8 Chapter 8

Connectivity: Completing the Job

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Reaffirming Canada's Commitment

Canada was among the first countries to recognize the potential for information and communications technologies (ICTs) to transform and enrich economic and social life. Since 1993, it has been the policy of the federal government and most provinces to increase the level of electronic "connectedness" of Canadian consumers and businesses to each other and to the world. Over the past decade, the federal government has made investments of close to $600 million toward advancing the connectivity agenda.

As a result of one of these investments, the federal government's SchoolNet program,[1] Canada became the first country in the world to connect all of its schools and libraries to the Internet. Industry Canada's Community Access Program[2] (CAP) now provides Internet access in a public setting to some 100 000 Canadians each day, and it has provided training to 19 500 community volunteers through its cross-Canada network of public Internet sites.

In 2000, the federal government set a policy goal of ensuring that broadband networks and services would be available to businesses and residents in every Canadian community. The National Broadband Task Force was established to recommend how the federal government's broadband access goal could be achieved. In response to the 2001 task force report,[3] Industry Canada launched the Broadband for Rural and Northern Development (BRAND) pilot program in 2002 and the National Satellite Initiative (NSI) in 2003.[4] In addition to the BRAND program, other federal government departments, provinces and territories have sponsored broadband access programs in various parts of Canada.

While these public sector investments were important, market forces played an even more significant role in making Canada a global leader in broadband deployment. By the mid-1990s, a vigorously competitive broadband market was developing in Canada. Both cable and telephone companies began offering high-speed access over upgraded facilities in urban centres in the mid- to late 1990s. Canadian cable companies were global pioneers, providing cable modem services as early as 1996. The subsequent large-scale deployment of broadband over DSL (digital subscriber line) technology by the incumbent Canadian telephone companies propelled Canada to the second-highest level of broadband service penetration in the world by 2003.

In 2000, the Organisation for Economic Co-operation and Development (OECD) began reporting on broadband penetration in its member countries. At that time, Canada's broadband penetration rate was 4.5 percent, measured by the number of broadband subscribers per 100 inhabitants. In the past five years, our broadband penetration rate has increased fourfold, and the share of the population who are paying subscribers now stands at 19.2 percent, according to the latest

1 For more information on SchoolNet, see website at: **http://www.schoolnet.ca/**

2 For more information on Community Access Program, see website at: **http://cap.ic.gc.ca/index.htm**

3 Report available online at: **http://broadband.gc.ca/pub/program/NBTF/index.html**

4 For more information on the federal government's broadband program, see website at: **http://www.broadband.gc.ca**

OECD statistics.[5] Using a different metric, the Canadian Radio-television and Telecommunications Commission (CRTC) reports that broadband access services are now available to 89 percent of all Canadian households, 98 percent of urban households and 69 percent of rural households. The Commission also reports that about 48 percent of households that have access to broadband subscribe to the service.[6]

The impressive growth of broadband in Canada over the past five years is mainly the result of the expansion of competitive commercial markets. The broadband initiatives of the federal, provincial and territorial governments have also played an important part in helping to close the "broadband divide." However, many rural and First Nations communities lack broadband access, and there are still unserved areas not far from major urban centres.

As discussed in Chapter 7, Information and Communications Technology Policy, the Panel believes the smart adoption of ICTs is essential to increasing Canada's productivity and competitiveness, improving the efficiency and quality of education, health care and other public services, and providing opportunities for all Canadians to participate in and contribute to our society.

