PLAN FOR A DIGITAL CANADA

The Standing Senate Committee on Transport and Communications
The Honourable Dennis Dawson, Chair
The Honourable Leo Housakos, Deputy Chair
JUNE 2010

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www.senate-senat.ca/transcom.asp

Information regarding the committee can be obtained through its web site:
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THE COMMITTEE

The following Senators have participated in the study:

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The Honourable Leo Housakos, Deputy Chair

and

The Honourable Senators:

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Francis Fox, P.C.
Linda Frum
Janis G. Johnson
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Ex-officio members of the committee:

The Honourable Senators Marjory LeBreton, P.C. (or Gérald J. Comeau) and James S. Cowan (or Claudette Tardif)

Other Senators who have participated on this study:
The Honourable Senators Willie Adams, John Trevor Eyton, Bill Rompkey, P.C., and John D. Wallace

and

The Honourable Lise Bacon as Chair until August 25, 2009, date of her retirement.

From the Library of Parliament:
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Mona Ishack, Communications Officer

ORDER OF REFERENCE

Extract from the *Journals of the Senate*, Tuesday, March 16, 2010:

The Honourable Senator Housakos moved, seconded by the Honourable Senator Greene:

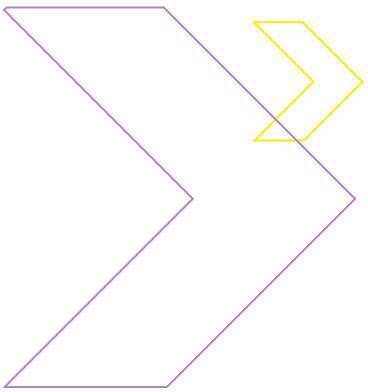
That the Standing Senate Committee on Transport and Communications be authorized to examine and report on emerging issues related to its communications mandate and on the wireless sector, including issues such as access to high-speed Internet, the supply of bandwidth, the nation-building role of wireless, the pace of the adoption of innovations, the financial aspects associated with possible changes to the sector, and Canada's development of the sector in comparison to the performance in other countries;

That the papers and evidence received and taken and work accomplished by the committee on this subject since the beginning of the Second Session of the Fortieth Parliament be referred to the committee; and

That the committee report to the Senate from time to time, with a final report no later than June 22, 2010 and that the committee retain all powers necessary to publicize its findings until 180 days after the tabling of the final report.

The question being put on the motion, it was adopted.

Gary W. O'Brien
Clerk of the Senate



LIST OF ACRONYMS

2G	Second Generation mobile communications technology
3G	Third Generation mobile communications technology
4G	Fourth Generation mobile communications technology
APPs	Applications (for smart phones)
ARPU	Average Revenue Per User
AWS	Advanced Wireless Services (Spectrum Auction)
CCD-COE	[NATO] Cooperative Cyber Defence Centre of Excellence
CCTS	Commissioner for Complaints for Telecommunications Services
CDMA	Code Division Multiple Access
CIOB	Chief Information Officer Branch (Treasury Board)
CMA	Census Metropolitan Area
CRTC	Canadian Radio-television and Telecommunications Commission
CWTA	Canadian Wireless Telecommunications Association
DBRS	[Formerly, Dominion Bond Rating Service]
EBITDA	Earnings Before Interest, Taxes, Depreciation and Amortization
EU	European Union
FCC	Federal Communications Commission (U.S.)
G-7	Group of seven industrialized nations (Canada, France, Germany, Italy, Japan, United Kingdom, United States)
Gbps	Gigabit per second
GPS	Global Positioning System
GSM	Global System for Mobile communications
HSPA	High Speed Packet Access
HSPA+	Evolved (faster, more versatile) High Speed Packet Access
ICT	Information Communications Technologies
ISP	Internet Service Provider
IT	Information Technology
ITAC	Information Technology Association of Canada
LTE	Long Term Evolution
Mbps	Megabit per second
MOU	Minutes Of Use
OECD	Organization for Economic Co-operation and Development
PCS	Personal Communications Services
PIAC	Public Interest Advocacy Centre
PPP	Purchasing Power Parity
Wi-Fi	Wireless Fidelity (high-speed wireless local area networking)
WiMAX	Worldwide Interoperability for Microwave Access

CHAPTER 1

1 INTRODUCTION AND BACKGROUND

Canada has a long history of accomplishments in telecommunications, from the invention of the telephone[1] to being the first country in the world to connect all its schools to the Internet[2] to leading the Organisation for Economic Co-operation and Development member countries in the deployment and uptake of broadband.[3]

Courtesy of Apple

1. House of Commons, Debates, 21 June 2002. http://www2.parl.gc.ca/HousePublications/Publication.aspx?Pub=hansard&Language=E&Mode=1&Parl=37&Ses=1#SOB-291991
2. Industry Canada, "What is SchoolNet?" http://web.archive.org/web/20070224224427/www.schoolnet.ca/home/e/whatis.asp
3. Industry Canada, Government of Canada Launches National Consultations on a Digital Economy Strategy, News Release and Backgrounder, 10 May 2010. http://www.ic.gc.ca/eic/site/ic1.nsf/eng/05531.html

Given the importance of Information Communications Technologies (ICT) to the world's economies, falling behind in telecommunications is a national cause for concern. One witness before the committee talked of a new reality: "... that the Canadian telecommunications scene is in a state of crisis."[4]

There is still some room for optimism, as Canada has a highly educated population, universities, such as the University of Waterloo, that are world renowned in computer science and related fields, and some of Canada's firms, such as Research in Motion (RIM), are dominant players in global markets.

CHANGES IN THE MOBILE PHONE MARKET

In 2002, Canada's Research in Motion released its iconic BlackBerry. This was a "convergent device" – better known now as a smart phone – that allowed access to the Internet. The BlackBerry, until recently, was seen primarily as a business tool that allowed busy executives mobile access to their e-mail. The BlackBerry was the first smart phone developed for the optimal use of wireless email; from the beginning, RIM emphasized the efficient use of spectrum and security.

Apple's much-hyped launch of the iPhone on June 29, 2007, changed cell phone markets. It was a smart phone, like the BlackBerry, but the iPhone tapped the Internet for entertainment and fun. The growing popularity of smart phones demonstrated that cell phones were no longer just devices for carrying voice and simple text messages but a means for tapping the multi-media resources of the Internet. Cell phones became an integral part of the digital broadband universe.

Canada did not get the iPhone until just over a year after the U.S. launch, at terms that led to numerous complaints by Canadians. Several studies around this time criticized Canada for having relatively high cell phone prices and relatively low cell phone penetration; these studies have been challenged, especially by the incumbent wireless service providers, but they led to the view that Canada had an uncompetitive cell phone market. Also of concern was the relatively low coverage in Canada by third-generation (3G) networks, the network needed for the efficient use of smart phones; when this committee began its study, the most recent available data, for the end of 2007, showed 78% coverage for 3G (and 98% for 2G).

For these reasons, the Standing Senate Committee on Transport and Communications decided to examine emerging trends in communications, with an initial focus on the wireless sector.

4. Professor Michael Geist, 26 May 2009. http://www.parl.gc.ca/40/2/parlbus/commbus/senate/Com-e/tran-e/03evb-e.htm?Language=E&Parl=40&Ses=2&comm_id=19

PREVIOUS WORK OF THIS COMMITTEE

Courtesy of Apple

This is not the first time this committee has examined digital communications.

Eleven years ago the Standing Senate Committee on Transport and Communications tabled the final report, *Wired to Win: Canada's Positioning within the World's Technological Revolution* (May 1999).[5] Two years before that, the committee had tabled the interim report, *Wired to Win: Canada's International Competitive Position in Communications* (April 1997).[6] The core of the committee's order of reference was that it: "… examine and report upon Canada's international competitive position in communications generally, including a review of the economic, social and cultural importance of communications for Canada."

The previous work mapped concerns that still exist today – for example, the threat of digital divides between different groups in society – and the previous work also emphasized the growing importance of change in modern telecommunications.

In 1996, when a subcommittee of this committee began its study, the World Wide Web was about three years old, Amazon.com was two years old, and Google was only a research project by two graduate students at Stanford.

In 1999, when the subcommittee tabled its final report, Research in Motion (RIM) introduced a wireless handheld device as a two-way pager; it would be another three years before the iconic BlackBerry would take its present form as a smart phone. In 2001, Wikipedia, now the most popular source of general information on the Internet, appeared. In February 2005, YouTube, the video-sharing website, was founded, and the first video was uploaded on April 23, 2005. In 2007, the iPhone was launched.

The *Wired to Win* reports were optimistic about the new technology and analysed the new area with respect to traditional concerns, such as employment opportunities, competitiveness in the emerging sector and effects on Canadians (health, education, identity).

Today, the issues raised by this committee's previous reports remain, but the frame of reference is not merely that of connecting Canadians to a new technology – the "Wired" in *Wired to Win* – but the possibility of improving the connections and offering high-speed access to the Internet (broadband) for all Canadians and the possibility of completely mobile access to broadband.

A lesson from the period during which the committee's work was done and from the decade after the final report was tabled is that rapid change is a given in modern telecommunications.

5. http://www.parl.gc.ca/36/1/parlbus/commbus/senate/Com-e/COMM-E/rep-e/finalrepmay99-e.htm
6. http://www.parl.gc.ca/35/2/parlbus/commbus/senate/Com-e/COMM-E/rep-e/interimpart1-e.htm

ORDER OF REFERENCE

The following is the order of reference that was tabled in the Senate on March 11, 2009 and adopted on March 24, 2009:

> That the Standing Senate Committee on Transport and Communications be authorized to examine emerging issues related to its communications mandate and to report on the wireless sector, including issues such as access to high-speed Internet, the supply of bandwidth, the nation-building role of wireless, the pace of the adoption of innovations, the financial aspects associated with possible changes to the sector, and Canada's development of the sector in comparison to the performance in other countries.
>
> That the committee report to the Senate from time to time, no later than March 31, 2010.

The mandate for this committee is broad and could be distilled to: Report on the wireless sector. The phrase "including issues such as" allowed the committee to choose any aspects of the sector. As will be noted below, this study evolved from one narrowly focused on smart phones and the third-generation (3G) and advanced wireless networks needed to support smart phones. The new focus is broader and examines a possible digital society for Canada, one for which the wireless sector would be an important part.

After the prorogation of parliament at the end of 2009, the order of reference needed to be reintroduced and accepted in the Senate. This was done in March 2010, and the order of reference remained the same, with the exception of the reporting deadline, which was changed to "no later than June 22, 2010."

WORK OF THE COMMITTEE

Senator Lise Bacon was the previous Chair of this committee, and with the other members of the committee, especially the steering committee, she helped choose the subject area for the current study. She tabled the order of reference and saw it adopted, and she then worked with the committee staff on a feasible timetable for the report and on the scheduling of expert witnesses and fact-finding missions. Before her retirement in the summer of 2009, Senator Bacon chaired all the meetings on this order of reference, as well as carrying on with a full schedule of other Senate duties. She championed the mission to Estonia, when several questioned it, and, as will be seen below, that mission helped shape this report. The members of this committee thank her for her efforts in beginning this study and seeing that it was well on its way before she left the Senate.

The committee held twenty-two meetings in Ottawa, hearing from expert witnesses. These included government, academic and other experts; representatives of high-tech companies; wireless service providers – national incumbents, regional providers and new entrants – consumer advocates and groups with focused concerns, such as digital literacy and privacy. This report would not have been possible without the assistance of these experts. A list of the witnesses is attached as Appendix 2. The transcripts of the committee meetings with these witnesses can be found on the committee website.[7]

7. http://www.parl.gc.ca/common/Committee_SenHome.asp?Language=E&Parl=37&Ses=2&comm_id=19

In addition to the hearings in Ottawa, the committee made two fact-finding missions to Europe, meeting with officials and experts in France, the United Kingdom, Belgium and Estonia, as well as with officials at the European Union. Over seventy officials shared their expertise with the committee and their view of a digital world. An important fact that came out in these meetings was that every country visited had a comprehensive digital plan. Because these plans existed and were meant to shape policy, the officials the committee met had a broad view of a digital economy or society, and the wireless sector fit into this broad view, rather than as a narrow focus on its own.

DEVELOPMENTS SINCE THE COMMITTEE BEGAN ITS WORK

As noted above, rapid change is a given in modern communications. During the period spent working on this study, the committee had to adjust its focus in the light of numerous changes.

While conducting its study, the committee saw the introduction – seemingly weekly – of a new smart phone, targeting the iPhone or the BlackBerry or both.[8] In 2008, 21% of cell phone handset sales in Canada were for smart phones, up from 12% in 2007.[9] On April 3, 2010 Apple released in the United States the basic Wi-Fi version of its iPad, a tablet computer, and one of the most anticipated and hyped electronic devices in years. On April 30, 2010, Apple released the iPad with 3G wireless connectivity. By May 3, 2010 a million iPads had been sold in the United States. The iPad finally became available in Canada on May 28, 2010.

Not only were there newer telecommunications devices and applications to change the landscape, but the structure of the wireless industry in Canada also changed.

For the 2008 Advanced Wireless Services (AWS) spectrum auction, Industry Canada set aside spectrum for new entrants. Several new entrants purchased spectrum. Although none was operating when the committee began its study, several subsequently announced their plans to begin operating by the end of 2009 or in 2010. Some pricing plans for these new entrants were released, and the benefits of competition – lower prices, flexibility in contract terms (some offered no-contract plans) and the removal of additional fees (system access charges) – became apparent.

When the committee began its study, the one statistic of the wireless sector that stood out was the proportion of the Canadian population covered by 3G networks; this coverage, based on end of 2007 data was 78%. From the perspective of most committee members, this meant that 22% of Canadians – about seven and a half million Canadians – could not take advantage of smart phones. This was a digital divide that called for some explanation. In August 2009, however, the CRTC released its *Communications Monitoring Report 2009*,[10] which showed that 3G coverage had increased to 91%.

8. The website MobileSyrup.com Canadian Mobile Phone News and Reviews gives a daily record new smart phones becoming available to Canadians. http://mobilesyrup.com/
9. CRTC, *Communications Monitoring Report 2009, August 2009*. http://www.crtc.gc.ca/eng/publications/reports/policymonitoring/2009/2009MonitoringReportFinalEn.pdf. The data are from a TNS Canadian Facts survey dated 9 April 2009.
10. CRTC, *Communications Monitoring Report 2009, August 2009*. http://www.crtc.gc.ca/eng/publications/reports/policymonitoring/2009/2009MonitoringReportFinalEn.pdf

In the beginning of November 2009, Bell and TELUS rolled out a jointly built, national HSPA network – Bell on November 4th and TELUS on November 5th. This meant that the three dominant wireless players in Canada can all offer services using the European/International GSM standard, the most popular standard in the world and the one compatible with popular wireless devices, most notably the Apple iPhone, but also Android phones and the more sophisticated BlackBerry models.[11]

Before November 2009, Rogers was the only wireless service provider in Canada operating on the GSM network; Bell and TELUS operated on the CDMA network.[12] After November 2009 and the roll-out of a competing GSM/HSPA network, all the dominant players in the Canadian wireless market could compete for GSM-compatible devices. Having head-to-head-to-head competition among the three dominant wireless service providers in Canada is good for domestic consumers, or would-be consumers, of GSM devices. There is another advantage to having Bell and TELUS able to offer GSM devices. Handset manufacturers outside Canada now see a market that is about three times larger than it was, so they are more inclined to make their devices available sooner in Canada.

Most of the new entrants, including Globalive and Videotron, announced that they would be operating on an HSPA network.

In October 2009, the Canadian Radio-television and Telecommunications Commission (CRTC) issued a decision that Globalive, which had purchased 30 spectrum licences for $442 million at the 2008 AWS auction, was not a Canadian firm in terms of ownership and control criteria.[13] This decision was varied by Order-in-Council P.C. 2009-2008 in December 2009.[14] The decision and variance raised the issue of the foreign ownership of telecommunications companies in Canada. The process also pushed back the launch of Globalive, under the product brand Wind, by several months.

In addition to these changes, the government in the March 2010 Throne Speech promised a national digital strategy, the liberalization of foreign ownership restrictions in telecommunications and more attention to cyber-security:

> To fuel the ingenuity of Canada's best and brightest and bring innovative products to market, our Government will build on the unprecedented investments in Canada's Economic Action Plan by bolstering its Science and Technology Strategy. It will launch a digital economy strategy to drive the adoption of new technology across the economy. To encourage new ideas and protect the rights of Canadians whose research, development and artistic creativity contribute to Canada's prosperity, our Government will also strengthen laws governing intellectual property and copyright.
>
> …
>
> Our Government will open Canada's doors further to venture capital and to foreign investment in key sectors, including the satellite and telecommunications industries, giving Canadian firms access to the funds and expertise they need. …

11. HSPA stands for high-speed packet access technology; GSM stands for global system for mobile communications. HSPA is the next-generation extension of GSM. In keeping with the common usage, recent cell phone that use the HSPA technology are still described as being GSM-based.
12. CDMA, which is sometimes called the North American standard, stands for Code Division Multiple Access and is one way of allowing multiple users of nearby cell phones to talk simultaneously. The global split between CDMA-based networks and GSM-based networks is now about 15:85 in favour of GSM.
13. Canadian Radio-television and Telecommunications Commission, Telecom Decision CRTC 2009-698, 29 October 2009. http://www.crtc.gc.ca/eng/archive/2009/2009-678.htm
14. Privy Council, P.C. 2008-2009, 10 December 2009. http://www.ic.gc.ca/eic/site/ic1.nsf/vwapj/PC2009-2008-eng.pdf/$file/PC2009-2008-eng.pdf

> ...
> Working with provinces, territories and the private sector, our Government will implement a cyber-security strategy to protect our digital infrastructure.[15]

In short, while this study was in progress, the committee saw the introduction of numerous demand-shifting products and applications, a change in the structure of the domestic wireless market and a more explicit focus on the digital economy by the government.

