4 CANADIAN AND US BROADBAND POLICIES A Comparative Analysis

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Broadband is becoming increasingly important for rural economic activities and for the delivery of education, health care, and other social services. Industry Canada (2009) notes: “Broadband Internet access is viewed as essential infrastructure for participating in today’s economy, as it enables citizens, businesses and institutions to access information, services and opportunities that could otherwise be out of reach.” On a nationwide basis, Canada currently ranks tenth among Organisation for Economic Co-operation and Development (OECD) nations in broadband access, and the United States ranks fifteenth. At the same time, both Canada and the United States have major gaps in broadband availability in rural areas.

Both countries have long recognized the importance of communications for social and economic development. The Canadian Department of Communications’ Instant World report in 1970 heralded a new era of interconnected citizens and instantaneous access to information long before the Internet came into being. Both countries invested in experimental communications satellites, and supported projects to explore their potential for telemedicine, distance education, and cultural exchanges. Commercial satellites were then launched to provide national television distribution and voice and video services for remote areas, primarily in the North. In the 1990s, the United States proposed a National Information Infrastructure (NII) initiative to connect
Americans to the Internet. Canada proposed a national information highway that would link Canadians and provide access to new information services. Currently, Industry Canada is proposing a new initiative on the so-called digital economy that would focus on applications and impacts of information and communication technologies (ICTs), including broadband (Industry Canada 2009b).

Both countries recognized internal digital divides that left rural and remote communities and low-income households cut off from these new opportunities, and both have adopted policy and funding strategies to attempt to bridge these gaps. Canadian federal initiatives have brought broadband to remote Indigenous communities across the Arctic and to remote regions of some Canadian provinces. The United States has provided subsidies for broadband access to communities through schools and libraries, and grants and loans to rural carriers to upgrade their networks for Internet services. However, access can be expensive and quality of service inadequate in these remote areas. Also, there are still rural areas, typically with low population density, that do not have broadband access or where broadband is only available via individual satellite installations. For example, the Canadian Radio-television and Telecommunications Commission’s (CRTC) 2009 Communications Monitoring Report states that some 6 percent of Canadian households currently lack broadband (1.5 Mbps) access. In rural areas, that figure is closer to 22 percent (Canadian Radio-television and Telecommunications Commission 2009).

**BROADBAND: A MOVING TARGET**

Industry Canada (2009a) has defined broadband as a speed of at least 1.5 Mbps (presumably downstream). It further defines unserved Canadians as “those without Internet access or with dial-up service only” and underserved Canadians as “those who may be able to access the Internet using a connection with a speed less than 1.5 Mbps.” It notes that “at 1.5 Mbps, a customer can make a voice call over the Internet, download an audio CD in seven minutes and experience video-quality streaming / video conferencing. It is also possible to use multiple applications at the same time, enabling consumers to make a voice-over-Internet telephone call while downloading a document” (Industry Canada 2009c).

The United States has adopted a higher speed target of actual download speed of 4 Mbps for universal broadband in its National Broadband Plan, although the plan also calls for a much higher target: 100 million households with 100 Mbps by 2020 (Federal Communications Commission 2010a). Other countries have chosen targets from 0.5 Mbps to 2 Mbps (see table 4.1).
Table 4.1: Universal broadband speed goals for selected countries

<table>
<thead>
<tr>
<th>Country</th>
<th>Download speed</th>
<th>Target date</th>
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<tbody>
<tr>
<td>United States</td>
<td>4 Mbps</td>
<td>2020</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>2 Mbps</td>
<td>2012</td>
</tr>
<tr>
<td>Australia</td>
<td>2 Mbps</td>
<td>2018</td>
</tr>
<tr>
<td>Canada</td>
<td>1.5 Mbps</td>
<td>2010?</td>
</tr>
<tr>
<td>South Korea</td>
<td>1 Mbps</td>
<td>2008</td>
</tr>
<tr>
<td>Finland</td>
<td>1 Mbps</td>
<td>2009</td>
</tr>
<tr>
<td>Ireland</td>
<td>1 Mbps</td>
<td>2010</td>
</tr>
<tr>
<td>Germany</td>
<td>1 Mbps</td>
<td>2010</td>
</tr>
<tr>
<td>Australia</td>
<td>0.5 Mbps</td>
<td>2010</td>
</tr>
<tr>
<td>Denmark</td>
<td>0.5 Mbps</td>
<td>2010</td>
</tr>
<tr>
<td>France</td>
<td>0.5 Mbps</td>
<td>2010</td>
</tr>
</tbody>
</table>

Source: Federal Communications Commission 2010a, 135.