Access to broadband is becoming a prerequisite for sharing in the economic and social benefits of a broad array of new ICT services and applications in the private and public sectors. This is the case in rural and remote areas of our country, just as it is in the more urban areas of southern Canada. Broadband access will make it possible to bring the following kinds of benefits to unserved areas of Canada:

- **Improved primary and secondary education and new opportunities for post-secondary education, training and lifelong learning:** Broadband can provide students, teachers, trainers and self-directed learners with access to online courses and educational materials, and connect them with colleagues and peers in order to share information and work together on projects.
- **Improved health care:** Broadband can help deliver better health care services to rural and remote areas by allowing medical professionals based in these areas to obtain diagnostic services and real-time assistance from colleagues in larger centres. It can also give residents of rural and remote areas improved access to information that may help prevent disease and promote healthy lifestyles.
- **New and improved business opportunities:** Broadband makes it possible to use innovative online marketing and e-commerce services to generate growth in tourism, recreation and other service industries, which are becoming important sources of employment in many rural and remote areas. Broadband access is also essential to improving the productivity and competitiveness of resource-based, agricultural and manufacturing industries.

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5 See OECD, *Broadband Statistics, June 2005*. Available online at: **http://www.oecd.org/document/16/0,2340,en_2649_34225_35526608_1_1_1_1,00.html**

6 CRTC, *Report to the Governor in Council: Status of Competition in Canadian Telecommunications Markets* (Ottawa: CRTC, October 2005), p. 91. Available online at: **http://www.crtc.gc.ca/eng/publications/reports/PolicyMonitoring/2005/gic2005.pdf**

- **Stronger rural and remote communities:** Broadband can help empower residents of rural and remote areas by improving access to information about public policy issues affecting their communities, and facilitating engagement in governance activities at every level from local to national.
- **Enhanced cultural opportunities:** Broadband opens access to a wide range of entertainment products and services. It also provides opportunities to develop new forms of cultural expression and preserve traditional languages and cultures.

As well as offering improved education, health care and economic opportunities, access to broadband in unserved areas of the country will help ensure all Canadians have the opportunity to participate in the "global information society."[7]

In the age of globally connected networks, distance no longer poses the kinds of obstacles to economic and social participation that it did in the past. Individuals and communities not only are consumers, but also are becoming producers of information products and services. Mass markets and standardized products are giving way to differentiated market segments and customized solutions. Diversity is being recognized as a potential source of strength in the global environment. Creativity and control are shifting from the centre toward the edge — in networks, in corporations, in communities and in countries.

In order to maximize Canada's potential, we need to leverage our geographic and demographic diversities and give everyone an opportunity to contribute to building a stronger, more prosperous country, no matter where they live. Social and economic inclusion should no longer be seen as a problem, but as an opportunity that must be seized.

While Canada has been acknowledged to be one of the most connected countries in the world, we must continually benchmark ourselves against other countries, and adjust our policies to continue to reap the potential economic and social benefits of evolving telecommunications technologies. If we fail to respond to the challenge of change, we run the risk of compromising our competitive position as one of the leaders of innovation in the 21st century global networked economy.

According to OECD data, Canada's broadband leadership position is slipping. In 2003, we were second among OECD countries in the number of subscribers to high-speed Internet services per 100 inhabitants. By June 2005, we had dropped to sixth.

Given the increasing importance of broadband access for full participation in 21st century society, the Panel believes the federal government should reaffirm its commitment to maintaining Canada's global broadband leadership and to ensuring that broadband access is available everywhere in the country.

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7 See **http://www.itu.int/WSIS** for information on the United Nations World Summit on the Information Society, which took place in Geneva in 2003 and Tunis in 2005, and for access to related information resources.

Recommendation 8-1

As a key part of its national ICT strategy, the federal government should

(a) ensure that Canada remains a global leader in the deployment of broadband networks, and

(b) immediately commence a program to ensure that affordable and reliable broadband services are available in all regions of Canada, including urban, rural and remote areas, by 2010 at the latest.

Canada is rightly proud of its achievements in reaching a high level of penetration of voice telecommunications services. Wireline and wireless voice services are available to more than 99 percent and almost 98 percent, respectively, of Canadian households, and more than 98 percent are connected to networks providing such services.[8] This penetration level is so high that it has been referred to as "universal" or "ubiquitous" coverage. In the Panel's view, Canada should aim to achieve comparably ubiquitous levels of broadband service penetration by 2010.