BROADENED FOCUS OF THE COMMITTEE

By the end of 2009, the committee's study had evolved from one with a narrow focus on Canada's wireless sector to one with the broader focus on a digital society: There were several reasons for the broadening of the focus.

Professor Michael Geist, an early witness, who described Canada's telecommunications scene as being in a state of crisis, noted: "Your focus is primarily on the wireless sector, but our problems within the telecommunications infrastructure are not easily divisible." Professor Geist was concerned with the accessibility and quality of broadband in Canada as well as the state of the wireless service in Canada.

The rising popularity and increasing versatility of smart phones showed that cell phones were becoming a substitute for computers. Cell phones are no longer separate devices for the transmission of voice and simple text messages, devices that merely complemented computers. Citizens want accessible broadband anytime and anywhere, whether by the use of a laptop, netbook, tablet computer or smart phone.

The most important influence on the broadening of the focus for this report were the two fact-finding missions made by the committee. Each country visited had a comprehensive digital plan. To the officials the committee met, the wireless sector was an important part of a digital society, but only part. Issues such as digital literacy, privacy and security are important for users of wireless technology, but they are also important for anyone engaged with digital communications, so it makes sense to study them with a broader perspective. Moreover, telecommunications firms often bundle services – telephone (wireline), wireless (cell phone), Internet and television – so analyzing the price of one component can bias comparisons of the prices for any single service.

Canada has made progress in tapping the potential of digital communications. This is true for both the private and public sector. Research in Motion (RIM) is a world leader in secure and spectrum-efficient smart phones, and in early 2009 RIM opened an online store – BlackBerry App World -- offering APPs for its smart phones. Every year there are more opportunities to connect online with government. Last year, between July and September, for example, Canadians could take place in e-consultations on the long-overdue copyright reform. Despite these opportunities, Canadians are still digital tourists as opposed to fully functioning citizens in a digital society.

The committee is presenting findings and recommendations dealing with Canada's wireless sector, but the centre of this report is a call for an inclusive digital society. The first two recommendations of this report emphasize the broader perspective.

15. Speech from the Throne. 3 March 2010. http://www.sft-ddt.gc.ca/eng/media.asp?id=1388

INTRODUCTION

RECOMMENDATION 1

Canada should present a strategy for an inclusive digital society.

RECOMMENDATION 2

Canada should, in conjunction with the presentation of a strategy for an inclusive digital society, appoint a Minister for Digital Policy, who would take over the oversight of the strategy from the Minister of Industry.

An overriding concern of this committee is that all Canadians - whether in cities or rural and remote areas – are included in this digital society.

More background for an analysis of these recommendations will be given below. This report has two main chapters. *Chapter Two: An Inclusive Digital Society* reflects the broader focus of this report and also fits in with the recent call by the Minister of Industry for consultations on a digital economy strategy.[16] *Chapter Three: The Wireless Sector* discusses one of the key sectors in the digital society. The report ends with a brief chapter of conclusions.

16. Industry Canada, *Government of Canada Launches National Consultations on a Digital Economy Strategy*, News Release and Backgrounder, 10 May 2010. http://www.ic.gc.ca/eic/site/ic1.nsf/eng/05531.html

CHAPTER 2

AN INCLUSIVE DIGITAL SOCIETY

CANADA'S DIGITAL ECONOMY STRATEGY CONSULTATIONS

On May 10, 2010, the Honourable Tony Clement, Minister of Industry, the Honourable James Moore, Minister of Canadian Heritage and Official Languages, and the Honourable Diane Finley, Minister of Human Resources and Skills Development launched national consultations on a digital economy strategy.[17] This continues the promise made in the March 2010 Throne Speech to forge a strategy to drive the adoption of new technology.

17. Industry Canada, *Government of Canada Launches National Consultations on a Digital Economy Strategy*, News Release and Backgrounder, 10 May 2010. http://www.ic.gc.ca/eic/site/ic1.nsf/eng/05531.html

> It will launch a digital economy strategy to drive the adoption of new technology across the economy. To encourage new ideas and protect the rights of Canadians whose research, development and artistic creativity contribute to Canada's prosperity, our Government will also strengthen laws governing intellectual property and copyright.[18]

Key themes being considered in the consultations are:
- Capacity to Innovate Using Digital Technologies;
- Building a World-Class Digital Infrastructure;
- Growing the Information and Communications Technology Industry;
- Digital Media: Creating Canada's Digital Content Advantage; and
- Building Digital Skills for Tomorrow.[19]

The consultations will take place online and at national roundtable meetings. The news release directed interested persons to a consultation paper, *Improving Canada's Digital Advantage*, which provides essential background on the key themes and lists 30 questions to be addressed. The consultations are to end July 9, 2010.

The members of this committee have discussed national digital strategies with officials from several countries and have recommendations for transforming Canada into a digital society. The recommendations do not deal with the specific 30 questions in the background paper; they focus more on the general goals that countries have set in their digital strategies and on how the Canadian federal government should be positioning itself in a digital society.

GLOBAL DIGITAL STRATEGIES

Over twenty countries in the world have comprehensive digital strategies, among them:
- France (*francenumerique 2012*)
- United Kingdom (*Digital Britain*)
- Estonia (*Estonian Information Society Strategy 2013*)
- Belgium (*Belgium, Digital Heart of Europe 2010-2015*)
- European Union (*i2010, now part of Europe 2020: A European Strategy for Smart, Sustainable and Inclusive Growth* ("A Digital Agenda for Europe"))
- The United States (*The National Broadband Plan*)

Although the published plans can be very detailed – the recent National Broadband Plan from the United States is 376 pages and the National Broadband Network Implementation Study from Australia is over 500 pages – the plans share a small number of common elements. These include a general pledge for universal broadband access, the specification of quantitative goals for the broadband speed to be provided and the recognition of the need for digital literacy. Other goals that are not common to all digital plans include the need for digital security, the protection of intellectual property rights and the need to promote national cultural content. Almost all the plans announce a desire to take a leadership position in the digital economy.

The following table, from the recent U.S. broadband plan, shows universal broadband goals in selected countries.

18. Speech from the Throne. 3 March 2010. http://www.sft-ddt.gc.ca/eng/media.asp?id=1388
19. Industry Canada, *Improving Canada's Digital Advantage*, May 2010, http://de-en.gc.ca/consultation-paper/

TABLE 1 > Broadband Goals in Selected Countries

COUNTRY	"UNIVERSAL" AVAILABILITY TARGET (DOWNLOAD)	DATE
United States	4 Mbps	2020
South Korea	1 Mbps (99%)	2008
Finland	1 Mbps	2009
Australia	0,5 Mbps	2010
Denmark	0,5 Mbps	2010
Ireland	1 Mbps	2010
France	0,5 Mbps	2010
Germany	1 Mbps	2010
United Kingdom	2 Mbps	2012
Australia	12 Mbps	2018

Source: Federal Communications Commission, *the National Broadband Plan*, "Chapter 8: Availability," 16 March 2010, http://www.broadband.gov/plan/8-availability/.

The U.S. National Broadband Plan describes its universal goal of 4 Mbps download (and 1 Mbps upload) as aggressive, but notes that changes in technology may enable these targets to be increased, so the FCC should review them every five years.

In addition to having goals for universal coverage, several countries have high-speed targets for a portion of the population or key sites such as schools, libraries and hospitals. The United States, in a list of six national broadband goals, has two goals with high-speed targets.

> **Goal 1:** At least 100 million U.S. homes should have affordable access to actual download speeds of at least 100 megabits per second and actual upload speeds of at least 50 megabits per second.
>
> **Goal 4:** Every community should have affordable access to at least 1 Gbps broadband service to anchor institutions such as schools, hospitals and government buildings.[20]

The U.S. goal is for 2020. Australia has a goal of 100 Mbps to 90% of its homes and workplaces by 2017; South Korea wants access to 1 Gbps to its cities in 2012; Germany wants 50 Mbps for 50% of households.[21] Other countries have similar goals that vary somewhat in the speed, coverage and target date. When a target is set is important, because of changes in technology.

This was seen recently in Canada with the program *Broadband Canada: Connecting Rural Canadians*. This program was announced in July 2009 and established a fund of $225 million to provide broadband, defined as 1.5 Mbps, to as many communities as possible that had been identified as unserved. Successful applicants were to receive federal support equal to 50% of the costs of connecting the community to broadband. These successful applicants were to be announced at the end of 2009 or the beginning of 2010, with work to start early in 2010.

Technology overtook the program's schedule. In the beginning of November 2009, Bell and TELUS rolled-out their new HSPA+ networks that offered wireless broadband at 21 Mbps. The joint network covered 93% of Canada's population.

20. Federal Communications Commission, *The National Broadband Plan*, 16 March 2010.
21. Research supplied by Library of Parliament, May 2010.

The representative from TELUS who appeared before the committee explained the "problem":

> … we built a network so extensive in its size that when we launched on November 5 this year, we immediately covered with broadband wireless service 40 per cent of the communities in Alberta and B.C. that Industry Canada had just put on the list of underserved communities for stimulus funding. Before the applications were even flowing into the department, we had basically removed off the list about 40 per cent of the communities that had been identified as underserved for broadband.[22]

The representative from Bell who appeared before the committee wondered:

> ... what the point is in using this money to build legacy Internet services to these communities at 1 megabit per second when we can extend our wireless network and offer them top speeds, mobility and voice. We want to bring these communities into the modern age.[23]

At one time, universal service of 0.5 Mbps would have seemed an achievement, and there are citizens in isolated regions who would be thankful for that speed today. To use it as a general universal target today, however, would seem much too modest. With this in mind, policy makers around the globe have set higher and higher speed goals, but there are several problems with these goals. They are expensive to achieve, especially when linked to promises of "fibre for all." Changes in technology can make today's targets appear modest tomorrow (or dim the achievement of attaining them), and higher speeds may be no better than slightly slower speeds for many digital uses.[24]

There are alternatives to quantitative targets. The representative from the Information Technology Association of Canada (ITAC) explained:

> Today, the question of broadband is more than about just rolling out broadband connectivity to all Canadians at, say, 1.5 megabits of connectivity. I know that job is not fully done but, in the policy sphere, everyone's mind now has to turn to next generation broadband. There are debates as to whether that is 100 megabits, 25 megabits or 30 or whatever. I am not sure anyone can ever set a number in the digital world that becomes the end all and be all. There are questions arising now as to whether the X-100 megabit target is really the most relevant thing.
>
> There was a time when you bought computers with advertised measures of clock speed and things like that and you do not see that anymore because it is becoming irrelevant. The system has gone beyond that in terms of the differences it can make. The important thing in terms of broadband and next generation broadband is the ability to do interactive video and probably high-definition video to truly be able to take advantage of the possibilities of broadband so that a doctor and a patient or a nurse and a patient can have an exchange. Doctors can look at MRI and x-rays in a very precise way or even conduct telemedicine so that citizens can interact with public services and governments among each other.[25]

22. TELUS, 25 November 2009. http://www.parl.gc.ca/40/2/parlbus/commbus/senate/Com-e/tran-e/09eva-e.htm?Language=E&Parl=40&Ses=2&comm_id=19
23. Bell Canada/Bell Aliant (Bell), 30 March 2010. http://www.parl.gc.ca/40/3/parlbus/commbus/senate/Com-e/tran-e/01evb-e.htm?Language=E&Parl=40&Ses=3&comm_id=19
24. *The Economist*, "The broadband myth: To what good, these high-speed links?" 23 May 2008 (online edition).
25. Bernard Courtois, Information Technology Association of Canada (ITAC), 28 April 2010. http://www.parl.gc.ca/40/3/parlbus/commbus/senate/Com-e/tran-e/02ev-e.htm?Language=E&Parl=40&Ses=3&comm_id=19

In a Power Point presentation as part of a review of the European New Regulatory Framework, representatives from Telefonica, the Spain-based, international telecommunications company, argued that universal service goals should not be expressed in terms of specific technology and bit rates. "Universal service policy should be about ensuring that no European citizen faces social exclusion."[26]

Rather than set a specific, technology-based goal – such as, provide all citizens with fibre connections that give broadband service at 100 Mbps – it is better to start with three questions based on the information needs of citizens.

1. What are the services without which an EU citizen risks social exclusion?
2. What problems do European Citizens find in using and benefiting from them?
3. What can we do to enable all citizens to access these basic services?[27]

To the representative from ITAC, basic digital services would include the transmission of a high-definition video of a patient from wherever his doctor or nurse is located to a major medical centre where specialists are located. Professor Geist told the committee of his attempts at running a virtual lecture series, which includes putting together some of the best available videos on a topic – available on YouTube and other video spaces. He discovered that his aunt who lived in a smaller town in Ontario cannot easily access his lecture series. He also discussed the possibility of digitizing the contents of Canada's major libraries and making them available throughout Canada.[28]

Health and education are, of course, provincial responsibilities. The examples above were chosen to help determine a minimum universal broadband speed that the federal government should attempt to provide. The federal government would have a role in facilitating the provision of basic services to citizens in all the provinces and territories.

RECOMMENDATION 3

The Minister of Industry in the Digital Strategy should not focus on any particular technology or speed for increased broadband coverage in Canada.

RECOMMENDATION 4

The Minister of Industry in the Digital Strategy should focus on the broadband speeds necessary to bring essential digital services to all citizens.

26. Telefonica, S.A., *Universal Service: Where Next?*, Power Point presentation, April 2009, p. 3.
27. Telefonica, S.A., *Universal Service: Where Next?*, Power Point presentation, April 2009, p. 4.
28. Professor Michael Geist, 26 May 2009. http://www.parl.gc.ca/40/2/parlbus/commbus/senate/Com-e/tran-e/03evb-e.htm?Language=E&Parl=40&Ses=2&comm_id=19

UNIVERSAL ACCESS AND THE CHOICE OF TECHNOLOGY

There are several technologies available to deliver broadband. The representative from the Information Technology Association of Canada (ITAC) discussed several and noted that the technical capabilities of them can change over time.

> Technology is changing and continues to evolve very fast. Various elements of technology are becoming higher performing and at very high-cost performance metrics that allow more things to be done. That is, in fact, causing a change in our behaviour and how we run things and communicate with each other. However, from a wire line standpoint you have DSL technology that is upgrading to DSL2, which is faster. You have coaxial cable with DOCSIS 3 which will be delivering to Canadians within a couple of years — already delivering 50 megabits in some cases, soon 100 megabits or more.
>
> Fibre is being rolled out in more parts of the country either in pilot projects or in greenfield developments directly to homes or to a node very close to homes and businesses. We have Wi-Fi, which is the existing most popular way of connecting wirelessly other than mobile. We have WiMAX coming on stream and LTE, which is the fourth generation. LTE is the fourth generation in Wi-Fi, WiMAX as well, and we have advanced 3G which is already delivering, on a mobile basis, much of the capacity that we think of in terms of next generation broadband.
>
> In terms of satellites, each generation of satellites is able to deliver a much higher throughput and also reduce the lag time in transmission, so satellites become a more and more realistic and substantial part of the picture of rolling out broadband.[29]

Later, the ITAC representative mentioned possible satellite speeds in the future:

> ... I am told that the next generation of satellites will be able to provide a business with 20 megabits both ways. Particularly in rural and remote Canada, that is very good next-generation broadband that allows you to do everything you want to.[30]

The representative from Barrett Xplore, which provides wireless broadband and satellite broadband to rural areas, was much more modest in the speeds he was offering customers with satellite, but he pointed out that there would be a massive increase in satellite capacity in Canada in 2011 and 2012. This would put some downward pressure on prices and will make:

> ... satellite a more viable solution for hundreds of thousands of Canadian households. In essence, it will allow Canada to achieve that critical goal of 100 per cent technical broadband availability at a cost to the consumer, a retail price point, that is comparable with the balance of urban Canada.[31]

29. Bernard Courtois, Information Technology Association of Canada (ITAC), 28 April 2010. http://www.parl.gc.ca/40/3/parlbus/commbus/senate/com-e/tran-e/02ev-e.htm?Language=E&Parl=40&Ses=3&comm_id=191
30. Bernard Courtois, Information Technology Association of Canada (ITAC), 28 April 2010. http://www.parl.gc.ca/40/3/parlbus/commbus/senate/com-e/tran-e/02ev-e.htm?Language=E&Parl=40&Ses=3&comm_id=19
31. Barrett Xplore, 3 June 2009. http://www.parl.gc.ca/40/2/parlbus/commbus/senate/Com-e/tran-e/04eva-e.htm?Language=E&Parl=40&Ses=2&comm_id=19

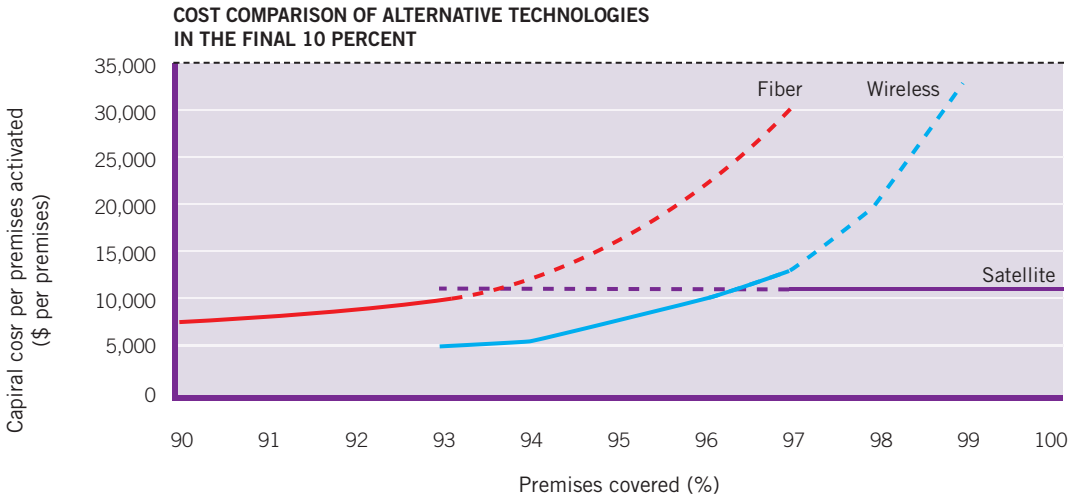
Mr. André Tremblay, in his capacity as an officer of TerreStar Canada, spoke of his company's product that can tap terrestrial and satellite systems.

