framework for wireless services in Canada, where it will examine, among other things, the affordability of services. Also, Ms. Setlakwe explained that ISED is considering issuing a directive to the CRTC about service affordability and competition for ISPs. She said that "[w]hat we're asking them to do, as they are going to be making decisions on a variety of policy areas, is that they consider or give it a consumer lens first and that's looking at affordability, consumer rights, encouraging competition and also encouraging innovation." Mr. Ghiz said he supports the goals of this new directive but is surprised that ISED does not also consider encouraging infrastructure investment by facility-based carriers as a priority for the CRTC.

Prospects for Cooperation

Witnesses unanimously supported collaboration and partnership among key stakeholders to facilitate the deployment of wireless infrastructure in Canada. Several organizations stated the importance of the federal government to continue to consult with rural businesses, municipalities and community groups as they are the ones with the tools and knowledge to improve the situation, often at a lower cost. For example, since 2009, Aide Tic has developed 47 projects to develop large telecommunications sites, including 300-foot telecommunications towers in various villages and road accesses. Mr. Nepton specified that municipalities should be directly involved in rural

connectivity decision-making processes because they have a better understanding of what is needed.

Witnesses told the Committee that collaboration among stakeholders is important when implementing funding programs to support rural connectivity. The FCM stated that municipal input was important in designing broadband funding programs to ensure that eligibility criteria and application processes meet rural communities' needs. Mr. Seidl pointed out that one of the goals of the CRTC's broadband Internet fund ($750 million fund awarded over five years to help provide all Canadians with access to broadband Internet and mobile wireless services) is to ensure community engagement.

In January 2019, the federal government created the new Rural Economic Development portfolio, under Infrastructure Canada, which, according to Mr. Amos and Minister Jordan, will facilitate collaboration between various stakeholders involved in rural development. Minister Jordan explained that she is working on a national strategy for rural connectivity within a larger rural economic development strategy. She claimed that this is a whole-of-government strategy and that to date, 21 departments of various governments have been involved. The Committee agrees that a national strategy may be useful if it addresses issues such as wireless infrastructure, affordability and spectrum licence management.

OBSERVATIONS AND RECOMMENDATIONS

The Committee acknowledges that considerable effort has been made in recent years to improve connectivity in Canada, particularly in rural and remote areas. However, it is worth conducting a more in-depth study of how these initiatives can further wireless infrastructure deployment in rural and remote areas, as well as a more in-depth review of available, reliable, and authoritative data and analysis on connectivity in these areas. This infrastructure is critical for rural Canadians, not only during emergencies or natural disaster, but also in their daily lives. The Committee expresses concerns regarding the appropriateness of the CRTC's stewardship of the deployment of wireless infrastructure in rural and remote areas, and the amount of time it is taking to provide solutions. The Committee therefore recommends:

Recommendation 1

That, within one year, the House of Commons Standing Committee on Industry, Science and Technology study, and consider prospective solutions to address gaps in wireless infrastructure deployment in rural Canada, namely:

- **cellular infrastructure capacity during emergency situations;**

- **the directive of the Canadian Radio-television and Telecommunications Commission in supporting the deployment of wireless infrastructure in rural and remote areas;**

- **data and analysis on connectivity in rural and remote areas; and**

- **how to encourage greater investment in rural wireless infrastructure.**

Recommendation 2

That the federal government, together with key stakeholders, study ways to improve wireless infrastructure availability and reliability to ensure optimal performance in all circumstances and particularly, in an emergency.