This is an ambitious target but, even if we reach this goal, the job of connecting Canadians through ubiquitous telecommunications networks will not be done. The challenge of achieving ubiquitous access to telecommunications networks is ongoing and evolves anew with each new generation of technology. In the 1990s, connecting all Canadian schools through dial-up modem was an innovative and pioneering objective, but today this objective is no longer sufficient. Current broadband networks represent a quantum advance over traditional telephone networks. However, they are only the latest stage in the evolution of telecommunications networks. They will be surpassed as the capacity of networks continues to evolve in response to demand for new services and applications. The fivefold increase in broadband speed that took place between 2000 and 2005 is the beginning of the broadband story, not the end.

As broadband and other technologies evolve, our continuing challenge will be to ensure that advanced telecommunications technologies become available to all Canadians within a reasonable period of time.

Recommendation 8-2

The federal government should continually monitor technological developments in the telecommunications sector, assess their economic and social implications, and adopt policies to ensure that Canada continues to be a leader in the deployment of advanced telecommunications services.

[8] Statistics Canada and CRTC Monitoring Report, 2005. The precise number for combined wireline and wireless penetration is 98.8 percent.

New Policy Foundations

General Approach

In Chapter 2, Policy Objectives and Regulation, the Panel sets out a number of fundamental principles that should guide Canada's telecommunications policy. Three of these principles are particularly relevant to the challenge of achieving ubiquitous broadband access. These are:

- to rely primarily on market forces to achieve telecommunications policy objectives
- to use well-targeted government measures in cases where the market has failed or is likely to do so
- to ensure that government measures are efficient and proportionate to their objectives.

In considering how to apply these principles to Canada's challenge of keeping its citizens among the most connected in the world, one should first determine how much competitive telecommunications markets can do on their own. In this regard, the Panel notes that decreases in the price of access technologies combined with the development of new wireless technologies like WiMAX and higher-capacity satellite services will allow previously uneconomic areas to be served by the market. Such areas are likely to be served by both regulated incumbent telephone and cable companies and by new entrants, many of whom are likely to use low-cost new wireless services.

In seeking to apply its general policy principles to the challenge of achieving ubiquitous broadband access, the Panel faces two key questions:

- Can market forces alone be relied on to meet this objective?
- If not, what kind of government action would be needed?

Many participants in the Panel's Access Forum in Whitehorse in September 2005, including provincial and territorial governments and local communities, were of the view that market forces alone would not provide ubiquitous broadband access in the near future. Many of the submissions sent to the Panel in response to its Consultation Paper[9] shared this perspective. However, a consultant's study submitted to the Panel in the first round of written consultations concluded that market forces alone could result in ubiquitous broadband access to broadband by 2010.[10] This finding was challenged in the second round of written consultations and was questioned by other parties.

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9 Telecommunications Policy Review Panel, *Consultation Paper* (Ottawa: the Panel, June 6, 2005). Available online at: **http://www.telecomreview.ca/epic/internet/intprp_gecrt.nsf/vwapj/Consultation_Paper_Final_Clean_E.pdf/$FILE/Consultation_Paper-Final-Clean_E.pdf**

10 See SECOR Consulting, "Broadband Access for Every Canadian Home: The Business Case" (Montréal: Bell Canada, August 2005). Available online at: **http://www.telecomreview.ca/epic/internet/intprp-gecrt.nsf/vwapj/Appendix_E3.pdf/$FILE/Appendix_E3.pdf**

To better understand these conflicting views, the Panel conducted its own study to assist in estimating whether market forces alone can achieve the objective of achieving ubiquitous broadband availability by the end of this decade. The study began by constructing a highly detailed map of Canada that identified areas where broadband is not currently available and showed the location of the network access point nearest to each unserved area. Using geographic, engineering and financial data, the study then estimated the cost of providing broadband access in these unserved areas through the most cost-efficient solutions. Using population data and benchmarks from the business cases of existing broadband service providers in rural and remote areas, the study segmented the currently unserved market. It identified areas where a viable business case might exist if least-cost technologies were used to extend broadband networks to these areas and to provide access within them. It also identified areas where some form of subsidy likely would be required to make broadband available on a basis that would be sustainable, scalable and upgradable as markets grow and technology evolves.