> The satellite technology has been evolving to the point where, with very high power and with very big antennas, the satellite signal can now be reached on a small form handset. That is the first handset we will launch next year some time. The idea is that it is not a satellite phone as such anymore; it is a mobile phone. It will include terrestrial coverage from any carrier — Bell, Rogers, TELUS or the new guys. Anyone could insert its territorial coverage into that product.[32]

Impressive progress is being made with respect to the technology to provide broadband to the isolated areas in Canada.

As one moves to provide broadband coverage for all citizens, either costs skyrocket or performance, in terms of broadband speed falls. This can be seen in the following figure showing the technologies and costs associated with Australia's proposed national broadband network. Fibre is faster than wireless which is faster than satellite.

FIGURE 1 › Technologies and Costs for Universal Broadband



Source: Adapted from Australia, *National Broadband Network Implementation Study, 6 May 2010. http://data.dbcde.gov.au/nbn/NBN-Implementation-Study-complete-report.pdf.*
Library of Parliament. Note: The dollar amounts are in Australian dollars (in April 2010, $1 AUS = $0.93 CAN).

Australia has set a goal of giving 90% of its homes, schools and workplaces broadband speeds of 100 Mbps using fibre, and giving the remaining 10% speeds of 12 Mbps using next-generation wireless and satellite.[33] The actual mix of technologies, according to the recent implementation study, is fibre for 93%, wireless for the next 4 percentiles and satellite for the final 3%.[34] The estimated cost of the broadband network plan is $43 billion AUS, which is about $40 billion in Canadian dollars.

Promising very high-speed broadband as a universal goal will lead to enormous cost or a redefinition of universal. The Telecommunications Policy Review Panel wrote of ubiquitous as opposed to universal coverage.

32. André Tremblay, TerreStar Canada (and Trio Capital), 18 November 2009. http://www.parl.gc.ca/40/2/parlbus/commbus/senate/Com-e/tran-e/08evc-e.htm?Language=E&Parl=40&Ses=2&comm_id=19
33. Australia, *New National Broadband Network*, Press Release, 7 April 2009. http://www.minister.dbcde.gov.au/media/media_releases/2009/022
34. Australia, *National Broadband Network Implementation Study*, 6 May 2010. http://data.dbcde.gov.au/nbn/NBN-Implementation-Study-complete-report.pdf

As part of its national ICT adoption strategy, the Panel recommends that Canada should set a clear goal of remaining a global leader in the deployment of broadband networks in all regions of the country, including urban, rural and remote areas. The Canadian government should establish an objective of achieving ubiquitous broadband coverage no later than 2010. Ubiquitous coverage should be defined as the same level of coverage that Canada has traditionally achieved for wireline telephone service; that is, broadband network access should be available to over 98 per cent of Canadian households.[35]

The promise of changes in communications technology, such as in satellite technology, is that universal can literally mean universal.

RECOMMENDATION 5

The government in its digital strategy should define universal as 100 per cent of its citizens.

RECOMMENDATION 6

The government should use all the proceeds from spectrum auctions to provide high-speed Internet (broadband) access for rural and remote areas.

In June 2008, the Standing Senate Committee on Agriculture and Forestry tabled the report *Beyond Freefall: Halting Rural Poverty.*[36] One chapter addressed the rural infrastructure deficit and the digital divide, and gave reasons for bringing broadband to rural areas. Having broadband would: (1) help retain residents, especially younger ones, in rural areas; (2) bring in urban residents, who are attracted to a country lifestyle but do not want to give up urban amenities such as broadband; and (3) offer online business opportunities to those in rural areas.

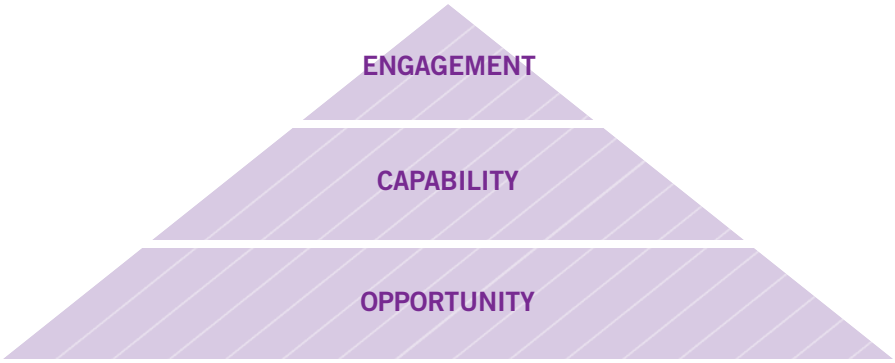
Those are three good reasons for providing broadband to rural areas. This report gives a fourth. The *Halting Rural Poverty* report wants rural residents to have the same Internet advantages that urban residents have. An inclusive digital society would go beyond this, tapping modern communications to improve the economic and social position of all citizens – urban and rural -- in what can be termed a high-tide policy. Just as all boats rise with a high tide, all citizens would benefit from the more efficient provision of government services, and the increase in available digital services, such as online educational lectures and health monitoring.

35. Telecommunications Policy Review Panel, *Final Report*, 2006, p. 1-15. http://telecomreview.ca/eic/site/tprp-gecrt.nsf/vwapj/report_e.pdf/$FILE/report_e.pdf
36. Standing Senate Committee on Agriculture and Forestry, *Beyond Freefall: Halting Rural Poverty*, June 2008. http://www.parl.gc.ca/39/2/parlbus/commbus/senate/com-e/agri-e/rep-e/rep09jun08-e.pdf

ESSENTIAL ELEMENTS OF A DIGITAL SOCIETY

In its presentation to the Standing Senate Committee on Transport and Communications on October 27, 2009, the Media Awareness Network borrowed a pyramid figure from the United Kingdom's Digital Britain, Final Report and discussed three stages for digital development:[37]

FIGURE 2 › **The Components of a Digital Society**



The first stage focuses on infrastructure and access; the second stage on education and basic digital literacy; and the third stage on allowing citizens to take full advantage of digital tools and content, both that of the private sector and of government. The three stages could be relabelled: Technology, Citizens and Providers (Government, Private Sector, Third Sector). In order to transform a country into a working digital society progress must be made in concert at all three stages.

No part or level of the pyramid can be neglected at any stage of digital policy. It is easier to say that digital policies should be coordinated throughout society than to follow a strategy of coordinated policy. Digital technology, which seems to get more powerful and versatile and necessary each day, attracts the attention and resources of policy makers. This explains, in part, the attraction of digital goals expressed in terms of very high broadband speeds.

Canada, according to the witness from the Media Awareness Network, is focused at the digital inclusion/opportunity stage. Canada has achievements to be proud of, such as the 1999 linking of all its schools to the Internet – a global first. At about the same time as that success, Canada launched the Government On-Line (GOL) initiative that set out to make the 130 most commonly used government services available online, and by 2005, Canada had met this goal.[38] The GOL initiative evolved into Service Canada, a more ambitious online service delivery program.[39] These are impressive initiatives, but Canadians seem inclined to see online delivery as an alternative to more traditional delivery, as opposed to a first and natural choice.

37. *Digital Britain, Final Report* (June 2009), Figure 1, p. 40. In its figure the Media Awareness Network labeled the stages digital inclusion, digital competence/usage and digital transformation. http://www.culture.gov.uk/images/publications/digitalbritain-finalreport-jun09.pdf and http://www.parl.gc.ca/40/2/parlbus/commbus/senate/Com-e/tran-e/07eva-e.htm?Language=E&Parl=40&Ses=2&comm_id=19
38. Internal Revenue Service, *Advancing E-file Study*, Phase 1 Report, 30 September 2008, p. 103. http://www.irs.gov/pub/irs-utl/irs_advancing_e-file_study_phase_1_report_v1.3.pdf
39. About Service Canada, http://www.servicecanada.gc.ca/eng/about/index.shtml

The United Kingdom, as officials from Ofcom, the U.K.'s telecom regulator, told members of the committee, now recognizes that digital literacy programs are needed to attract previously excluded citizens to the new technologies and to give all citizens the capability to use these new technologies. Estonia, since the mid-1990s, recognized the importance of policy coordinating all three stages, and its multi-targeted policy prepared the way for innovation and change in the private sector (for example, the creation of Skype by those trained in Estonia) and in government (for example, Estonia was the first country to have e-voting).

LESSONS FROM ESTONIA

This committee is not suggesting that Estonia is a digital or economic utopia. But Estonia does provide the best available example of how to use digital technology to transform a society.

In 1998, its parliament approved the *Principles of Estonian Information Policy* and immediately began implementing that policy. The policy included a recognition of the importance of competition in the private sector; the involvement of all government agencies, with annual reports from each; a principle of universality (to avoid the creation of "information haves" and "information have-nots"); and the development of support programs, especially the program for digital literacy ("Tiger Leap").

Estonia began implementing its program a dozen years before Canada launched consultations on a digital economy strategy. During this twelve year period, Estonia introduced paperless cabinet meetings, e-voting, digital IDs, online and secure citizen access to government files. By the end of the dozen years, when other countries were finishing or consulting on digital plans, the Tiger Leap program was in its third phase, and citizens were taking advantage of digital communications, from filing tax returns online (97% of Estonians file online) to paying for parking or bus tickets with their cell phones.

In Estonia the committee met people who shaped early digital progress in the country, entrepreneurs, several MPs, educators (at school and university levels) and two groups concerned with cyber-security. A chronological summary of the fact-finding mission gives a picture of how Estonia tapped available digital technology, coordinated changes in all parts of its society – with significant reliance on the private sector – and transformed itself.

Monday's breakfast session with Mr. Linnar Viik, a relatively young "grand old man" of Estonia's Internet society, and Mr. Priit Almae, a young entrepreneur, provided background on how Estonia became a digital society. Several factors helped. After the Soviets left, Estonia did not have very much in the way of computer and communications infrastructure, and the country did not have much money. The Internet offered a relatively low-cost way of communication, and those in government pushed the new technology. Factors that contributed to the growth of a digital society in Estonia included: acceptance of online banking (Estonia has never had bank cheques); digital literacy programs; proximity to Finland with its high-tech communications; roll-out of wired and wireless Internet across the country; introduction of e-ID cards with digital signatures; e-voting; and the provision of online government services (citizens, for example, must apply online for maternity benefits); and trust in e-government (to the extent that no political party has campaigned against it).

Election campaigns do include e-campaigning with social networking sites, but party discipline – in the sense of having one voice on a topic – is difficult to maintain with e-campaigning.

Visit to the Estonian ICT Demo Centre. Speakers here discussed the extensive mobile broadband access in Estonia. Four operational 3G networks cover almost all of the country, which is small – about 10% smaller, in area, than Nova Scotia, with a population of 1.3 million – and there are almost 1200 public Wi-Fi areas, about two-thirds of which are free of charge. The speakers also discussed two important elements of Estonia's digital society: the X-Roads project and national e-IDs. The X-Roads project provides a secure Internet platform that links all government databases and allows citizens to access their personal information. The national e-IDs enable access to government databases, and allow citizens to take part in e-voting and use other online services. These cards have separate PINs for the card and for the digital signature function; the cards were described as a key to the databases, not a vault of personal information. After the discussions, the committee was given a demonstration of some of the innovative uses of mobile phones in Estonia (paying for public parking, bus fares, train fares and small items, such as newspapers and magazines). To one speaker, access to broadband is becoming a necessity ("what access to electricity was a hundred years ago").

NATO Cooperative Cyber Defence Centre of Excellence (CCD-COE). With the increased use of the Internet and Internet-based activities in business and government, new security threats have arisen. The Internet involves links with other countries and national borders are not the barriers they once were, so viruses can move from country to country, and the infrastructure in one country may be more vulnerable than under the pre-Internet system. Although the focus at the CCD-COE is primarily on defence, the centre also examines offensive aspects. Cyber attacks on Estonia in 2007 and Georgia in 2008 have provided examples for study. In each case, Russian hackers attempted to disrupt Internet operations in the target counties. There is a need for governments to accept a comprehensive treaty with respect to the treatment of cyberspace, but officials at the centre feel this will not take place in the near future.

Meeting at the Estonian Informatics Centre with various officials involved with cyber security (Critical Information Infrastructure Protection Department, Ministry of Defence, Rescue and Crisis Management Department, Ministry of Justice). Although people became complacent when the potential Y2K catastrophe did not occur, the cyber attack on Estonia in 2007 brought home the need for security at the state and individual level. The attack made people aware that infrastructure, such as electrical grids, was at risk. Officials at this meeting gave us details of the April 2007 cyber attack that came from Russia and discussed the resulting Estonian cyber security strategy and their crisis management system, which has at its core the continuous operation of vital services.

Meeting with Estonian-Canadian Parliamentary Group. After meeting with the President [Speaker] of the Parliament of Estonia the committee discussed e-government with several Estonian MPs. They were proud of Estonia's pioneering role in e-government and argued that e-government was efficient and a boon to rural citizens who, at a minimum, have access to the Internet at any of the libraries in Estonia. They joked that Estonia had done away with tax lawyers, because 97% of its citizens file online. The MPs focussed on digital IDs and e-voting. According to them, e-government was made possible by legislation in 2000 that required federal and local governments to accept digital signatures, so citizens can do everything, with the possible exception of getting married, online. Starting with online banking, Estonians have developed a trust of the Internet. There have been four elections since 2005 that allowed e-voting, and online participation has increased each time. There is some evidence that the possibility of e-voting has increased participation by young voters. The biggest early concern with e-voting was secrecy; e-voting that uses the e-ID with the associated e-signature was likened to the two-envelope system in postal voting. From the start the government challenged hackers to penetrate the e-voting system; to date, hackers have been unable to disrupt the system.

Tuesday's breakfast session with Mr. Ivar Tallo, who was involved in the earliest days of e-government in Estonia and was a founding member of the e-governance academy, continued with the theme of e-Estonia. Mr. Tallo noted that Estonia had prioritized ICT development and backed the development with its scarce resources, which amounted to 1% of GDP between 1994 and 2004. He, too, gave reasons as to why Estonia was able to transform itself into a digital society: little in the way of telecommunications legacies (infrastructure or practices); a general consensus about the transformation among Estonians; commitment of the "political elite;" an active role by government; the right mix of public and private initiatives; and open, project-based development. The last factor was introduced by necessity; Estonia did not have the money for the development of a complete, final system to replace a complete, current system (which, according to the speaker, is the misplaced goal of bureaucracies in Britain, the United States and Canada), so it developed through a sequence of small, pilot projects. As an example of an Estonian success he discussed paperless cabinet meetings. At a G-7 meeting in the mid-1990s, Japan brought up the possibility of paperless government by 2000; policymakers of the G-7 went back to their respective countries where civil service bureaucrats explained that paperless government was impossible at the time. The Estonians thought it sounded like a good idea – and "no one told us it couldn't be done" – so they introduced paperless cabinet meetings. These meetings are shorter, more efficient, and decisions from the meetings can be put online within minutes of the meetings.

Tallinn University of Technology. The committee met with university administrators and professors. In addition to discussing the university and taking the committee on a tour of some of its labs, the people that the committee spoke with emphasized the importance of user-friendly information and communications technologies (ICT). They mentioned smart spaces where technologies of classical engineering merge with electronic-, Internet- and mobile-based services, which can involve learning, shopping, public relations, government operations, banking and medicine. As a member of the European Union, Estonia is becoming involved in Europe-wide research projects; one such project is TransFics (Transforming the Future Information and Communications Society), coordinated by the University of Edinburgh. There are still Estonia-based Internet projects, such as EstWin, which is a public-private project to make 100 Mbps wide-band Internet (that is, very high-speed Internet) available to every citizen in Estonia by 2015.