More Bandwidth but Limited Competition

Each country typically has very little broadband competition, with a duopoly of DSL and cable in most urban areas, and only one provider in rural areas that have broadband service. Both countries rely primarily on facilities-based competition, with little use of unbundling. In Canada, according to CRTC data, incumbent cable companies receive 48 percent of Internet access revenues, and incumbent telecom companies receive 40 percent. The top five Canadian ISPs (most owned by the incumbent carriers) captured 76 percent of Internet access revenues in 2008 (Canadian Radio-television and Telecommunications Commission 2009).

Fixed wireless was considered a promising means to increase competition, but most community wireless networks have not been sustainable (Hudson 2009a). New high-speed mobile networks may offer a competitive option, but are not likely to reach isolated residents. The CRTC estimates that 91 percent of Canadians are covered by mobile broadband (Canadian Radio-television and Telecommunications Commission 2009). Canada’s major mobile carriers claim that mobile broadband will be available to 90 percent of their current mobile coverage areas (CRTC, pers. comm. 2009). However, mobile broadband pricing is considerably higher than fixed service, and quality of service is variable.

Satellite service is another option, particularly for remote areas. The United States and Canada have national satellite coverage that can provide two-way
broadband, although the signal delay using geostationary satellites (located 36,000 km above the equator) is noticeable, and prices tend to be higher than for terrestrial services. Both countries use satellites to reach remote communities, and satellite services using small terminals (VSATs) are available for otherwise unserved households, businesses, and organizations. Ubiquitous broadband could be made available today throughout North America by providing a subsidy for satellite access, if needed, but neither country has adopted this approach.

Satellite proponents argue that the next generation of satellites will have much greater capacity at only slightly higher costs so that the costs (and ostensibly price to end users) of satellite bandwidth should be significantly cheaper (Barrett Xplore, pers. comm. November 2009). Yet rural and remote providers are increasingly opting for terrestrial facilities to replace satellite service. Alaskan consortia have won two stimulus grants to install terrestrial wireless middle mile and last mile networks to provide broadband connectivity to more than sixty villages, and a consortium including KNet (see chapter 14 in this volume), Bell Aliant, and public sector entities requested federal stimulus funding to install optical fibre to link remote communities in Northwestern Ontario.

**RURAL INFRASTRUCTURE INVESTMENTS**

The Canadian federal government sponsored several innovative initiatives to extend broadband to rural and remote areas in the 1990s, such as BRAND (Broadband Access for Rural and Northern Development Pilot Program). However, no new funding has been provided to continue or replace BRAND. The government has subsidized satellite service for northern communities through its Northern Satellite Initiative, which continues through 2011 (Industry Canada 2004). Satellite broadband is also available throughout much of rural Canada, but at prices significantly higher than comparable service (on the same Anik satellite) in the United States.

Strategies to achieve universal broadband in Canada have focused on capital subsidies, with the apparent assumption that availability is all that is required to achieve access. The CRTC took steps to fund rural broadband when it required incumbent local exchange carriers (ILECs) to use established deferral accounts after the introduction of price cap regulation in 2002. Up to CAD $650 million from the accounts was to be used to support initiatives to expand broadband services to rural and remote communities and improve accessibility of telecommunications services for persons with disabilities (Canadian Radio-television and Telecommunications Commission 2008).

Two US federal agencies provide funding for rural telecommunications infrastructure. The Rural Utilities Service (RUS), in the Department of Agriculture, provides low-interest loans and some grants to rural communications
carriers to extend and upgrade their networks. The National Telecommunications and Information Administration (NTIA), in the Department of Commerce, has administered several grant programs that included support for rural broadcasting and communications.

In 2009, both countries announced broadband infrastructure grants as part of national economic stimulus initiatives. The US American Recovery and Reinvestment Act (ARRA), signed in February 2009, appropriated USD $7.2 billion “to begin the process of significantly expanding the reach and quality of broadband services.” NTIA received USD $4.7 billion to address the following goals:

- Provide access in unserved areas and improved access in underserved areas
- Provide broadband education, awareness, training, access, equipment, and support
- Improve access and use by public safety agencies
- Stimulate broadband demand, economic growth, and job creation.