As noted previously, the CRTC has reported that approximately 89 percent of Canadian households currently have access to broadband. On the basis of its study, the Panel estimates that ongoing initiatives will increase this number to 91 percent by the end of 2007. The Panel's analysis further suggests that there is a potentially positive business case for providing broadband access to a significant number of currently unserved Canadians by using low-cost wireless technologies, assuming that the private sector chooses to make such an investment. Nevertheless, the study finds that there is not a viable business case in all areas and that, without some form of government intervention, a significant number of Canadians will remain without broadband access. The study concludes that after taking into account the maximum likely level of "sustainable" private sector investment, approximately 1.5 million people — about 5 percent of Canada's population — will remain unserved.[11]

Taking into account the findings of its study (see Annex A), the submissions of interested parties and the other information available to it, the Panel concludes that market forces alone will not provide Canada with ubiquitous, affordable broadband access by 2010.

Recommendation 8-3

Federal government policy should recognize that market forces

(a) will continue to expand the availability of broadband access across the country, but

(b) will not on their own achieve the policy objective of deploying ubiquitous broadband access by 2010, particularly in rural and remote areas.

[11] The Panel's study was based on average estimated costs, prices and take-up rates for extending broadband service to unserved areas. Actual figures are likely to vary significantly among unserved areas because of differences in terrain and population density. On February 16, 2006, the CRTC released Telecom Decision CRTC 2006-9, "Disposition of Funds in the Deferral Accounts," which decided that funds set aside in so-called "deferral accounts" by a number of incumbent local exchange carriers (ILECs) should be directed primarily to the expansion of broadband services in these ILECs' territories. The Panel's analysis indicates that, even if all of these deferral account funds were directed to expanding broadband services in uneconomic areas of the relevant ILECs, a significant number of Canadians would remain without broadband access.

Funding Mechanisms

As stated throughout this report, the Panel believes as a matter of general principle the federal government should rely primarily on market forces to achieve Canada's telecommunications policy objectives, but that well-targeted, proportionate government measures should be used in cases where the market fails to do so.

Some submissions to the Panel proposed that government subsidies should be used to extend broadband access in rural and remote areas. Others suggested that broadband access should be funded by the telecommunications industry itself; for example, through a contribution fund of the kind the CRTC has used to subsidize the cost of providing basic service to customers in high-cost service areas.

As discussed in Chapter 3, Economic Regulation, in the monopoly era of telecommunications, cross-subsidies between various telecommunications services helped achieve universal, affordable access to basic service. However, with the onset of competition, such cross-subsidies have gradually been replaced by more targeted subsidies. The CRTC-regulated contribution fund is a more direct form of subsidy that continues to play an important role in supporting universal access to basic telecommunications services today. The Panel supports the continuing use of the contribution fund for this purpose.

In general, however, the Panel believes cross-subsidies between classes of telecommunications service consumers are an inappropriate means of achieving policy objectives in a competitive telecommunications industry. If inter-service subsidies remain small, like the CRTC's contribution fund subsidies, then economic distortions and inefficiencies are minimized. However, if the contribution fund were expanded significantly to finance broadband expansion programs, the price distortions and inefficiencies would increase to an unacceptable level. This would distort markets and result in an inefficient allocation of resources by artificially lowering the prices of some services and raising the prices of others.

Internal cross-subsidies are also undesirable from the viewpoint of social equity. Since the cost of providing subsidies is passed onto consumers, and since all consumers contribute at the same rate regardless of income, internal cross-subsidies effectively impose a regressive tax on the customers of telecommunications service providers.