Visit to Tallinn Lillekula Gymnasium. At the gymnasium, which covers primary grades through high school, the committee discussed the Tiger Leap program. Tiger Leap is a project, announced in 1996 and funded in the 1997 budget, to invest in the development and expansion of computer and network infrastructure throughout Estonia, with an emphasis on education. The project included the rollout of Internet access to all schools and the establishment of computer labs in most. Since the early days of the project and the school hook-ups to the Internet, the emphasis of Tiger Leap has been on improving computer literacy of school children and on integrating information and communications technologies (ICT) in the schools. Tiger Leap is more than a simple digital literacy program, although it has been extremely successful in increasing digital literacy in Estonia. The program has had three phases (1997-2000, 2000-2005 and 2005-2009); the first modernized the ICT infrastructure in schools and provided basic ICT courses for teachers; the two subsequent phases have looked for new and innovative ways of raising the quality and effectiveness of the curriculum using ICT. Portals have been developed during each phase that allow information flows among teachers, competitions in various areas among students throughout Estonia, Internet safety programs to make students aware of online threats and programs to make subjects such as science and technology more interesting and accessible. The committee had a chance to visit some students and in a second-grade class the committee was surprised when about 80% of the students said they had mobile phones.

The Estonians the committee met were almost always modest about what they had accomplished. The word "luck" was used several times. They were lucky to be near Finland and have a window on developments in modern telecommunications. They were lucky, in a way, not to have a legacy of telecommunications infrastructure after the Russian departure; they needed a system and they focused on the Internet. But it was something more than luck that enabled them to lead the world in e-voting; to develop the Tiger Leap digital literacy program, which is now in its third phase; to run cabinet meetings without paper; to have covered the country with Wi-Fi hotspots, most of which are free; and to give all citizens secure access to their records using the X-Roads project (Internet platform).

Estonia has an engaged and inclusive digital society. It is not an elusive digital utopia, but it does provide examples of several things that Canada could do as part of its digital strategy.

PROPOSALS FOR CANADA'S DIGITAL STRATEGY

The following recommendations are proposed to bring government into an inclusive digital society. It is useful to start by repeating first two recommendations given above.

RECOMMENDATION 1

Canada should present a strategy for an inclusive digital society.

RECOMMENDATION 2

Canada should, in conjunction with the presentation of a strategy for an inclusive digital society, appoint a Minister for Digital Policy, who would take over the oversight of the strategy from the Minister of Industry.

The wording "digital society" is broader than "digital economy," and relates to one concern emphasized by Figure 2 above. Digital policy must be coordinated among all sections of society. Government must take an active part as a provider of digital products and services, as a user of digital communications and, through fiscal and monetary policy, as a shaper of the incentives to use digital communications.

The Minister for Digital Policy will work on policy incentives to involve all segments of society with digital communications, including, and at times especially, the government. The 2010 Spring Report of the Auditor General of Canada examined the information technology (IT) systems of five government entities and found that aging IT posed a significant risk of breakdown, with potentially severe consequences for the conduct of government business.

The report found:

> Although the Chief Information Officer Branch of the Treasury Board of Canada Secretariat is aware that the aging of IT systems is an issue, it has not formally identified it as an area of importance for the government. Nor has it assessed the issue from a government-wide perspective or worked with departments and agencies to develop government-wide solutions. Despite the significant funding likely to be needed across government to renew aging systems – estimated at a total of $2 billion in three of the five entities alone – the CIOB has not formulated strategic directions or a plan to address these issues on a government-wide level.[40]

40. Auditor General, 2010 Spring Report of the Auditor General of Canada, 20 April 2010. http://www.oag-bvg.gc.ca/internet/English/parl_oag_201004_01_e_33714.html#hd3d

This must change if the government is to take a credible role in a digital society.

The committee was told that 97% of Estonians file their income tax returns online. A study released by the Internal Revenue Service (IRS) in the United States provided a small international comparison of online tax filing by individuals in 2006: United States (54.5%), United Kingdom (36%), Canada (54.7%) and Australia (80%).[41] The IRS has set a goal of 80% e-filing, and the study examines different ways of achieving this, from providing incentives to individuals or mandating e-filing by tax preparers.

There are obvious advantages to tax agencies and tax filers to eliminating paper filing and doing tax returns online. Errors and handling costs go down for the agency and refunds are made faster to e-filers. Obvious questions are: How did Estonia reach 97% for e-filers? and How can Canada approach this figure? Part of the answer to both questions lies in an inclusive digital society. When all citizens have access to the Internet and become accustomed to using it for various tasks, such as online banking, the attractions of e-filing are easy to market. Canada could use monetary and benefit-based incentives, although there is little evidence that either is effective in converting hardcore paper-filers to e-filing.[42]

The following recommendations are meant to transform government so that it takes an active role in a digital society.

RECOMMENDATION 7

The Minister for Digital Policy should receive an annual report from each department outlining: (a) its progress in making its programs more accessible and easier to use over the Internet; (b) its digital goals for the coming year; and (c) any special Information Technology needs or concerns.

RECOMMENDATION 8

Within one year from the release of the Digital Strategy, cabinet meetings should be paperless.

41. Internal Revenue Service, *Advancing E-file Study*, Phase 1 Report, 30 September 2008, p. 91. http://www.irs.gov/pub/irs-utl/irs_advancing_e-file_study_phase_1_report_v1.3.pdf

42. Internal Revenue Service, *Advancing E-file Study*, Phase 1 Report, 30 September 2008, "Chapter 10: Incentive-based *E-filing* Options." http://www.irs.gov/pub/irs-utl/irs_advancing_e-file_study_phase_1_report_v1.3.pdf

RECOMMENDATION 9

The Minister for Digital Policy should work with his ministerial colleagues to develop a secure Internet platform (modelled on Estonia's X-roads project) that would allow citizens to review their government files over the Internet.

RECOMMENDATION 10

Elections Canada should move expeditiously to develop major test projects involving e-Registration and e-Voting.

Security is an important issue if voting and the transmission of financial and personal data online are to take place. Estonia, as noted above, has a system of national e-IDs that is an integral part of online security for voting and transactions with the government. Canada, like Britain and the United States, seems to have an antipathy towards any form of national ID, although citizens here are accustomed to carrying provincial health cards and motor vehicle licences.

RECOMMENDATION 11

That the government examine the possible necessity of having digital IDs to have a viable, comprehensive and secure digital society.

Different citizens have different levels of familiarity and comfort with digital technology. In Brussels, the Director General of Digital Europe, a trade association of ICT industries in Europe (excluding the telecom service providers) described "digital natives," who are generally those individuals under thirty; "digital immigrants," individuals who are becoming part of the digital world; "digital citizens," individuals who are actively engaged online; and "digital resisters," those individuals who do not want to take part in the digital world. She felt that digital literacy programs, such as the European Union's "e-skills week 2010" would shrink the numbers in this last group, which she thought would be gone in ten years. Officials in France and the United Kingdom were also aware of the need for digital literacy programs to support any move to a universal digital society.

Canada, too, needs a comprehensive digital literacy program, one that makes digital technology a natural part of a child's education and one that brings digital awareness and skills to older members of society and those in marginalized groups. To forge a true digital society, digital literacy must be more than an add-on to education or social programs. One good model of a comprehensive digital literacy program is the Tiger Leap program in Estonia.[43] As noted above, education is a provincial responsibility, so the federal government will need to cooperate with the provinces and territories.

RECOMMENDATION 12

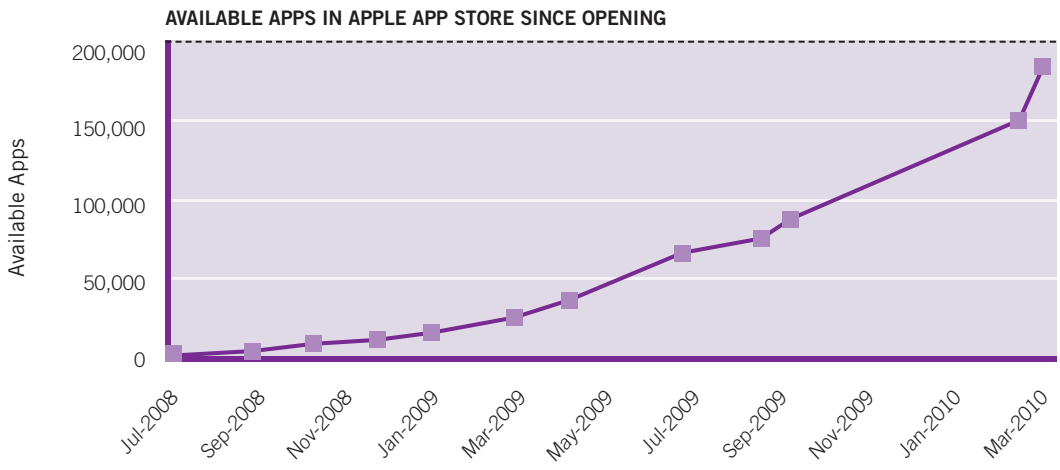
The Minister for Digital Policy and other federal ministers should work with their provincial counterparts to develop a comprehensive digital literacy programs that can become an integral part of the education system.

The Minister for Digital Policy will also deal with the opportunities and concerns that emerge in a digital society.

OPPORTUNITIES

The growing popularity of smart phones and devices to bring mobile broadband connections to laptops – Rogers' Rocket Stick, Bell's Turbo Stick and TELUS' Mobile Internet Key – shows how the transfer of digital data is reshaping the wireless world – and providing opportunities for high-tech firms. Figure 2 shows the rapid growth of applications (APPs) available for the Apple iPhone, from zero to 200,000 in fewer than two years, and is a good proxy for the rapidly changing wireless world.

FIGURE 3 › Rapid Growth of Applications for the iPhone



Source: Wikipedia, "App Store", http://en.wikipedia.org/wiki/App_store

43. The Tiger Leap Foundation. http://www.tiigrihype.ee/?setlang=eng

There have been billions of downloads from the Apple App store, and other companies, such as RIM and Nokia, have opened their own stores to sell APPs for their handsets. The development and sale of APPs is now a big business and one in which Canadian firms can participate.

An early witness before the committee, from Industry Canada, mentioned several of the larger Canadian wireless players.

> ... We have companies such as Vecima Networks, located in Victoria with manufacturing in Saskatoon, Sierra Wireless in B.C., SiGe here in Ottawa, Redline, Com Dev, all well-known on the Canadian scene but major players in the international marketplace. Remember, the Canadian market is only about 3 per cent of the world's wireless market, so if Canadian companies want to grow and succeed they have to look at the international marketplace.[44]

He, of course, mentioned Research in Motion (RIM), whose representative appeared before the committee, along with witnesses from other Canadian high-tech companies in the wireless sector, namely Barrett Xplore, DragonWave and TerreStar.

Canada has dynamic, innovative firms that can take advantage of the growing market for data-based wireless communication, and the hardware and software that will be part of the market. But as the figure above shows, large markets can develop rapidly, so any digital strategy must emphasize flexibility over specific business planning.

CONCERNS

The purpose of a digital society is to have all citizens with the ability and desire to be connected digitally with their government, businesses and each other. Broadband access to the Internet improves communications, allowing the transmission of simple messages, important files, photos and videos almost instantaneously across vast distances, and it can boost productivity, both of private firms and governments.

But a digital world also presents new concerns, concerns that can grow as more and more citizens become involved with digital technology.

SECURITY

There are three categories of security concerns in a digital society: individual, national and community. Witnesses from the Media Awareness Network, the Public Interest Advocacy Centre (PIAC) and the Office of the Privacy Commissioner of Canada discussed numerous concerns: stranger-danger predators on the Internet; invasive and abusive marketing; identity theft and stolen financial information; and possible risks to privacy from behavioural marketing, involving the online tracking of consumer activities, location-based data, such as that available from GPS-enabled mobile devices, and cloud computing, in which organizations rent computer usage from third parties.[45]

44. Industry Canada, Information and Communications Technologies Branch, 12 May 2009. http://www.parl.gc.ca/40/2/parlbus/commbus/senate/Com-e/tran-e/03eva-e.htm?Language=E&Parl=40&Ses=2&comm_id=19

45. On 25 May 2010 the government announced two measures to enhance safety and security in the online marketplace: The "tabling of amendments to the legislation protecting the personal information of Canadians (*Personal Information Protection and Electronic Documents Act*, or PIPEDA) and the reintroduction of anti-spam legislation in the House of Commons." http://www.ic.gc.ca/eic/site/ic1.nsf/eng/05596.html

National security issues deal with threats to a country's Internet infrastructure. Such threats are a growing concern among countries, especially after the cyber attacks on Estonia in 2007 and Georgia in 2008. Committee members visited the NATO Cooperative Cyber Defence Centre of Excellence (CCD-COE) in Tallinn, Estonia where they discussed cyber security and were told of the need for governments to accept a comprehensive international treaty with respect to the treatment of cyberspace. The recent Speech from the Throne promised domestic action in this area.

> Working with provinces, territories and the private sector, our Government will implement a cyber-security strategy to protect our digital infrastructure.[46]

Community digital security concerns deal with the safety of individuals who may be depending on digital communications in an emergency. As Canadians began replacing landline phone service with mobile service, there seemed to be a technical problem in pinpointing the location of someone using a cell phone. Cooperation among the CRTC and the wireless carriers has improved emergency 9-1-1 service involving cell phones. Safety groups, such as police, fire and paramedics, may also need to depend on digital communications, so there can be interoperability problems in which one group cannot easily communicate with another.

INTELLECTUAL PROPERTY RIGHTS

The Internet raises numerous issues with respect to intellectual property. As broadband gets faster and faster, and as more of the population have access to high-speed Internet, digital piracy becomes a growing issue. The committee heard from official in France and the United Kingdom of plans to address these problems, plans that have led to court challenges. Several witnesses before the committee in Ottawa emphasized the need to revamp Canada's *Copyright Act*.[47]

As the representative of the Information Technology Association of Canada (ITAC) noted:

> We see the world changing from an economy based on bricks and mortar and physical things to an economy based on knowledge and transactions that occur in cyberspace and are based on innovation and creativity. In that kind of world, it is extremely awkward for a country like Canada to have copyright legislation that actually predates the Internet.[48]

CULTURAL SOVEREIGNTY

Concerns about the place of Canadian culture in a digital world featured prominently in the *Wired to Win* reports tabled by this committee in the late 1990s.[49] The concerns are still around. One example, among many, is the effect that Internet-based television will have on Canadian content requirements and the support currently given to domestic production.

46. Speech from the Throne. 3 March 2010. http://www.sft-ddt.gc.ca/eng/media.asp?id=1388
47. On 2 June 2010, after a long period of preparation, which included several months of e-consultation, the Minister of Industry and the Minister of Canadian Heritage and Official Languages introduced a bill to modernize the Copyright Act. http://www.ic.gc.ca/eic/site/ic1.nsf/eng/05605.html
48. Bernard Courtois, Information Technology Association of Canada (ITAC), 28 April 2010. http://www.parl.gc.ca/40/3/parlbus/commbus/senate/Com-e/tran-e/02ev-e.htm?Language=E&Parl=40&Ses=3&comm_id=19
49. Senate Standing Committee on Transport and Communications, Wired to Win: Canada's International Competitive Position in Communications (April 1997). http://www.parl.gc.ca/35/2/parlbus/commbus/senate/Com-e/COMM-E/rep-e/interimpart1-e.htm. Senate Standing Committee on Transport and Communications, Wired to Win: Canada's Positioning within the World's Technological Revolution (May 1999). http://www.parl.gc.ca/36/1/parlbus/commbus/senate/Com-e/COMM-E/rep-e/finalrepmay99-e.htm

GREEN CONCERNS

A final concern is the effect the growing use of digital technology (and rapidly obsolescent devices) will have on the environment. Discarded cell phones could leave a legacy of toxic materials. Some handset manufacturers are finding ways to reduce the toxic materials in their products, and the representative of the Canadian Wireless Telecommunications Association (CWTA) was pleased to talk about the recycling programs that the CWTA runs with most of the provinces.[50]

Green concerns, like several of the concerns discussed above, may turn into opportunities. Digital technology can be harnessed, for example, in smart meters and smart grids, which can help reduce energy use.

CANADA'S GEOGRAPHY

Geography will figure prominently in discussions of Canada's digital strategy.

Occasionally, one hears the comment that Canada, because of its geography, cannot follow the telecommunications policies of other, smaller, densely populated countries. This argument is sometimes extended to suggest that if Canada has higher prices than in other countries for broadband or cell phones, the difference can be explained away by geography.

Yes, Canada is a vast, sparsely populated country, with extremes in climate and terrain. But Canada's geography is a challenge, not an excuse. The geography can also open up opportunities, as companies pick up exportable skills developed from dealing with Canada's challenges: Axia gained from its work on the Alberta SuperNet and SaskTel International from helping bring broadband to rural Saskatchewan.