The Committee notes that access to spectrum bands is essential for the deployment and development of wireless Internet services. Access to spectrum is particularly important in rural areas, where connectivity is almost entirely based on wireless Internet services. It is therefore essential that ISED consider the interests and needs of rural communities when allocating spectrum bands. The Committee therefore recommends:

Recommendation 3

That the federal government put in place means to ensure that when allocating spectrum licenses, the interests of rural areas are considered, which may include, but is not limited to

- **Decreasing the size of spectrum licensing tiers so that they serve rural areas separately from large urban centres;**

- **Retaining the licences already allocated for fixed wireless Internet in rural areas;**

- **Working towards removing the distinction between fixed and mobile wireless access.**

The Committee recognizes that it can be expensive to build and operate digital infrastructure in certain rural areas. Nonetheless, Internet access and mobile wireless (cellular service) is essential to participating in modern society for all Canadians. Innovative solutions must be explored, developed and implemented to help bridge the digital disparity in Canada. The Committee therefore recommends:

Recommendation 4

That the federal government support and encourage the development of innovative ways to provide digital wireless services in rural areas to improve connectivity in areas where deploying wireless and/or wired infrastructure is physically and economically challenging.

Recommendation 5

That the federal government and the CRTC treat mobile services as essential to both the safety of the public and participation in the modern economy, particularly in rural areas that are currently unserved or underserved.

APPENDIX A

Tableau 1—Spectrum auctions in Canada from 2001-2019

Year	Spectrum	License winners	Total amount of winning bids
2001	Personal Communications Service (PCS) spectrum in the 2 gigahertz (GHz) frequency range	Bell Mobility Inc.	$720,490,000
		Rogers Wireless Inc.	$393,520,000
		TELUS Communications Inc.	$355,920,000
		W2N Inc.	$11,390,000
		Thunder Bay Telephone	$600,000
		Winners Total	**$1,481,920,000**
2004, 2005 and 2009 (combined results)	Wireless Communication Services (WCS) in the 2,300 megahertz (MHz) band and Fixed Wireless Access (FWA) in the 3,500 MHz band	**Total for 36 licence winners**	**$68,888,300**
2008	Advanced Wireless Services (AWS-1) and other spectrum in the 2 GHz range	**Total for 15 licence winners**	**$4,254,710,327**

2009	Spectrum in the bands 849-851 MHz and 894-896 MHz for Air-Ground Services	**Winner** : SkySurf Canada Communications	**$2,100,007**
2014	Mobile Broadband Services (MBS) — 700 MHz band	Feenix	$284,000
		MTS Inc.	$8,772,072
		Bragg	$20,298,000
		TELUS Communications Inc.	$1,142,953,484
		Vidéotron	$233,328,000
		Bell Mobility Inc.	$565,705,517
		SaskTel	$7,556,929
		Rogers Communications Inc.	$3,291,738,000
		Winners total	**$5,270,636,002**
2015	Advanced Wireless Services in the bands 1755-1780 MHz and 2155-2180 MHz (AWS-3)	Bell Mobility Inc.	$499,868,630
		Bragg	$9,957,299
		TELUS Communications Inc.	$1,511,121,133
		Vidéotron	$31,800,359
		WIND Mobile	$56,400,000
		Winners total	**$2,109,147,421**

		Bell Mobility Inc.	$28,985,000
2015	Broadband Radio Service (BRS) — 2500 MHz Band	Bragg	$4,821,000
		Corridor Communicaitons	$2,299,000
		MTS Inc.	$2,242,000
		Rogers Communications Inc.	$24,086,270
		TBayTel	$1,731,000
		TELUS Communications Inc.	$478,819,000
		Vidéotron	$186,952,000
		Xplornet Communications	$25,435,731
		Winners Total	**$755,371,001**
2015	Residual spectrum licences in the 700 MHz and AWS-3 bands	Bell Mobility Inc.	$206,063
		TELUS Mobility Inc.	$58,303,223
		Winners total	**$58,509,286**
2018	Residual spectrum licences in the 700 MHz, 2500 MHz, 2300 MHz and PCS-G bands	Cogeco Connexion Inc.	$24,306,308
		Écotel Inc.	$1,244,894
		Freedom Mobile Inc.	$8,642,040
		Iris Technologies Inc.	$100,607
		TELUS Communications Inc.	$907,000
		Xplornet Communications Inc.	$8,235,473
		Winners total	**$43,436,322**

2019	Spectrum licences for the 600 MHz band	Bragg	$13,046,000
		Freedom Mobile Inc.	$491,877,000
		Iris Technologies Inc.	$2,556,000
		Rogers Communications Inc.	$1,725,006,000
		SaskTel	$12,168,000
		TBayTel	$2,802,000
		TELUS Communications Inc.	$931,238,000
		Vidéotron	$255,780,000
		Xplornet Communications Inc.	$35,755,000
		Winners total	**$3,438,224,000**
	Total revenues		**$17,482,942,666**

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. 161, 163 and 165 to 168) is tabled.