The Panel is also concerned that the changing structure of the telecommunications industry makes internal cross-subsidies increasingly unsustainable. Previously, the majority of service providers could be included in such programs, whether they were incumbents or new entrants. However, that opportunity is eroding as new types of services provided by new types of competitors emerge from outside the telecommunications industry, for example, Internet-based providers of PC-to-PC voice over Internet Protocol (VoIP) services.

In the changing telecommunications environment described in Chapter 1, a telecommunications provider or subscriber tax designed to subsidize the extension of broadband would put an unfair burden on traditional telecommunications providers and their customers, while some new entrants such as web-based service providers and their customers would be exempt. These solutions appear neither efficient nor fair.

For all these reasons, the Panel has concluded that the CRTC contribution fund should not be used to finance expansion of broadband access.

Ubiquitous broadband availability is a desirable national policy objective in terms of both economic and social policy. In line with the basic economic and policy principles expressed in this report, the Panel believes where the market fails, the cost of achieving important economic and social goals should be shared by all Canadians. Accordingly, the Panel believes federal government tax revenues should be used to fund an efficient, targeted subsidy program designed to achieve ubiquitous broadband access. In this report, the Panel proposes a specific form of subsidy program that is tailored to meet the policy objective of ubiquitous broadband access in an effective and economically efficient manner.

Recommendation 8-4

A specific, targeted government subsidy program, the Ubiquitous Canadian Access Network/ Ubiquité Canada or U-CAN program, should be established to ensure that broadband access is made available to Canadians in areas where commercial operators are not providing service and are unlikely to do so for economic reasons.

Building on Past Broadband Initiatives

A number of lessons can be learned from Canada's previous broadband programs. These were pointed out to the Panel through written submissions received in response to the Consultation Paper, discussions at the Whitehorse Access Forum and the Gatineau Policy Forum, and consultations with various stakeholders. These lessons should be applied to the design, development and implementation of the U-CAN program. This will help ensure that Canadian taxpayers' money is well spent, and that the goal of achieving ubiquitous access to broadband by 2010 is achieved as efficiently and effectively as possible.

Including All Canadians

BRAND was successful in connecting over 900 communities that would not otherwise have had access to broadband. However, BRAND was designed as a pilot program. Its limited funding was insufficient to respond to all the requests it received, let alone to connect all communities. Since there were more applications for participation in the program than could be funded, a competitive process was developed to allocate available funds, and many communities' applications were turned down.

The Panel believes the time for pilot programs that achieve partial results is over. Broadband access should be expanded to all regions of Canada, not just selected communities.

Canada's goal, as we have recommended, should be to achieve ubiquitous, affordable broadband access as rapidly as possible. Given scarce public resources and the ability of market forces to achieve most of this goal, the main purpose of the U-CAN program should be to fill in the gaps in broadband coverage in Canada. U-CAN should be targeted at areas where the market is unlikely to provide broadband coverage in the near future because projected customer revenues are insufficient to cover the costs of deploying and operating broadband networks.

The Panel believes a program designed to achieve ubiquitous broadband availability should not be focused on individual "communities" that develop business plans and compete with each other for funds. The program should be aimed at broader coverage than selected communities. At the same time, the design of the program should be flexible enough to meet the access requirements of a wide range of communities and regions, since Canada's diverse geography clearly means "one size does not fit all." Finally, taking into account the fact that different areas of the country have different levels of deployment, the Panel considers that subsidies should be made available based on actual requirements to complete the job, rather than on per capita or other formulas.

Recommendation 8-5

The U-CAN program should aim to complete the job begun by BRAND of providing ubiquitous broadband throughout all regions in Canada that the market is not likely to serve on its own by 2010.

Recommendation 8-6

The budget allocation for the U-CAN program should be based on the projected costs of providing broadband connectivity to the remaining unserved areas of Canada. The funds should be assigned based on the projected cost of achieving such connectivity in each region.