TABLE 2 ›

Population Densities, Urbanization and GDP Per Capita (Selected Countries)

COUNTRY	AREA (SQ KM)	POPULATION (MILLIONS)	DENSITY (POP/SQ KM)	URBANIZATION (PER CENT)	GDP PER CAPITA (PPP)
Canada	9,984,670	33.5	3.4	80	$38,400
United States	9,826,675	307.2	31.3	82	$46,400
Australia	7,741,220	21.3	2.8	89	$38,500
United Kingdom	243,610	61.1	250.8	90	$35,400
France	643,427	62.2	96.7	77	$32,800
Belgium	30,528	10.4	340.7	97	$36,600
Estonia	45,228	1.3	28.7	69	$18,800
Finland	338,145	5.3	15.7	63	$34,900
South Korea	99,720	48.5	486.4	81	$27,700
Singapore	697	4.7	6,743.2	100	$50,300
Hong Kong	1,104	7.1	6431.2	100	$42,700
Japan	377,915	127.1	336.3	66	$32,600

Source: CIA, *World Fact Book*, https://www.cia.gov/library/publications/the-world-factbook/index.html. Population is a July 2009 estimate; urbanization is for 2008; GDP per capita, based on purchasing power parity, is a 2009 estimate. Density has been calculated from the data given in the *World Fact Book*.

50. Canadian Wireless Telecommunications Association (CWTA), 29 September 2009. http://www.parl.gc.ca/40/2/parlbus/commbus/senate/Com-e/tran-e/05evb-e.htm?Language=E&Parl=40&Ses=2&comm_id=19

The following familiar demographic description of Canada is from Natural Resources *Canada's Atlas of Canada:*

> Canada, with 3.3 people per square kilometre, has one of the lowest population densities in the world. In 2001, most of Canada's population of 30 million lived within 200 kilometres of the United States. In fact, the inhabitants of our three biggest cities – Toronto, Montréal and Vancouver – can drive to the border in less than two hours. Thousands of kilometres to the north, our polar region – the Yukon Territory, the Northwest Territories and Nunavut – is relatively empty, embracing 41% of our land mass but only 0.3% of our population. Human habitation in the solitary north clings largely to scattered settlements: villages among vast expanses of virgin ice, snow, tundra and taiga.[51]

Canada certainly has regions with sparse population, but the simple calculation of total population to total land area gives a misleading picture of the attractiveness of most of Canada for private telecommunications companies. A recent report by DBRS, the bond rating service, noted the "reasonable scale of the wireless market in Canada."[52]

The following table gives population densities for the top five census metropolitan areas (CMAs). These five CMA's have over 41% of Canada's total population and rest on 0.3% of Canada's land. Private-sector firms can do well serving the population in these cities and along some of the transportation corridors linking them. That is, in fact, the obvious strategy for most of the wireless service providers in Canada, a strategy dictated by private-sector business models.

TABLE 3 ›

Population Densities, Canada and Selected Census Metropolitan Areas (CMAs), 2006

	POPULATION (THOUSANDS)	AREA (KM SQUARED)	DENSITY (PEOPLE PER KM SQUARED)
Toronto	5,113.1	5,903.6	866.1
Montreal	3,635.6	4,259.0	853.6
Vancouver	2,116.6	2,877.4	735.6
Ottawa	1,130.8	5,716.0	197.8
Calgary	1,079.3	5,107.4	211.3
Top Five CMAs	13,075.4	23,863.4	547.9
Canada	31,612.9	9,017,698.9	3.5

Source: Statistics Canada, *Population and dwelling counts, for census metropolitan areas, 2006 and 2001 censuses*, http://www12.statcan.ca/english/census06/data/popdwell/Table.cfm?T=205&RPP=50.
Data for Montreal and Calgary exclude one or more incompletely enumerated Indian reserves or Indian settlements.

51. Natural Resources Canada, *The Atlas of Canada*, "Population Density, 2001," http://atlas.nrcan.gc.ca/site/english/maps/peopleandsociety/population/population2001/density2001/1
52. DBRS, *The Canadian Wireless Landscape*, May 2010. This report was made available to the committee researcher.

The challenge remains to provide modern telecommunications to Canadians in less densely populated areas, which can include rural fringe areas that are within the large five CMAs. One witness before the committee, an official of DragonWave Inc., a company at the leading edge of wireless communications technology, pointed out that he could not get cell phone coverage, let alone broadband, where he lived, in Dunrobin, Ontario, 25 minutes from Parliament Hill. Some of the less densely populated areas are, of course, closer to tundra and taiga than to Parliament Hill.

A study of the distribution of its population shows that Canada can be an attractive, profitable market for telecommunications firms, but there are areas where public-private partnerships, such as seen in Alberta, Saskatchewan and elsewhere, and other areas where more direct government involvement is needed.

Canada's geography is a challenge, but it is not an excuse.

CHAPTER 3

THE WIRELESS SECTOR

The committee's mandate refers to the wireless sector, and this part of the digital society remained a concern throughout its hearings. The key question here, as it would be with respect to any industry, is, What is the extent of competition in the industry? From the consumers' perspective, the key question becomes, How does any lack of competitiveness affect the prices, quality and terms of service faced by consumers?

BACKGROUND ON THE ISSUE OF COMPETITION

In August 2009 the Organization for Economic Co-operation and Development (OECD) released its *OECD Communications Outlook, 2009*.[53] This publication provides international comparisons in the telecommunications sector. The 2009 edition showed Canada with the lowest mobile phone penetration of the OECD countries; Canada, Spain and the United States were shown to have the highest cell phone prices among OECD countries (Finland, the Netherlands and Sweden were shown to have the lowest). These findings, almost immediately contested by Canada's wireless service providers, attracted considerable media attention.

Soon after the OECD study appeared, the Federal Communications Commission released a draft of a paper it had commissioned from the Berkman Center for Internet & Society at Harvard University. The Berkman study, *Next Generation Connectivity: A Review of Broadband Internet Transitions and Policy from around the World*, focused on broadband, including wireless connections, and was also critical of Canada's performance.

> Canada, for example, is often thought of as a very high performer, based on the most commonly used benchmark of [broadband] penetration per 100 inhabitants. Because our analysis includes important measures on which Canada has had weaker outcomes – prices, speeds and 3G mobile broadband penetration – in our analysis it shows up as quite a weak performer, overall.[54]

This study attracted considerable media attention in Canada and the United States, which was also found to perform poorly. In Canada, the conclusions of the OECD and Berkman studies were taken by some to indicate a crisis in telecommunications.

The Berkman study and the OECD Communications Outlook, 2009 attracted considerable criticism from the large telecommunications players in Canada. The five largest Internet service providers are Bell, TELUS, Rogers, Vidéotron and Shaw. The first three are, of course, the dominant players in the wireless industry, and the last two are new entrants, by way of the 2008 AWS spectrum auction, into the wireless industry. The common criticism of both sets of studies – cell phones and broadband – is that they involved the comparison of apples and oranges. European countries were too different in terms of their telecommunications for comparisons to be meaningful.

This is a standard criticism of international comparisons. The Telecommunications Policy Review Panel, in its 2006 report, examined Canada's low wireless penetration rate compared with rates in Europe and admitted that there were a number of factors that could explain the differences. These include:

- historical differences in the quality, availability and pricing of wireline telephone services in the two regions, which are said to have made wireless more attractive to European consumers;
- different approaches to tariffing wireless services, which may have created stronger incentives to subscribe in Europe;
- Europe's leadership in developing and deploying second- and third-generation wireless technologies, which resulted in superior products and services being available to European consumers for a period of time.[55]

53. OECD, *OECD Communications Outlook*, 2009, August 2009. http://www.oecd.org/document/44/0,3343,en_2649_34225_43435308_1_1_1_1,00.html. The *OECD Communications Outlook* alternates every year with the *OECD Information Technology Outlook*.
54. Berkman Center for Internet and Society, *Next Generation Connectivity: A Review of Broadband Internet Transitions and Policy from around the World*, Draft, October 2009, p. 10. http://www.fcc.gov/stage/pdf/Berkman_Center_Broadband_Study_13Oct09.pdf
55. Telecommunications Policy Review Panel, *Final Report*, 2006, p. 1-19. http://telecomreview.ca/eic/site/tprp-gecrt.nsf/vwapj/report_e.pdf/$FILE/report_e.pdf

After the hearing with Bell, one of its representatives referred the committee to an essay that had appeared in the Globe & Mail and that challenged the international broadband comparisons that criticised Canada's performance. The essay by Professor Leonard Waverman, a well-known Canadian economist in the field of telecommunications, and a colleague from London, complains that ill-founded international comparisons can lead to poor policy. A paragraph from *The Globe & Mail* essay gives a flavour of how difficult international comparisons can be:

> The standard take is that Canada is 10th and the United States is 15th among 30 OECD countries in broadband penetration. The OECD measures broadband penetration as the number of broadband lines per 100 persons, and mixes business and residential connections. Residential broadband subscriptions, however, are taken at the household level, not at the individual level. And big businesses often connect several hundred employees with one "line." The United States and Canada have 2.6 individuals per household, compared with 2.2 in Germany and some other European countries. Thus, if North American household sizes fell to German levels, and all households subscribed to broadband, the United States and Canada would have an additional seven lines per 100 persons.[56]

Representatives of the three dominant national wireless service providers addressed the OECD comparisons of cell phone pricing. The following from the official from Rogers is representative of the three positions and, again, emphasizes the possible unreliability of apples-and-oranges comparisons.

> I do not think that the OECD study is reliable. In terms of the average revenue per minute, Canada is cheaper than Scandinavian countries. Europeans are devoted to their wireless service because their wire line service is of such poor quality and so expensive. We are blessed in Canada with huge local calling areas and fairly low monthly rates for wire line service. Europeans pay a local measured service which means that they pay for every local call in Europe. As well, it can be difficult to have a wire line installed. The wireless industry in Europe has benefited from the fact that the wire line service is poor.
>
> When making these international comparisons, it is important to remember about Europe is the system "calling party pays." In Europe, whoever makes the call pays for the call. In Canada, if you have a bucket with 2,000 minutes for your wireless phone and someone calls you from a wire line phone and talks for a minute, you have used up one minute of your bucket. That does not happen in Europe. In Europe, an incoming phone call does not take time off your bucket but the wire line caller will see on his bill at the end of the month 15 cents to 25 cents per minute for that call. All incoming calls for wireless customers in Europe are free. Many people have cellphones that cost them nothing because they do not make outgoing calls. Kids will get calls from their parents at work and the employer sees the calls on their bills, but the cellphone does not cost anything.[57]

That international comparisons are difficult to make means that studies that make such comparisons must be used carefully – and, where possible, adjusted or improved. The OECD, for example, is not giving up its Communications Outlook reports, but it is revising the methodology used in the cell phone price comparisons.[58]

56. Leonard Waverman and Kalyan Dasgupta, "Canada and broadband: When 'behind' is actually ahead," *Globe & Mail*, (Saturday print edition, published Friday), 5 March 2010. http://www.theglobeandmail.com/news/opinions/canada-and-broadband-when-behind-is-actually-ahead/article1491778/
57. Rogers Communications Inc., 3 November 2009. http://www.parl.gc.ca/40/2/parlbus/commbus/senate/Com-e/tran-e/08eva-e.htm?Language=E&Parl=40&Ses=2&comm_id=19
58. OECD, revision of methodology for constructing telecommunication price baskets, 18 March 2010. http://www.olis.oecd.org/olis/2009doc.nsf/LinkTo/NT00008FD6/$FILE/JT03280342.PDF

A representative of MTS Allstream appeared before the committee and argued that there were too many studies reaching the same conclusion about Canadian telecommunications to dismiss any one or two of them on methodological grounds.

> ... studies conducted by the OECD, Oxford University, TeleGeography, the SeaBoard Group, speedtest.net and even JiWire, which ranks Canada twentieth out of a total of 30 countries in terms of wireless hot spot penetration, have all come to the same conclusion: Canada is now a laggard in the digital communications sector where it should be a leader.
>
> Let me just answer those who take issue with these studies based on criticisms of their methodology. It does not matter what study or methodology one relies on. None of these studies places Canada where it should be, which is at or near the top of the international rankings.[59]

As long as international data are available, comparisons and rankings will be made. The Telecommunications Policy Review Panel suggested a complementary approach to get around some problems with Canada-Europe comparisons.

> In the Panel's view, there is relatively little to be gained by focusing on historical differences between the performance of the wireless industry in Europe and North America. Canada's most important comparator is the United States, because of our similar geography, demographics and telecommunications markets, and because the United States is our principal trade partner and competitor. Additionally, the U.S. and Canada have historically adopted comparable approaches to pricing wireless services and have followed one another closely in the deployment of new services and technologies. Nevertheless, an examination of the growth of wireless in the United States and Canada reveals a persistent and growing gap between the rates of the two countries.[60]

Mr. André Tremblay, a former panellist for the Telecommunications Policy Review Panel, appeared before the committee and presented several indicators to support the argument that the Canadian wireless sector was far from competitive. This led him to a simple conclusion:

> … we certainly have great Canadian telecommunications companies and their executives are doing a great job of protecting their interests. However, the industry is lagging in competitive behaviour and this is not to the benefit of the Canadian population. We need more competitive behaviour if we want to extract value from the wireless industry to support the legions of entrepreneurs that could benefit from it in the Canadian market.[61]

In a newspaper article soon after the Bell/TELUS roll-out of a new national HSPA network, Mr. Bernard Lord, the president and CEO of the Canadian Wireless Telecommunications Association (CWTA), described the wireless industry in Canada as having a "hypercompetitive market from coast to coast" and added: "When you consider our sparse population and large geography, Canadians are very well served when it comes to quality of service, speed of network and the handsets they have access to."[62]

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59. MTS Allstream, 28 October 2009. http://www.parl.gc.ca/40/2/parlbus/commbus/senate/Com-e/tran-e/07evb-e.htm?Language=E&Parl=40&Ses=2&comm_id=19
60. Telecommunications Policy Review Panel, Final Report, 2006, p. 1-19. http://telecomreview.ca/eic/site/tprp-gecrt.nsf/vwapj/report_e.pdf/$FILE/report_e.pdf
61. André Tremblay, TerreStar Canada (and Trio Capital), 18 November 2009. http://www.parl.gc.ca/40/2/parlbus/commbus/senate/Com-e/tran-e/08evc-e.htm?Language=E&Parl=40&Ses=2&comm_id=19
62. Tamara Grinac, "Canada's cellphone market is 'hypercompetitive,'" Calgary Herald, 22 November 2009, p. B1.

In 2006, the Telecommunications Policy Review Panel's final report criticized the Canadian wireless industry's relatively slow deployment of next-generation technology.[63] Mr. Lord's description of a hypercompetitive market was made when Canada had, or would soon have, more HSPA providers with their own networks than anywhere in the world.[64] One way to reconcile the two views is to suggest that one was looking back to the period when the review panel did its study and that one was looking forward. This is a suggestion that cannot be pushed too far, although the observation was made above that the structure of the Canadian wireless industry has changed during the period when the committee has been working on this report.

A starting point for any debate on the competitiveness of the Canadian wireless industry is the recent past, for which the available data apply. The present is arguably different for reasons given above, namely the new entrants from the AWS spectrum auction and the new, possible head-to-head-to-head competition as the three dominant players now have networks based on the same HSPA technology. It is also necessary to speculate on how the present, more competitive network will evolve – and what can be done to sustain any increased competition.

PROFILE OF THE WIRELESS SECTOR IN CANADA

THE RECENT PAST

The following table gives some indication of the state of competition among wireless service providers before the industry began adjusting to the new entrants from the Advanced Wireless Services (AWS) spectrum auction and before Bell and TELUS had rolled out a national HSPA+ network that allowed them to compete head-to-head with Rogers in offering the iPhone, Android-based handsets and some of the newer BlackBerries. In other words, this table shows the state of the wireless market in Canada when this committee began its study.

TABLE 4 ›

Wireless subscriber market share by province (2008)

PROVINCE	BELL GROUP	TCC	ROGERS	OTHER
British Columbia	13%	41%	43%	3%
Alberta	18%	53%	27%	3%
Saskatchewan	1%	3%	14%	82%
Manitoba	1%	12%	28%	59%
Ontario	28%	19%	48%	5%
Quebec	37%	23%	35%	5%
New Brunswick	64%	12%	21%	3%
Prince Edward Island	66%	13%	17%	3%
Nova Scotia	57%	17%	24%	3%
Newfoundland and Labrador	79%	16%	3%	2%
The North	n/a	n/a	n/a	n/a

Source: [CRTC, *Communications Monitoring Report, 2009*, Table 5.5.4, p. 244] CRTC data collection.
Note: n/a not available (Wireless subscriber market share data for the North was not derived due to insufficient data.)

63. Telecommunications Policy Review Panel, *Final Report*, 2006, p. 1-15. http://telecomreview.ca/eic/site/tprp-gecrt.nsf/vwapj/report_e.pdf/$FILE/report_e.pdf
64. Canadian Wireless Telecommunications Association (CWTA), 29 September 2009. http://www.parl.gc.ca/40/2/parlbus/commbus/senate/Com-e/tran-e/05evb-e.htm?Language=E&Parl=40&Ses=2&comm_id=19

Several witnesses pointed out that, although there were three dominant national wireless service providers, in most markets any competition was between two players. In the table above, two firms have over 80% of subscribers in all but two provinces: in those two provinces, Ontario and Quebec, the top two firms have 76% and 72% of the subscribers, respectively.