Grants were to be awarded for infrastructure, public computer centres, projects to foster sustainable broadband adoption, and for broadband data collection and mapping. The RUS received USD $2.5 billion specifically for rural infrastructure projects. Other stimulus initiatives include funding for electronic health record systems, ICTs in education, “smart grids” to manage distribution and utilization of energy, and communication systems for public safety and security (American Recovery and Reinvestment Act of 2009).

In September 2009, Industry Canada announced “Connecting Rural Canadians,” a CAD $225 million stimulus program to extend “essential infrastructure” in remote and rural areas. Projects required a 50 percent match in funds, except for programs serving First Nations, and a five-year sustainability plan (Industry Canada 2009a). Industry Canada has adopted 1.5 Mbps as a baseline definition for broadband service availability and has developed a map of broadband availability.

**STATE AND PROVINCIAL INITIATIVES**

Meanwhile, faced with frustrated residents, businesses, and social service providers who were without broadband access, many American states decided to tackle the problem of getting broadband to all their residents. Several have authorized task forces to examine the status of broadband recommendations and to recommend policies to accelerate deployment. Among the strategies adopted or being proposed are various types of grants, deregulatory bargains, tax credits, and public-private partnerships. Several states have also made efforts to address barriers to adoption among lower-income, elderly,
and minority populations through various programs and grants for training, outreach, and content development (Hudson 2008).

Like US states, many Canadian provinces have recognized the importance of broadband to their economic development and are providing various forms of support to extend broadband access, particularly in rural areas. For example, Ontario has an e-government initiative known as Digital Ontario that includes support for community projects. Ontario and the federal government provided CAD $170 million to extend broadband throughout counties in eastern Ontario (Eastern Ontario Warden’s Caucus 2009). The British Columbia government has provided subsidies to Telus to extend rural broadband infrastructure through its Network BC initiatives. Alberta’s SuperNet is a public-private partnership with carriers and industry that has built a broadband backbone throughout the province. Nova Scotia, New Brunswick, and Prince Edward Island have created incentives for investment from regional carriers, while government-owned SaskTel is extending broadband facilities throughout rural Saskatchewan.

**AFFORDABILITY**

Access requires both availability and affordability. A Canadian consumer representative noted that not everyone could afford to pay for the Internet: “There is a difference between service existing and service being available to all” (quoted in Ditchburn 2010). As noted below, affordability remains an issue even where broadband is available to individual households, especially if service is delivered by satellite or mobile wireless.

In both countries, broadband via satellite and wireless is substantially more expensive than that offered by DSL and cable providers, although US prices are generally substantially cheaper. Satellite broadband for individual households is an option in rural and remote areas where neither terrestrial DSL/cable nor line-of-site wireless is available. However, the price of satellite equipment and service can be prohibitively expensive for some households. For example, the price of basic satellite broadband (download up to 512 Kbps) using XPlornet is CAD $50 per month, plus initial charges for equipment ranging from CAD $99 with a three-year contract to CAD $399 with no contract, plus installation charges, a CAD $99 set-up fee, and CAD $75 annual universal service fee. Thus a person who did not want a three-year contract would have to pay CAD $500 for equipment and initial fees, plus an installation charge, plus more than CAD $50 per month for service at best one-third the speed designated as broadband by Industry Canada.

The CRTC estimates that 91 percent of Canadians are covered by mobile broadband (Canadian Radio-television and Telecommunications Commission
Canada’s major mobile carriers claim that mobile broadband will be available to 90 percent of their current mobile coverage areas (CRTC, pers. comm. November 2009). However, at present, mobile broadband pricing is considerably higher than fixed service, and the quality of service is variable. For example, Telus Mobility currently charges CAD $65 per month for maximum data usage of 5 GB, plus 5 cents for each additional MB with no specified speed, while for DSL with speeds of 1.5 to 6 Mbps, Telus charges CAD $37 per month for 60 GB usage plus CAD $2 per additional GB.2

**Sustainability**

In addition to having sufficient capital investment and offering affordable rates, broadband services must operate sustainably. In Canada, although there have been intermittent federal projects to contribute to the costs of connectivity, to date there has been no long-term strategy for the sustainability of rural/remote Internet and broadband connectivity. Examples of operating support include federally subsidized satellite service for northern communities through the Northern Satellite Initiative, which continues through 2011, but no follow-on support has been announced (Industry Canada 2004). Another federal initiative, the Community Access Program (CAP) has facilitated free community Internet access at more than three thousand locations across Canada since 1994. The federal government announced severe cuts to the CAD $14-million-a-year program that would halt funding for 93 percent of the CAP sites in March 2010, although it subsequently rescinded the cuts, stating that funding would come from other sources (apparently, Connecting Rural Canadians).