Respectfully submitted,

Dan Ruimy, M.P.
Chair

NDP Supplementary Observations and Recommendations

Over the last decade, Canadians from coast to coast to coast have decried consecutive governments for not doing enough to support rural and remote broadband access. Canadians in these communities should have access to broadband – it's 2019. Every Canadian deserves access to affordable and reliable broadband of some kind. This needs to be addressed for our economy and to ensure equality.

- In the Northwest Territories, the Yukon and Nunavut no households have access to high speed broadband (50/10 Mbs with unlimited data) and 72 percent of highways and major transport roads do not have access to LTE wireless services.
- In Canada 63 percent of rural households do not have access to high speed broadband (50/10 Mbs with unlimited data) and 14 percent of highways and major transport roads do not have access to LTE wireless services.

This past fall 2018, the Auditor General released a report on the 'digital divide' between Canadians in rural and urban centres. It highlighted the government's lack of strategy to meet the connectivity needs of Canadians in rural and remote communities.

In Budget 2019, the government announced its commitment to set a national broadband target, in which 95 per cent of Canadian homes and businesses will have access to internet speeds of at least 50/10 Mbps by 2026 and 100 per cent by 2030, no matter where they are located in the country. By the government's own estimate it will cost approximately $6 billion to provide full broadband connections to all Canadians. In the Budget the government only committed to $1.7 billion over 13 years, starting in 2019–20, to establish a new national high-speed internet program, the Universal Broadband Fund. This is only 30 percent of the required amount of funds. The government is depending on the private sector to providing the remaining investments but there are no guarantees or commitments or a dedicated timeline for this private funding.

Our committee report, *Broadband Connectivity in Rural Canada: Overcoming the Digital Divide*, unanimously supported by all parties, and in the best interests of rural and remote Canadians, recommended twelve distinct points for the Minister to consider while moving forward and improving access to broadband for rural and remote communities. Some of the recommendations included: working closer with internet service providers; government funding for 'last mile' infrastructure; and, considering the spectrum allocation process for the purpose of broadband deployment to ensure smaller providers have a larger chance obtaining spectrum licenses to help push service to rural and remote communities.

Also in the fall of 2018, a decision by the Canadian Radio-television and Telecommunications Commission (CRTC), Telecom Regulatory Policy CRTC 2018-377, halved the speeds previously announced by the government in 2016 - from 50Mbps to 25Mbps download and from 10Mbps to 5Mbps upload - for Canadians in rural and remote areas. This is a step backwards. It is not acceptable and the 16% of Canadian households who have no access to internet would all agree that being relegated to a substandard connection when the rest of the country is going to receiving access to even faster speeds through new technologies.

Since 2001, there have been multiple spectrum auctions, resulting in billions of dollars to our government in licenses being awarded to telecommunications companies. The total revenue for the government through 2019 was $ 17.6 billion. These spectrum auctions continue being a significant source of revenue for the government, yet Canadians in rural and remote communities still do not have appropriate service or even service at all.

Recommendations

- The Minister must reverse CRTC Telecom Regulatory Policy CRTC 2018-377 and mandate that minimum speeds for all Canadians in rural and remote area match those in urban areas which are 50Mbs to download and 10Mbs to upload.
- The government should use funds raised from telecom spectrum auctions to invest in high speed broadband infrastructure in rural and remote communities to achieve the goal of 100 percent of access for all Canadians.
- The government needs to disclose how all funds raised from the spectrum auctions to date have been used.
- The government needs to disclose why it will not implement any of the required actions of Motion 208 as the Minister of Rural Economic Development revealed during her testimony for main estimates for her department.