The three dominant, or incumbent, wireless service providers make up what economists would call an oligopoly. There is no single theory of oligopoly. The behaviour of a single firm among two others in the industry depends on the behaviour of the others. The net effect is that a three-firm industry can mirror the behaviour of a competitive industry or a cartel that acts as a monopolist.

There are several indications that, until recently, the wireless service providers in Canada have had a cozy oligopoly. As the recent study by DBRS, the bond rating agency, notes: "Market share levels in the Canadian wireless market have remained relatively steady in the six years since Rogers' acquisition of Microcell in 2004."[65] In addition to the fairly steady market shares, the three dominant firms were able to charge activation fees, system access charges and impose relatively long (three-year) contracts. Not surprisingly, the firms enjoyed high margins.

TABLE 5 ›

National Incumbent Wireless Service Providers Operating Statistics (2009)

	ROGERS	BELL	TELUS
Total Wireless Subscribers (thousands)	8,494	6,833	6,524
EBITDA Margin	45.7%	41.5%	41.1%
ARPU – blended (annual average, $ per month)	$63.60	$51.70	$58.46
Churn - blended	1.4%	1.7%	1.6%
Wireless/Total Revenue (per cent)	56.7%	30.1%	49.3%
Wireless/Total EBITDA (per cent)	69.3%	31.3%	52.6%

Source: Based on Table 1 in DBRS, *The Canadian Wireless Landscape*, May 2010, p. 9. The DBRS table includes some data for the regional incumbents. EBITDA is Earnings Before Interest, Taxes, Depreciation and Amortization. ARPU is average revenue per user. Churn is the ratio of disconnecting subscribers to total subscribers.

Table 5 gives a picture of financially healthy wireless companies. The bond rating service that prepared the report from which the table is taken described the EBITDA margins as "Strong" and 'Impressive," but noted that emerging competition in the wireless industry is expected to put pressure on the margins.[66]

With changes in the wireless landscape – new competitors and a growing variety of popular smart phones – churn becomes a more important measure of a company's performance. Churn for a company will increase as competitors offer better prices, terms, service or more popular smart phones. Other factors, such as the length of a contract, can also affect churn. In short, churn measures the ability and desire of customers to change carriers. The following table shows average churn rates for Canada's dominant wireless service providers between 2004 and 2008.

65. DBRS, *The Canadian Wireless Landscape*, May 2010, p. 9. The text refers to a figure on page 10.
66. DBRS, *The Canadian Wireless Landscape*, May 2010, p. 6.

TABLE 6 ›

Average Monthly Churn Rates (Per Cent)

	2004	2005	2006	2007	2008
Bell Mobility	1.3	1.6	1.6	1.7	1.6
Rogers	1.8	2.1	1.8	1.6	1.5
TCC [TELUS]	1.4	1.4	1.3	1.5	1.6

Note: Microcell was acquired by Rogers in 2004.
Source: Source: [CRTC, *Communications Monitoring Report, 2009*, Table 5.5.6, p. 244] Companies' annual reports and CRTC data collection.
The churn rate is calculated by dividing the number of disconnected subscriber units by the average number of units.

In the United States, the average monthly churn rate for the nationwide carriers for the first quarter of 2009 was 1.9%; the range for most mobile telephone providers was between 1.5% and 3%.[67] The range in Canada from 2004 to 2009 was 1.3% to 2.1%; Rogers low churn rate in 2009 may show the effects of being the only carrier able to offer the Apple iPhone and other GSM-based smart phones.

As mentioned, a low churn rate can indicate a low level of competition. Surprisingly, a recent change in the Canadian telecommunications sector aimed at increasing competition – national wireless number portability – "... has not had a significant impact on the churn rates of the top three wireless carriers. Their annual monthly average churn rates continued to be relatively low ranging between 1.5 and 1.6% in 2008."[68] Number portability may increase churn in subsequent years when the new entrants from the AWS spectrum auction are up and running – and competing for the current customers of Rogers, Bell and TELUS.

The following table from an annual report by the U.S. Federal Communications Commission shows Canada's mobile performance by several measures compared with the performance of several countries at the end of 2007.

67. FCC, *Annual Report and Analysis of Competitive Market Conditions With Respect to Commercial Mobile Services*, 13th Report, 16 January 2009.
68. CRTC, *Communications Monitoring Report*, 2009, p. 238.
http://www.crtc.gc.ca/eng/publications/reports/policymonitoring/2009/2009MonitoringReportFinalEn.pdf.

TABLE 7 ›

Mobile Market Performance in Selected Countries

COUNTRY	PENETRATION (% OF POPS)	PREPAID (% OF SUBS)	MOUs	REVENUE PER MINUTE ($)	DATA (% OF ARPU)
Receiving Party Pays					
USA	84.4	16.1	812	0.06	19.8
Canada	60.9	22.1	439	0.11	12.5
Hong Kong	138.3	40.8	510	n/a	n/a
Singapore	125.0	46.4	349	0.08	24.5
Calling Party Pays					
UK	121.7	64.6	185	0.19	26.4
Germany	118.2	55.2	102	0.21	23.3
Italy	152.8	89.5	139	0.18	21.9
Sweden	115.1	50.4	191	0.15	13.0
France	89.0	36.7	249	0.17	15.6
Finland	122.4	19.0	307	0.12	16.8
Japan	82.3	2.0	138	0.26	34.4
South Korea	89.9	3.0	319	0.11	18.6
Australia	104.3	48.0	208	0.16	25.2

Source: [FCC, Annual Report of Competitive Market Conditions With Respect to Commercial Mobile Services, 13th Report, 16 January 2009] *Interactive Global Wireless Matrix* 4Q07.

Following comments made in the Final Report of the Telecommunications Policy Review Panel, the comparison between the United States and Canada gives the best indication of the state of competition in Canada. Penetration in Canada is 72% of that in the United States. Revenue per minute, which some analysts use as a proxy for mobile pricing, is 1.83 times higher in Canada than in the United States. Canadians have about half the minutes of use that Americans do; this is consistent with the higher "prices" seen in Canada, but may reflect differences in cell phone plans.

The CRTC does not regulate wireless service providers. The forbearance from economic regulation goes back to decisions made by the CRTC in 1994.

> In Telecom Decisions 94-15, 96-14, and 98-18, the Commission forbore from regulating mobile wireless services on the basis that such services were sufficiently competitive. In public notices released in early 2006, the Commission ruled that mobile television services which offer television programming accessible through a wireless handset, such as a cell phone, are exempt from regulation.[69]

The decision to forbear from regulation was strengthened in 2006 when the Minister of Industry's Policy Direction mandated the CRTC to:

> (i) rely on market forces to the maximum extent feasible as the means of achieving the telecommunications policy objectives, and

69. CRTC, *Communications Monitoring Report*, 2009, Footnotes omitted. http://www.crtc.gc.ca/eng/publications/reports/policymonitoring/2009/2009MonitoringReportFinalEn.pdf

> (ii) when relying on regulation, use measures that are efficient and proportionate to their purpose and that interfere with the operation of competitive market forces to the minimum extent necessary to meet the policy objectives.[70]

The Policy Direction followed from a recommendation made by the Telecommunications Policy Review Panel, which included proposed text for a policy direction, including a condition for applying regulation.

> Economic regulation shall apply only if there is a finding of significant market power in respect of a telecommunications service or class of services provided by a Canadian carrier. The Canadian Radio-television and Telecommunications Commission should continuously review telecommunications markets on a timely basis to ascertain the appropriate degree of regulation or forbearance under section 34 of the Telecommunications Act.[71]

This drafting suggestion was not included in the Policy Direction that was issued to the CRTC.

Forbearing from regulating is not, however, the same as ensuring competition. This point was emphasized by the representative from the Public Interest Advocacy Centre (PIAC).

> Industry Minister Bernier's policy direction of December 2006 has made the problem worse by making the withdrawal of the CRTC from many consumer protection requirements part and parcel of treating the incumbents and the competitors in the same fashion. We need a new act and new rules across the board to provide standards and deal swiftly with industry misconduct. In this interregnum, certain persistent abuses and problems flourish and our new telecom ombudsman body, the Commissioner for Complaints for Telecommunications Services Inc., CCTS, has yet to find its feet in a substantial fashion.[72]

The Commissioner for Complaints for Telecommunications Services appeared before the committee and noted that most of the complaints he received were for the wireless segment of telecommunications. Neither the Commissioner for Complaints nor the Canadian Wireless Telecommunications Association (CWTA), which released a Code of Conduct on September 1, 2009, can undo the terms of a contract, although the CWTA's Code does deal with cases where the wireless service provider changes the terms of the contract. According to the Code:

> We do not change the material terms of our contracts with customers, without giving them at least 30 days' notice. In the case of such material changes that are unfavourable to customers, we either give them the right to terminate the contract without any additional fees for early termination, or allow them to remain on the unchanged contract. This does not apply to changes that are required by law or regulation or changes to those services and features that do not have a fixed term commitment.[73]

Competition provides the best way for consumers to have a set of transparent choices. The recent past shows a small number of excellent companies doing well for their shareholders, but not for all Canadians. Fortunately, there are indications of new competition among Canada's wireless service providers.

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70. Governor in Council, *Order Issuing a Direction to the CRTC on Implementing the Canadian Telecommunications Policy Objectives, P.C. 2006-1534, 14 December 2006*. http://www.gazette.gc.ca/archives/p2/2006/2006-12-27/html/sor-dors355-eng.html
71. Telecommunications Policy Review Panel, Final Report 2006, p. 10-7. http://www.telecomreview.ca/eic/site/tprp-gecrt.nsf/eng/h_rx00054.html
72. Public Interest Advocacy Centre (PIAC), 7 October 2009. http://www.parl.gc.ca/40/2/parlbus/commbus/senate/Com-e/tran-e/06eva-e.htm?Language=E&Parl=40&Ses=2&comm_id=19
73. CWTA, Code of Conduct for Wireless Service Providers, 1 September 2009. http://www.cwta.ca/CWTASite/english/codeofconduct.html

THE PRESENT

The Olympics and modern telecommunications came together in Vancouver in February 2010. The official from Bell Canada who appeared before the committee was justly proud of his company's performance at the Winter Olympic Games.

> ... the Vancouver Olympics served as a show case for us for how to put broadband networks to effective use. For example, we had a mobile TV service that was the number one iPhone application downloaded during the games. It delivered every minute of live TV coverage from the Canadian Broadcasting Consortium to wireless handsets, allowing Canadians to view live Olympic coverage over their mobile phones, wherever they were. We committed over $400 million to the games to deliver the most watched Olympic Winter Games in history and the most advanced broadband network of Olympic Games, even Beijing.[74]

The mobile phones mentioned are smart phones with high-speed broadband connections and the network these phones used was part of the national HSPA+ network that Bell and TELUS had rolled out in the beginning of November 2009.

At the end of November, an article in the *Financial Post* reported that Rogers was laying off 900 workers to cut costs and streamline operations.[75] The article mentioned the increased competition the three incumbents would face from the new entrants, and the competition that Rogers would also face from the other two incumbents. On November 4, 2009, the day Bell launched its national HSPA+ network, Rogers issued the news release "Unparalleled HSPA smartphone lineup underscores Rogers' network superiority." On the day of its network launch, Bell presented a list of the smart phones that it would offer, including the Apple iPhone.

About two months earlier, in the middle of September 2009, a Rogers news release announced that its next generation 21 Mbps HSPA+ network had gone live in Canada's five largest cities.[76] At the end of November and beginning of December 2009, Rogers, Bell and TELUS were involved in lawsuits over whose network could be marketed as the fastest and most reliable. What this demonstrates is that in the "present" wireless market in Canada, the big three incumbents have started competing among themselves on the basis of technology.

One hallmark of a competitive market is that firms compete on the basis of investment and innovation. Competition also occurs with respect to quality of service and, most noticeably with respect to prices and other terms of service. The new entrants offered – or announced that they intended to offer plans – with no hidden fees, no contracts and flat rates for unlimited voice and text messaging.

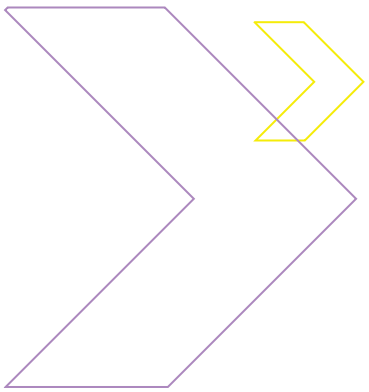
74. Bell Canada/Bell Aliant (Bell), 30 March 2010. http://www.parl.gc.ca/40/3/parlbus/commbus/senate/Com-e/tran-e/01evb-e.htm?Language=E&Parl=40&Ses=3&comm_id=19
75. Jamie Sturgeon, "Rogers laying off 900 as part of cost cuts," Financial Post, 26 November 2009.
76. Rogers, "Wireless Media Info," 4 November 2009, 14 September 2009, http://your.rogers.com/aboutrogers/newsroom/wirelessmediainfo/overview.asp

The incumbents have had to fight back. By the beginning of December, each the big three had dropped the $6.95 per month "system access fee," although they had increased some of their monthly plans by $5. The incumbents were also offering deals to retain or win back customers.

> We are already seeing a slight drop in prices, some fees being reduced or eliminated. If you're with Rogers, Bell, TELUS or even one of their flanker brands (Virgin, Koodo, Solo, Fido) you might find sweet deals to stay. Rogers, Bell and TELUS are all currently offering the same promo by waiving the $35 Activation Fee and giving free evenings starting at 6:00 pm. Bell is offering a $150 credit to WIND customers who port back to them...[77]

Perhaps the biggest competitive challenge to the incumbents will come from the two cable companies, Shaw and Vidéotron, that won spectrum in the 2008 AWS auction. These companies will also be operating on HSPA networks, and each is a diversified communications company that will be able to compete by bundling a telecommunications package that offers Internet, television, home phone and wireless (the so-called quad-play).

Lower prices, improved quality on faster networks and better terms of service may lead to higher wireless penetration rates in Canada and to the substitution of landlines phones by wireless phones. The DBRS study of Canada's wireless industry estimated that the new entrants would take 7% to 10% of market share in the next five years.[78] If penetration and substitution in Canada rise to levels in the United States, there will be profitable opportunities for the new entrants and the incumbents. As penetration and substitution level out, the structure of the industry and the number of players could change.



Consumers obviously gain from lower prices and better terms of service. In the past, one of the overriding consumer complaints had to do with high roaming charges – the cost of calls, text messages and data transmission when outside Canada – and the "bill shocks" that the roaming charges could cause. Some of the shocks could lead to a bill that is hundreds, even thousands, of dollars above the usual monthly bill.

When asked about high roaming charges, the president of the Canadian Wireless Telecommunications Association (CWTA) emphasized the CWTA's recent Code of Conduct and the availability of roaming packages from the Canadian carriers.

> Part of the code is to inform consumers clearly what they get when they buy a package and what they do not get. If you want a roaming package, you can add a roaming package. Different carriers have different agreements with carriers around the world.[79]

Transparency is always a good idea, but roaming charges are still high, even with the special roaming packages. A Canadian who makes a 15 minute call from Brussels with a Rogers cell phone would pay $2 per minute or $30 for the call without any travel package. With a $20 travel plan, the Rogers customer gets 15 minutes at an effective rate of $1.33 per minute (subsequent minutes are priced at $1.33). Other Rogers travel plans are available; the $75 plan gives 70 minutes at an effective rate of $1.07 per minute.

77. John Connors, "Big 3 waive Activation Fee & give free 6pm evenings until March 31st," Mobile Syrup, 22 March 2010. http://mobilesyrup.com/2010/03/22/big-3-waive-activation-fee-give-free-6pm-evenings-until-march-31st/
78. DBRS, *The Canadian Wireless Landscape*, May 2010, p. 10.
79. Canadian Wireless Telecommunications Association (CWTA), 29 September 2009. http://www.parl.gc.ca/40/2/parlbus/commbus/senate/Com-e/tran-e/05evb-e.htm?Language=E&Parl=40&Ses=2&comm_id=19

The wireless service providers who appeared before the committee and repeated that the roaming charges were out of their control. As the representative from Bell explained:

> The charge depends on our specific agreements with each specific carrier around the world. We have hundreds of roaming agreements around the world to provide the convenience to our subscribers to ensure that their phones continue to be used.[80]

The European Union has placed caps on roaming charges faced by Europeans travelling within Europe. Canadian regulators do not, of course, have authority over non-Canadian wireless service providers. Likewise, the Federal Communications Commission (FCC), the telecommunications regulator in the United States, has no authority over non-U.S. wireless service providers, and U.S. cell phone users do complain about unexpectedly high bills.

In a recent notice of a new initiative, the FCC noted: "In the European Union, carriers are required by law to send text messages to consumers when they are running up roaming charges or getting close to a set limit for data roaming."[81] The FCC's Consumer and Governmental Affairs Bureau has asked for comments on, among other issues, whether "technological or other differences exist that would prevent wireless providers in this country from employing usage alerts similar to those now required by the EU."[82]

The committee feels that Canada should also find ways to deal with bill shock.