In discussing the decision to continue CAP support in the near term, Tony Clement, the minister for Industry Canada, noted: “We don’t want to get anybody left in the lurch by having the funding cut this year, while the broadband strategy to households is still rolling out” (quoted in Ditchburn 2010). He added that funding for libraries and community centres would be decreased when more Canadians have the opportunity to pay for high-speed Internet at home. Yet such services may not only be unaffordable for some residents but unsustainable for providers in some high-cost or low-revenue areas.

**Universal Service Support**

The means of financing expansion of services to high-cost and/or low-income regions traditionally was cross subsidies, generally internal cross-subsidies from high margin services. Typically, a regulator would designate regions to be served or quality of service (QoS) targets to be met as a condition of granting or renewing a license and would authorize tariffs designed to generate
revenue from services such as international calls or domestic long distance that could be then directed to subsidizing expansion of or rates for services in other areas. With the introduction of competition, subsidies had to become explicit so that providers could not transfer revenues from still-monopolized services to competitive offerings in order to drive out competitors. Funds for such subsidies could come from government budgets, but to avoid relying on governments, mechanisms were set up to channel some revenue from all the carriers (or all in a certain category) into a fund for redistribution as subsidies to address universal service or access.

US universal service programs were originally designed to subsidize voice telephony access for low-income residents and to extend reasonably priced telephone services to rural and other underserved areas. The Telecommunications Act of 1996 expanded the definition of universal service to include schools, libraries, and rural health care facilities, and access to “advanced services” (Telecommunications Act of 1996). The goal was to provide opportunities for students and community residents to take advantage of these advanced services, even if they were not yet available in their homes, to help bridge what came to be called the digital divide. Funds come from telecommunications carriers, which are required to contribute a set portion of their revenues to the universal service funds (USF) (Hudson 2009b). Other USF support is provided for carriers in high-cost regions and for low-income residents. These programs are likely to be modified in the implementation of the 2010 National Broadband Plan (see below).

In the United States, the E-Rate (short for “education rate”) created by the Telecommunications Act of 1996 provides discounts on a wide variety of telecommunications, Internet access and internal connections for schools and libraries. The applicable discount rate is based on a school’s economic need and whether it is located in an urban or rural area. Up to USD $2.25 billion worth of discounts can be made available each year. Approved costs are billed directly to the Universal Service Administrative Company (USAC), up to the limit of the subsidy. Schools and libraries are responsible for the remainder, and must demonstrate that they can cover their portion of the costs (Hudson 2009b).

Approved schools and libraries post their requirements online, where they are open for competitive bids. If no competitors respond during the designated time period, the school or library may contract with the local incumbent operator. The result in many small communities has been that the school has become an anchor tenant for Internet access. In Alaska, which has many remote villages similar to Indigenous communities in the Canadian North, the E-Rate subsidy had brought Internet access to most village schools. One of the competitive providers concluded that the school subsidy was critical to its business case to bring broadband to the villages (primarily by satellite), and subsequently
installed broadband wireless to cover the villages, with price for individual access not to exceed the price in Anchorage, the largest city (Hudson 2006).

Connectivity for rural health services is also supported from universal service funds in the United States. In Alaska, the AFHCAN Telehealth System relies on this subsidy to connect more than 250 sites, including links between more than 150 village clinics and regional hospitals (Hudson 2006). Up to USD $2.25 billion per year is available for schools and libraries. A further USD $400 million is available for rural health care but has been significantly underutilized. In 2007, the Federal Communications Commission (FCC) announced a one-time allocation of more than USD $417 million for construction of statewide or regional broadband telehealth networks (Hudson 2009b). Other USF support is provided for carriers in high-cost regions and for low-income residents. These programs are currently under review.

Although Industry Canada has underwritten some connectivity costs for rural and remote areas for limited periods, there is no Canadian equivalent of the US E-Rate program, which is in effect a mandated sustainability subsidy targeting service for schools and libraries.

**NATIONAL BROADBAND POLICIES**

As required in the US stimulus legislation, the FCC announced a National Broadband Plan in March 2010 (Federal Communications Commission 2010a). Its proposals include creation of a Connect America Fund and reform of current universal service policies to provide incentives to extend broadband services. The plan’s goals included:

- At least 100 million US 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.
- Every American should have affordable access to robust broadband service and the means and skills to subscribe if they so choose.
- Every community should have affordable access to at least 1 Gbps broadband service to anchor institutions such as schools, hospitals, and government buildings.