RECOMMENDATION 13

Industry Canada and the Canadian Radio-television and Telecommunications Commission should work with the Canadian Wireless Telecommunications Association and individual Canadian wireless service providers to develop a technological procedure for informing users when their usage will push the monthly bill past a set limit.

80. Bell Canada/Bell Aliant (Bell), 30 March 2010. http://www.parl.gc.ca/40/3/parlbus/commbus/senate/Com-e/tran-e/01evb-e.htm?Language=E&Parl=40&Ses=3&comm_id=19
81. Federal Communications Commission, "FCC Bureau Launches Initiative to help Consumers Avoid "Bill Shock," News Release, 11 May 2010. http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-298028A1.pdf
82. Federal Communications Commission, "FCC Bureau Launches Initiative to help Consumers Avoid "Bill Shock," News Release, 11 May 2010. http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-298028A1.pdf

Some of the new entrants may be able to bargain harder with foreign carriers than the incumbents and find ways to lower roaming charges. If this happens, of course, they will be trumpeting the lower charges, just as they promote their lower prices or better terms for domestic cell phone use. One of the hallmarks of a competitive industry is that the firm selling at lower prices or at better terms has a strong incentive to publicize its prices and terms. With a competitive market, in other words, comparisons of prices by a third-party are generally not needed.

In September 2009, the CBC announced the federal government had scrapped an online calculator for cell phone rates that had been expected to be launched in June.[83] In Belgium the committee met with officials from the Belgium Institute for Postal Services and Telecommunications (BIPT), which is the Belgian equivalent of the telecommunications side of the CRTC, and heard of its recently launched telecommunications rate calculator.[84] The BIPT calculator covers rates for fixed phones, mobile phones and the Internet, but cannot yet handle comparisons involving bundled services.

Private online rate calculators are also available. In the United Kingdom, Ofcom, which is the U.K.'s telecommunications regulator, has a program to accredit private online rate calculators. The accreditation is meant to ensure that the site "provides prices that are accurate, comprehensive, up to date and accessible."[85] Canada has several private online rate calculators,[86] but there is no accreditation process for them.

The committee is pleased that the wireless sector is more competitive now than when this study began. But some concerns remain, especially about the future structure of the industry, and a possible return to the cozy oligopoly seen in the recent past.

THE FUTURE

Competition, with numerous wireless service providers vying for customers, is obviously better for consumers than a market dominated by only a few firms.

The spokesman for Bell looked at the number of players that could be competing in Canada in the near future and compared that number with the number of players in European countries.

> Let us calculate the number of players: Bell, TELUS, Rogers, and WIND Mobile. Soon we will have Mobilicity, Public Mobile, EastLink and Videotron; therefore, nine in all. If you include the discount brands that Bell, TELUS and Rogers own, add another three or four brands. In all, we will have 13 different brands owned by about six or seven providers. That is huge amount of competition.
>
> In 2009, Bank of America and Merrill Lynch looked at 15 European countries. Only one of those countries had five providers; six of them had four providers; and seven countries had three providers. Given that we have nine providers, is it accurate to say that we do not have enough competition?[87]

83. CBC News, "Aborted cellphone rate calculator cost Ottawa $1.4M," 10 September 2009. http://www.cellphoneratecalculator.com/news.html?nid=2107
84. Belgium's Telecommunications Rate Calculator. http://www.besttariff.be/
85. Ofcom, "Bundling and Switching," 8 December 2009. http://www.ofcom.org.uk/consumer/2009/12/bundling/
86. Examples include: http://www.cellphones.ca/cell-plans/; http://www.comparecellular.com/; and http://www.cellphoneratecalculator.com/
87. Bell Canada/Bell Aliant (Bell), 30 March 2010. http://www.parl.gc.ca/40/3/parlbus/commbus/senate/Com-e/tran-e/01evb-e.htm?Language=E&Parl=40&Ses=3&comm_id=19

The conclusion seems to be that there will be a shake-out in the Canadian market. DBRS, the bond rating service that recently studied the Canadian wireless landscape, reached a similar conclusion: "DBRS is of the opinion that ultimately there is room for a fourth national carrier. However, the case for the viability of a fifth or sixth national carrier is harder to make."[88]

On the day that Cabinet varied the CRTC Globalive decision, the CEO of Rogers Communications was quoted as saying, "There's no question in my mind that Canada cannot support more than three national facilities-based players." The CEO of Wind Mobile, Globalive's wireless brand, responded, "I'm sure somebody told Starbucks that there wasn't room for more coffee shops."[89]

The concern remains that Canada could return to the situation of the recent past, with three national players and the possibility of a cozy oligopoly that will feature higher that competitive prices, less choice and less transparency. Canada, after all, has seen consolidation in the wireless sector before. CANTEL, Microcell and Clearnet no longer exist. The question today, before any shake-out occurs, is, how can competition be sustained?

HOW TO ENCOURAGE AND SUSTAIN COMPETITION

Witnesses before the committee mentioned two ways of producing competition in the wireless industry.

LIBERALIZE FOREIGN OWNERSHIP RESTRICTIONS

In 2008 Advanced Wireless Services (AWS) spectrum auction, Globalive Wireless bid $442 million for 30 licences, covering each province but Quebec. It satisfied Industry Canada that it qualified as a Canadian corporation. On October 29, 2009, however, the CRTC decided, under the *Telecommunications Act* (1993) that it did not qualify. Section 16 of the Act requires a carrier to be Canadian-owned and controlled, which is defined in Section 16(3):

a) not less than eighty per cent of the members of the board of directors of the corporation are individual Canadians;
b) beneficially own, directly or indirectly, in the aggregate and otherwise than by way of security only, not less than eighty per cent of the corporation's voting shares issued and outstanding; and
c) the corporation is not otherwise controlled by persons that are not Canadians.

The CRTC accepted that Globalive met the first two requirements – the legal or *de jure* test – but that it did not meet the third requirement – the control in fact or *de facto* test.

88. DBRS, *The Canadian Wireless Landscape*, May 2010, p. 19.
89. Hugo Miller, "Rogers Says Canada Can't Sustain New National Carrier," Bloomberg.com, 11 December 2009. http://www.bloomberg.com/apps/news?pid=20601082&sid=aulGEpbvIroM

On December 11, 2009, Cabinet varied the CRTC decision and decided that Globalive did meet conditions of Canadian ownership and control.[90] The Minister of Industry, in explaining the Cabinet decision, said that, "this variance is specific to the facts of this case and is based on the application of Canadian ownership and control requirements to these particular facts. The government is not removing, reducing, bending or creating an exception to (foreign ownership rules) in the telecommunications and broadcasting industries."[91] In other words, the *de facto* or control-in-fact test led to two different conclusions. There are obvious subjective elements in determining control in fact, and these subjective elements lead to uncertainty in applying the law with respect to the ownership and control of telecommunications firms.

As noted above, the Speech from the Throne in March 2010 promised to address this problem, by liberalizing the foreign ownership restrictions.

> Our Government will open Canada's doors further to venture capital and to foreign investment in key sectors, including the satellite and telecommunications industries, giving Canadian firms access to the funds and expertise they need. …[92]

This promise stems from more than the difficulties with the Globalive decision. The final report of the Telecommunications Policy Review Panel in 2006[93] and the report of the Competition Policy Review Panel in 2008[94] argued for the relaxation of the current restrictions. The emphasis in the Throne Speech was on the positive aspects of increased foreign investment in telecommunications, namely the improved access by Canadian companies to capital.

The representative from MTS Allstream, a vocal advocate of removing the foreign ownership restrictions, explained that MTS did not bid for national AWS spectrum licenses, as some observers had expected because of the high cost of the spectrum and the limited sources of capital it could tap.

> … It would cost a company like us, who already have backbone, close to $1 billion to build infrastructure across the rest of Canada, in addition to the spectrum. We did not have the ability at that time to raise that kind of capital.[95]

Removing the foreign ownership restrictions is one way of attracting more competitors into the wireless industry. It would also place Canada with most other developed countries in the world in terms of openness to foreign investment in telecommunications.

Opponents to removing the current foreign ownership restrictions in telecommunications argue that the current restrictions are needed to protect Canadian culture. Because of the increasing convergence between telecommunications and broadcasting, opening telecommunications to foreign ownership will eventually open up broadcasting. The representative of the Information Technology Association of Canada (ITAC) summed up the problems.

90. The CRTC decision contains useful background on the case and an analysis of the decision. http://www.crtc.gc.ca/eng/archive/2009/2009-678.htm
91. Paul Vieira, "Clement overrules CRTC decision against Globalive," *Financial Post*, 11 December 2009.
92. Speech from the Throne. 3 March 2010. http://www.sft-ddt.gc.ca/eng/media.asp?id=1388
93. Telecommunications Policy Review Panel, Final Report 2006, http://www.telecomreview.ca/eic/site/tprp-gecrt.nsf/eng/h_rx00054.html
94. Competition Policy Review Panel, *Compete to Win: Final Report*, June 2008. http://www.ic.gc.ca/eic/site/cprp-gepmc.nsf/eng/h_00040.html
95. MTS Allstream, 28 October 2009. http://www.parl.gc.ca/40/2/parlbus/commbus/senate/Com-e/tran-e/07evb-e.htm?Language=E&Parl=40&Ses=2&comm_id=19

> … we realize that as the world of content, culture and technology blend more and more, we cannot blindly say we will do something in telecommunications without thinking through the cultural consequences. While we have views in terms of culture and how the world of technology will open up many opportunities, we have not found the solution to resolving cultural issues.[96]

There have been many proposals with respect to the current set of foreign ownership restrictions, from a continuation of the status quo to complete removal of the restrictions in both telecommunications and broadcasting. Between the extremes have been suggestions for phased-in liberalization and different quantitative measures for the *de jure* or legal test of ownership.[97]

CONSIDER MANDATING OPEN ACCESS TO INFRASTRUCTURE

In addition to having access to the necessary capital, a company wishing to enter the Canadian wireless (or broadband) industry needs to avoid any possible barriers to entry protecting the incumbent firms. Some countries, especially in Europe, have decided that the ownership of infrastructure by incumbents, some of whom built up the infrastructure when they were government-owned telecommunications carriers, constitutes a barrier to entry. These countries have developed open access policies to allow new entrants access to the infrastructure.

The Economist criticized the U.S. National Broadband plan for not including the option of open access.

> Almost uniquely among OECD countries, America has adopted no policies to require the owners of broadband cables to open their infrastructure to rival sellers in order to enhance competition. America relies almost exclusively on "facilities competition", the provision of rival infrastructures: a cable provider may compete, for example, with a network that runs optical fibre to the home. True, there is a legitimate worry that forcing a company to rent out parts of its infrastructure to competitors may deter investment, but a review of international broadband policies prepared for the FCC by Harvard's Berkman Centre for Internet & Society revealed a range of successful compromises in use in other countries.[98]

Incumbents do not like open access policies, and the first draft of the Berkman study was heavily criticized. The final report expanded the study of open access policies and the authors maintained the early position.

> Our study further identified the great extent to which open access policies played a role in establishing competitive broadband markets during the first-generation broadband transition in Europe and Japan, and the large degree to which contemporary transpositions of that experience were being integrated into current plans to preserve and assure competitive markets during the next generation transition.[99]

96. Bernard Courtois, Information Technology Association of Canada (ITAC), 28 April 2010. http://www.parl.gc.ca/40/3/parlbus/commbus/senate/Com-e/tran-e/02ev-e.htm?Language=E&Parl=40&Ses=3&comm_id=19
97. On June 7, 2010, the Minister of Industry gave the keynote speech at the 2010 Canadian Telecom Summit and repeated the promise from the Throne Speech that the foreign ownership restrictions in telecommunications would be liberalized and announced that he would be issuing a consultations paper on the subject in a few days. http://www.ic.gc.ca/eic/site/ic1.nsf/eng/05627.html
98. *The Economist*, "Pipe Dream: Not What Was Asked For," 18 March 2010.
99. Berkman Center for Internet and Society, *Next Generation Connectivity: A Review of Broadband Internet Transitions and Policy from around the World*, Final Report, February 2010. http://cyber.law.harvard.edu/sites/cyber.law.harvard.edu/files/Berkman_Center_Broadband_Final_Report_15Feb2010.pdf

When asked during a committee hearing about wholesale access, the representative from Bell objected that such a policy was unfair to the company making the investment in infrastructure and even put it at a competitive disadvantage.

> On wholesale access, let us take wire line. We will fibre up every single home in Quebec City in 2010, so 260,000 homes in Quebec City will have fibre-to-the-home, 100 megabits per second through hundreds of millions of dollars of investment. Now a competitor can come along and put zero money into the ground and say, "I want access to that network, and, by the way, the CRTC says that it is at cost." Then they will turn around, use our network, pay costs on a monthly basis and offer each and every one of these services in competition with us. When they are tired of serving Quebec or the business model is not working, they will walk away and have no sunk costs because it is all unitized. All they have to do is pay us a monthly fee per subscriber. We feel that is unacceptable.[100]

The representative from MTS Allstream argued that the absence of wholesale access for next-generation broadband has allowed market dominance by the incumbent Internet Service Providers (ISPs).

> The absence of a robust wholesale framework for next generation broadband has had a dramatic impact. Today, independent or non-incumbent ISP competitors have about 6 per cent of residential market revenues. This leaves the combined incumbent telephone and cable company sector controlling nearly 95 per cent of the residential market for high-speed Internet services in 2008. The CRTC's 2009 monitoring report shows that for high-speed Internet services, the independent ISP's share of the residential mark is even lower, a mere 4.7 per cent.
>
> Canada's international broadband standings make it clear that competition limited to two incumbent providers, as is the case in the residential market today, is not sufficient to stimulate the type of customer choice and innovation needed to distinguish Canada as a broadband leader.[101]

The five largest ISPs in Canada are Bell, TELUS, Rogers, Vidéotron and Shaw (and their affiliates). The market shares of these dominant ISPs are reminiscent of the market shares of the dominant wireless service providers when that market was arguably a cozy oligopoly for them.

Open access is a complicated and contentious issue. This committee recognizes this but wants to see more competition in the Canadian telecommunications sector. Accordingly, the committee recommends that the government follow the European example and implement pro-competitive, open access policies.

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100. Bell Canada/Bell Aliant (Bell), 30 March 2010. http://www.parl.gc.ca/40/3/parlbus/commbus/senate/Com-e/tran-e/01evb-e.htm?Language=E&Parl=40&Ses=3&comm_id=19
101. MTS Allstream, 28 October 2009. http://www.parl.gc.ca/40/2/parlbus/commbus/senate/Com-e/tran-e/07evb-e.htm?Language=E&Parl=40&Ses=2&comm_id=19

RECOMMENDATION 14

The government should pursue open access policies with respect to telecommunications infrastructure as a means of sustaining or improving competition in the telecommunications sector.

Currently, spectrum licence holders are required to spend 2% of revenue on research and development, and to document the expenditure. The recent roll-out of 21 Mbps HSPA+ networks by numerous wireless service providers shows that the market, where competition prevails, will prompt investment in the latest technology. Competition will also prompt necessary investment in research and development.

Spectrum licence holders would, of course, like to see the 2% requirement dropped, or they would like to decide where to spend the money. As an official from Rogers put it:

> … Currently we must spend 2 per cent of our money on research and development. We have strongly encouraged the government to get rid of that requirement. If they keep it, we believe that we should have a choice between spending the money on research and development or on rural deployment. I think that in many ways rural deployment is better than research and development in terms of benefit to the country.[102]

The committee agrees with this suggestion.

RECOMMENDATION 15

The government should change the requirement for current spectrum licence holders to spend 2% of revenue on research and development and have the money redirected for the deployment of broadband to areas currently unserved.

102. Rogers Communications Inc., 3 November 2009. http://www.parl.gc.ca/40/2/parlbus/commbus/senate/Com-e/tran-e/08eva-e.htm?Language=E&Parl=40&Ses=2&comm_id=191

ISSUES WITH RESPECT TO SPECTRUM

Spectrum is the lifeblood of wireless technology. As the versatility of wireless technology increases, exemplified by the rapid industry-shaping growth of smart phones and other mobile broadband devices, the value of spectrum increases. And this ever-more valuable resource belongs to the Canadian people.

In an online column, an officer of DragonWave argued that spectrum had become an important resource that needed attention and enlightened management.

> At the introduction of the automobile, petroleum products were considered a near infinite resource. If you asked my father about the shortage of fresh water, he would have looked at you without comprehension. No one in today's world would consider either oil or water to be resources that are not in need of conservation and careful management. In the same way, spectrum for wireless applications is a large, but non-renewable resource.[103]

The topic of the first public meeting of the study was on Canadian spectrum policy and management. Numerous witnesses had views on various issues involving spectrum. These issues included: allocation (by auctions, comparative assessment, or other procedures), pricing, the possible shortage of spectrum and the alignment of Canadian spectrum policies with those in other countries.

The Minister of Industry is responsible for managing spectrum, which involves developing national policies and goals for spectrum resource use and ensuring its effective management. In June 2007, Industry Canada released a revised *Spectrum Policy Framework for Canada*, with the following Policy Objective:

> To maximize the economic and social benefits that Canadians derive from the use of the radio frequency spectrum resource.[104]

The Framework includes a long list of Enabling Guidelines. The emphasis in them is on market forces, with minimally intrusive regulation, although there is scope for allocation and licensing methods that ensure the availability of a range of services in the public interest and the responsiveness of spectrum management to changing technology and market place demands.

Industry Canada has used several methods forthe allocation of spectrum, including the use of market forces, exemplified by spectrum auctions.[105] The earliest allocation was in 1983 and was based on comparative assessment (sometimes called the "beauty contest" method), which bargains the spectrum in return for promises on the extent and quality of service. This method was used for the allocation of cellular spectrum and for some personal communications services (PCS) spectrum. In an effort to promote competition, spectrum caps were introduced in 1995; the caps were removed in 2004. For the 2008 AWS spectrum auction, Industry Canada had some spectrum set aside for new entrants. In 2001, some PCS spectrum that had been held in reserve during the 1995 allocation was auctioned. The Department has also tried methods to ensure that "there are mechanisms in place for others who are interested in obtaining spectrum in unserved and underserved areas."[106]

103. Alan Solheim, "4G Wireless Evolution – Spectrum is a Non-Renewable Resource," TCMnet, 8 September 2009. http://4g-wirelessevolution.tmcnet.com/topics/4g-wirelessevolution/articles/63801-spectrum-a-non-renewable-resource.htm
104. Industry Canada, *Spectrum Policy Framework for Canada*, June 2007, DGTP-001-07. http://www.ic.gc.ca/eic/site/smt-gst.nsf/vwapj/spf2007e.pdf/$FILE/spf2007e.pdf
105. Industry Canada, A Brief History of Cellular and PCS Licensing, October 2004. http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf08251.html
106. Industry Canada, Consultation on the Renewal of Cellular and Personal Communications Services (PCS) Spectrum Licences, March 2009. http://www.ic.gc.ca/eic/site/smt-gst.nsf/vwapj/dgrb-002-09-eng.pdf/$FILE/dgrb-002-09-eng.pdf

Consultation is used, where appropriate, to develop regulations. The Canadian Wireless Telecommunications Association (CWTA), for example told the committee that it was taking an active part in Industry Canada's review of its framework for awarding and renewing spectrum licences. The CWTA had a list of recommendations.

> One of those recommendations was for the department to state clearly that anyone who wins a spectrum licence at an auction should have a high expectation of having that licence renewed. We argued in favour of longer licence terms.
>
> We also feel that it is time for Industry Canada to establish a true cost recovery formula for assessing spectrum licence fees. We recognize that spectrum is a public resource and that the government has a responsibility to see that it delivers a fair return for Canadians. That is why we recommend that spectrum licence fees be based on the cost of government for administrating spectrum and nothing more. Anything else is a tax on innovation, a barrier on innovation, an obstacle to investment and, therefore, an obstacle to the information economy, which will slow down the rollout of the next generation networks.[107]

The spokesman for the CWTA noted that the wireless industry and carriers had "approximately 1 per cent to 2 per cent of the spectrum in Canada and yet we pay close to 50 per cent of the spectrum fees."[108]

Wireless companies paid $4.2 billion for spectrum in the 2008 Advanced Wireless Services (AWS) auction, and Industry Canada is about to renew licences for earlier-allocated cellular and personal communication services (PCS) spectrum, so licence holders have obvious concerns about the new fees for the cellular and PCS licences. Industry Canada is currently reviewing the market value of spectrum, and the conclusions of this study will undoubtedly influence the level of licence fees.

Although an auction is considered by many to be the best way of using market mechanism to allocate resources to their most highly valued use, the spokesman for TELUS complained that the structure of the recent AWS spectrum auction led to considerable overpayment for the spectrum and a misallocation of resources.

> Because of the way that auction was designed, it ultimately resulted in the treasury receiving about $4 billion. That sounds great on the face of it, but according to the research we did and according to what investment analysts had predicted would be spent in the auction, it ended up costing the bidders about $2 billion more in a relative value than they would have paid for similar spectrum in the U.S. You would think that in the U.S., because of the size of that economy, you would pay more.
>
> That is $2 billion gone that could have been turned around and spent on broadband in the wireless sector or for converged company on fibre as well as wireless broadband.[109]

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107. Canadian Wireless Telecommunications Association (CWTA), 29 September 2009. http://www.parl.gc.ca/40/2/parlbus/commbus/senate/Com-e/tran-e/05evb-e.htm?Language=E&Parl=40&Ses=2&comm_id=19
108. Canadian Wireless Telecommunications Association (CWTA), 29 September 2009. http://www.parl.gc.ca/40/2/parlbus/commbus/senate/Com-e/tran-e/05evb-e.htm?Language=E&Parl=40&Ses=2&comm_id=19
109. TELUS, 25 November 2009. http://www.parl.gc.ca/40/2/parlbus/commbus/senate/Com-e/tran-e/09eva-e.htm?Language=E&Parl=40&Ses=2&comm_id=19

Several witnesses noted that the cost of spectrum at auction and the fees for spectrum use were out-of-line with costs in the United States.

The pricing and allocation of spectrum is complicated, and this committee has no wish to attempt to micro-manage the experts at Industry Canada. However, the committee feels that more emphasis could be given to some factors when establishing Canadian spectrum policy.

RECOMMENDATION 16

Industry Canada, in establishing policies to allocate and price spectrum, promote wireless service in currently unserved or underserved areas.

RECOMMENDATION 17

Industry Canada, in establishing policies to allocate and price spectrum, consider pricing regimes in other countries, especially to those in the United States.

Another area of concern is the efficient use of spectrum by those with it. The growing demand for smart phones and mobile Internet puts addition pressure on the limited spectrum. An officer of DragonWave, in the online column quoted above, concluded.

> Given that spectrum is a non-renewable resource, and that bandwidth only goes one way – up, the Mbps per MHz metric becomes as important as other metrics on power, capacity, cost and size. It would not be unreasonable to expect mandated minimums for spectral efficiency, just the same way that we have such requirements for fuel efficiencies in the auto industry.[110]

110. Alan Solheim, "4G Wireless Evolution – Spectrum is a Non-Renewable Resource," TCMnet, 8 September 2009. http://4g-wirelessevolution.tmcnet.com/topics/4g-wirelessevolution/articles/63801-spectrum-a-non-renewable-resource.htm

The representative from Research in Motion (RIM) who appeared before the committee was proud to talk about the superior performance of the BlackBerry with respect to security and spectrum efficiency.[111] A research firm recently compared the spectrum efficiency of the BlackBerry to other devices and noted: "There are multiple areas in which RIM BlackBerry provides advantages. One is in efficient e-mail handling. Another is superior browser efficiency."[112] Users obviously save by using less bandwidth with the BlackBerry. Operators also gain, and the Rysavy report presented a hypothetical example that showed an operator with fifty million subscribers, of which 20% used smart phones and 40% of those are BlackBerrys, could save over $100 million a year in operating costs.[113]

The committee urges handset manufacturers, software developers and wireless operators to pay attention to spectrum efficiency.

RECOMMENDATION 18

Industry Canada, in establishing policies to allocate and price spectrum, provide incentives for the efficient use of spectrum.

111. Research in Motion (RIM), 17 November 2009. http://www.parl.gc.ca/40/2/parlbus/commbus/senate/Com-e/tran-e/08evb-e.htm?Language=E&Parl=40&Ses=2&comm_id=19

112. Rysavy Research, *Mobile Broadband Capacity Constraints and the Need for Optimization*, 16 February 2010 (updated 24 February 2010), p. 26. http://www.rysavy.com/Articles/2010_02_Rysavy_Mobile_Broadband_Capacity_Constraints.pdf

113. Rysavy Research, *Mobile Broadband Capacity Constraints and the Need for Optimization*, 16 February 2010 (updated 24 February 2010), p. 26. http://www.rysavy.com/Articles/2010_02_Rysavy_Mobile_Broadband_Capacity_Constraints.pdf

CHAPTER 4

4 CONCLUSIONS

Without stronger competition and better government policies, Canadians are doomed to be digital tourists in a century being shaped by digital communications.

Over twenty countries now have comprehensive digital plans, while Canada is at the consultations stage for one. In 1998, Estonia began implementing a digital policy, and Estonians today are truly digital citizens. They have paperless cabinet meetings, e-voting, digital IDs, and secure, online access by citizens to their government files. While other countries finished or consulted on digital plans, Estonians were taking advantage of the versatility of digital communications, from filing tax returns online (97% of Estonians file online) to paying for parking or bus tickets with their cell phones.

Canada can follow this example and develop a strategy for an inclusive digital society that allows all Canadians to become digital citizens. It is imperative that Canadians in rural and remote areas be part of this digital society.

The government should avoid the current international game of focusing on super-fast broadband speeds or on certain advanced technologies (such as fibre optics). To do so is expensive, can overlap private-sector investment and can widen digital divides. Instead, the government should determine the broadband speed required to access basic digital services (health, education or other online services, whether provided by the public or private sector), and focus government policy on bringing this broadband speed to all Canadians, whether in cities or in rural and remote regions.

The government must also lead by example. It must be involved in a digital society to the extent that it looks to digital technology to run itself and to deliver its services. Citizens, given adequate broadband access, should look to online government as a natural first choice for obtaining service and not as an alternative to traditional delivery methods. The new Minister for Digital Policy is responsible for seeing that all government departments and agencies improve their digital performance each year, and that better ways are constantly being developed to make it easier and more attractive for all citizens to be part of a digital society.

The need for strong competition can be seen in the mobile phone sector. In the recent past, Canadians faced a cozy oligopoly that allowed the three dominant firms to charge activation fees, system access fees and to impose relatively long (three-year) contracts. Now the industry is more competitive, and consumers are beginning to see the benefits. There are still irritants, such as bill shocks from high roaming charges, but there has been downward pressure on prices and improved terms for cell phone users.

With a more competitive market, more Canadians may use cell phones (a higher penetration rate) and they may use them in more versatile ways, helping Canada become a true digital society.

APPENDIX 1

List of recommendations

RECOMMENDATION 1

Canada should present a strategy for an inclusive digital society.

RECOMMENDATION 2

Canada should, in conjunction with the presentation of a strategy for an inclusive digital society, appoint a Minister for Digital Policy, who would take over the oversight of the strategy from the Minister of Industry.

RECOMMENDATION 3

The Minister of Industry in the Digital Strategy should not focus on any particular technology or speed for increased broadband coverage in Canada.

RECOMMENDATION 4

The Minister of Industry in the Digital Strategy should focus on the broadband speeds necessary to bring essential digital services to all citizens.

RECOMMENDATION 5

The government in its digital strategy should define universal as 100 per cent of its citizens.

RECOMMENDATION 6

The government should use all the proceeds from spectrum auctions to provide high-speed Internet (broadband) access for rural and remote areas.

RECOMMENDATION 7

The Minister for Digital Policy should receive an annual report from each department outlining: (a) its progress in making its programs more accessible and easier to use over the Internet; (b) its digital goals for the coming year; and (c) any special Information Technology needs or concerns.

RECOMMENDATION 8

Within one year from the release of the Digital Strategy, cabinet meetings should be paperless.

RECOMMENDATION 9

The Minister for Digital Policy should work with his ministerial colleagues to develop a secure Internet platform (modelled on Estonia's X-roads project) that would allow citizens to review their government files over the Internet.

RECOMMENDATION 10

Elections Canada should move expeditiously to develop major test projects involving e-Registration and e-Voting.

RECOMMENDATION 11

That the government examine the possible necessity of having digital IDs to have a viable, comprehensive and secure digital society.

RECOMMENDATION 12

The Minister for Digital Policy and other federal ministers should work with their provincial counterparts to develop a comprehensive digital literacy programs that can become an integral part of the education system.

RECOMMENDATION 13

Industry Canada and the Canadian Radio-television and Telecommunications Commission should work with the Canadian Wireless Telecommunications Association and individual Canadian wireless service providers to develop a technological procedure for informing users when their usage will push the monthly bill past a set limit.

RECOMMENDATION 14

The government should pursue open access policies with respect to telecommunications infrastructure as a means of sustaining or improving competition in the telecommunications sector.

RECOMMENDATION 15

The government should change the requirement for current spectrum licence holders to spend 2% of revenue on research and development and have the money redirected for the deployment of broadband to areas currently unserved.

RECOMMENDATION 16

Industry Canada, in establishing policies to allocate and price spectrum, promote wireless service in currently unserved or underserved areas.

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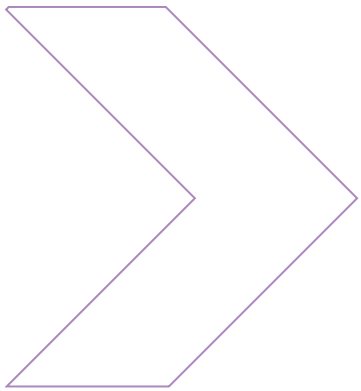

APPENDIX 2

List of witnesses

LIST OF WITNESSES

ORGANIZATION	NAME/TITLE	DATE OF APPEARANCE
	40th Parliament – 3rd Session	
Information Technology Association of Canada	Bernard Courtois, President and Chief Executive Officer Brendan Glauser, Manager, Communications	April 28, 2010
Bell Aliant	Denis E. Henry, Vice-President, Regulatory and Government Affairs and Chief of Privacy	March 30, 2010
Bell Canada	Mirko Bibic, Senior Vice-President, Regulatory and Government Affairs David Krause, Director, Economic Analysis	March 30, 2010
	40th Parliament – 2nd Session	
Office of the Privacy Commissioner of Canada	Jennifer Stoddart, Privacy Commissioner of Canada Elizabeth Denham, Assistant Privacy Commissioner of Canada Steve Johnston, Senior Security and Technology Advisor	December 8, 2009
Office of the Commissioner for Complaints for Telecommunications Services Inc.	Howard Maker, Commissioner for Complaints for Telecommunications Services Josée Thibault, Director of Complaints and Inquiries	December 8, 2009
Telus	Michael Hennessy, Senior Vice-President, Government and Regulatory Affairs Craig McTaggart, Director, Internet Policy	November 25, 2009
TerreStar Canada	André Tremblay, President and Chief Executive Officer Jan Skora, Regulatory Advisor, Jan Skora Consulting Services Inc.	November 18, 2009
Research In Motion	Robert Crow, Vice-President, Industry, Government and University Affairs Morgan Elliott, Director, Government Relations	November 17, 2009
Rogers Communications Inc.	Bob Berner, Executive Vice-President Network and Chief Technology Officer Ken Engelhart, Senior Vice-President, Regulatory Sylvain Roy, Regional President, Quebec Dermot O'Carroll, Senior Vice-President, Network Engineering and Operations	November 3, 2009

ORGANIZATION	NAME/TITLE	DATE OF APPEARANCE
	40th Parliament – 2nd Session	
DragonWave Inc.	Erik Boch, Co-Founder, Chief Technology Officer, Vice-President of Engineering	October 28, 2009
MTS Allstream	Teresa Griffin-Muir, Vice-President, Regulatory Affairs Jenny Crowe, Director, Regulatory Law	October 28, 2009
Media Awareness Network	Jane Tallim, Co-Executive Director Cathy Wing, Co-Executive Director	October 27, 2009
Globalive Wireless Management Corp.	Kenneth Campbell, Chief Executive Officer	October 21, 2009
Public Interest Advocacy Centre	Michael Janigan, Executive Director and General Counsel Michael De Santis	October 7, 2009
Alberta SuperNet	Erwin Loewen, Director, SuperNet, Technology Services, Service Alberta Michelle Chapeski, Project Support Analyst, SuperNet, Service Operations, Service Alberta	October 7, 2009
SaskTel	Robert Watson, President and CEO John Meldrum, Vice President of Regulatory Affairs and Corporate Counsel	September 30, 2009
Canadian Wireless Telecommunications Association	Bernard Lord, President and CEO Jim Patrick, Vice President, Government Affairs	September 29, 2009
Industry Canada	Helen McDonald, Assistant Deputy Minister, Spectrum, Information Technologies and Telecommunications Louis LePage, Manager, Industry Framework, Industry Framework Policy Shari Scott, Manager, Policy and Communications, Broadband Canada	September 29, 2009

LIST OF WITNESSES

ORGANIZATION	NAME/TITLE	DATE OF APPEARANCE
	40th Parliament – 2nd Session	
Barrett Xplore	John Maduri, CEO	June 3, 2009
University of Ottawa	Michael Geist, Law Professor	May 26, 2009
Industry Canada	Keith Parsonage, Director General, Information and Communications Technologies Branch	May 12, 2009
Canadian Radio-television Telecommunications Commission	John Traversy, Executive Director, Telecommunications Michel Murray, Acting Director, Decisions and Operations, Telecommunications Bill Mason, Manager, Competition Implementation and Technology Steve Malowany, Manager, Financial and Technical Reports	April 22, 2009
Industry Canada	Len St. Aubin, Director General, Telecommunications Policy Branch Pamela Miller, Senior Director, Business and Regulatory Analysis Louis LePage, Manager, Industry Framework, Industry Framework Policy	April 1, 2009

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