The plan also provides a detailed analysis of the steps the FCC has determined will be required to achieve these goals under four major headings:

- Establishing competition policies, including pricing, privacy, and transparency
- Ensuring efficient allocation and use of government-owned and government-influenced assets, such as spectrum and rights-of-way
- Creating incentives for universal availability and adoption of broadband
- Updating policies, setting standards, and aligning incentives to maximize use for national priorities, in fields such as health, education, and public safety
Of these, the most relevant goals and targets for comparison with Canadian broadband policy concern broadband access, including changes to universal service definitions and support mechanisms.

The National Broadband Plan states that the FCC’s long-term goal should be “to replace all the legacy High-Cost programs with a new program that preserves the connectivity that Americans have today and advances universal broadband in the 21st century” (Federal Communications Commission 2010a, 145). Following the publication of the Broadband Plan, the FCC accordingly announced a 2010 Broadband Action Agenda with steps identified to achieve the four key goals. The steps designed to achieve universal access to broadband include:

- Carry out a “once-in-a-generation transformation of the Universal Service Fund over the next ten years to support broadband service . . . by converting existing subsidy mechanisms over time from ‘POTS’ (plain old telephone service) to broadband, without increasing the size of the fund over the current baseline projection.”
- Upgrade the E-Rate program (which subsidizes Internet connectivity for schools and libraries: see above) to benefit students and others across the country by making broadband more accessible (possibly by providing support for additional means of community access through schools or other local institutions).
- Reform and upgrade current rural health connectivity subsidies “to connect more public health facilities to high-speed Internet facilities and to foster telemedicine applications and services.”
- Create a Health Care Infrastructure Fund to support the deployment of dedicated health care networks to underserved areas.
- Create a “Connect America Fund to extend broadband service to unserved areas of the nation and to ensure affordable broadband service in high-cost areas.” The goal is provision of affordable broadband with at least 4 Mbps of actual download speed.
- Create a Mobility Fund to upgrade wireless coverage throughout the country to 3G or better. (Federal Communications Commission 2010b)

The National Broadband Plan concludes that private investment alone is unlikely to extend broadband in some areas of the country with low population density (Federal Communications Commission 2010a). The FCC began the universal service reform process through a Notice of Inquiry and Notice of Proposed Rulemaking on these universal service proposals in April 2010 (Federal Communications Commission 2010c).

In contrast, Canada lacks an explicit broadband policy. Industry Canada is proposing a new initiative on the digital economy that would focus on applications and impacts of ICTs, including broadband. Although considered a
regulator rather than policy maker, the Canadian Radio-Television and Telecommunications Commission also plays a role in policy. As noted above, the CRTC has designated deferral account funds of up to CAD $650 million for rural broadband upgrades and in February 2010 announced its intention to review its definition of basic service, last updated in 1998 (Canadian Radio-Television and Telecommunications Commission 2010).

**BEYOND INFRASTRUCTURE**

Although there are still gaps in availability of broadband in both Canada and the United States, the next steps in closing the digital divide and deriving socioeconomic value from infrastructure investments are to increase adoption and to develop and implement applications that address social and economic needs for information, e-services, access to markets, consultation with specialists, and so on. National data in the United States shows lower levels of broadband adoption among lower-income, rural, and some minority populations. Among non-adopters, lack of relevance is cited as main reason for not having broadband at home (Federal Communications Commission 2009). In both countries, research is needed to increase our understanding of the reasons for non- adoption, to develop strategies to encourage adoption, and to identify or develop relevant applications for users with limited ICT or English-language skills.

The United States and Canada are investing significant public funds in extending and upgrading broadband infrastructure and in providing regulatory incentives for carriers to extend broadband facilities. These initiatives should be evaluated to assess impacts the increased access has had on availability and effectiveness of health services, education and training, government programs and services, new or increased economic activities, and so on.

The next step in research should be to examine national level impacts, or barriers to impact. There are some macro-economic studies (see, for example, Waverman and Dasgupta 2009), but little field research exists that examines how broadband and related access to ICTs and applications can improve productivity, contribute to new economic activity, and help to grow and diversify regional and national economies. In both countries, we will need such research to foster a digital economy.

**NOTES**

1 Prices posted at www.xplornet.ca in April 2010. Italics added. In the United States, prices for satellite equipment from WildBlue that accesses the same Anik satellite are considerably lower and more flexible (no installation fee and an option to lease the equipment). See www.wildblue.com.

REFERENCES