Flexible Implementation

Different areas of the country have different broadband needs and are at different stages of broadband readiness. In some areas, a one-time capital subsidy may be enough to provide broadband access on a sustainable basis. In other areas, operational expenses may also need to be subsidized for a period of time until a break-even point is reached. In still other cases, providing broadband access may never be economically viable without ongoing subsidy.

As well as having different financial needs, unserved areas are not all at the same starting point. In some areas, some service providers have the skills and other capacities needed to build and operate broadband access networks, and to develop local applications and services. Others need assistance in becoming broadband ready. To be effective, the U-CAN program must take these differences into account and avoid adopting a "cookie cutter" approach.

Recommendation 8-7

The U-CAN program should be flexibly designed and implemented to reflect the needs of stakeholders in regions to be served, including governments, communities and the private sector.

Coordination

Telecommunications service providers, departments and agencies of the federal government, the provinces and territories, municipalities and community organizations have all contributed to the expansion of broadband access in Canada through past and current initiatives. In the Panel's view, all these players should be stakeholders in the U-CAN program.

Experience from previous broadband programs has shown that the best results are obtained when stakeholders are consulted in program design and development, and initiatives are implemented in a coordinated fashion. Prior to undertaking a broadband expansion initiative in any region, the U-CAN program administrators should conduct a public consultation process. The goal of this process should be to avoid duplication of public and private sector efforts, to understand the programs of different jurisdictions and departments of government, and to ensure that program initiatives align with regulatory requirements imposed on telecommunications service providers. In particular, the U-CAN broadband initiatives should supplement, and not duplicate, infrastructure projects mandated under CRTC-approved service improvement plans or broadband infrastructure projects that may be funded out of the CRTC-established price cap deferral accounts.

The U-CAN program and other federal government broadband initiatives such as those aimed at serving First Nations should ensure coordination and efficient use of public funds, and should not inadvertently stifle or duplicate market-based initiatives to roll out broadband networks. In general, there should be better ongoing coordination among federal and provincial broadband expansion programs to increase their effectiveness and to avoid duplication and inconsistent market signals. The National ICT Adoption Centre described in Chapter 7 should be authorized to play this coordination role.

Recommendation 8-8

U-CAN broadband expansion initiatives should be implemented only after coordination with those involved in other broadband expansion programs of the private sector, federal government departments and agencies as well as other levels of government.

Community Involvement

The purpose of U-CAN is to help make the benefits of broadband available to Canadians living in all regions of the country. To be effective and to justify the cost of the U-CAN program, broadband access must provide local solutions to local requirements, whether for improved education and health care, innovative business and job opportunities, improved governance or cultural expression.

Local broadband benefits should be maximized through active involvement of local businesses, residents and providers of education, health care and other public services. For economic and social reasons, community involvement is essential for a successful program.

Recommendation 8-9

The U-CAN program administrators should develop broadband expansion initiatives in consultation with community members and organizations who can help define community access needs.

As many submissions to the Panel pointed out, in order to reap the full potential benefits of broadband access, communities need much more than access to technology. They also need access to the tools that will help them improve their broadband readiness and help their members not only learn how to use technology, but also develop applications and services tailored to their needs. As in the case of technology, there are no “one size fits all” solutions for these learning needs. They vary with geographic and demographic factors as well as with social and economic circumstances.

In Chapter 7, the Panel recommends that the federal government develop a national ICT strategy that, among other things, would provide all Canadians with the information and skills needed to better use ICTs to reach their economic and social potential. The Panel also recommends creating a National ICT Adoption Centre to plan and coordinate the implementation of this strategy with relevant federal and provincial government departments and agencies. In addition to these duties, the Panel recommends making the National ICT Adoption Centre responsible for administering the U-CAN program.

In carrying out these responsibilities, the National ICT Adoption Centre should ensure that residents of rural and remote communities included in U-CAN have access to federal and provincial government programs that help build capacity to use ICTs at the local level, for example, through online training and skills development.

The National ICT Adoption Centre should also ensure that federal and provincial economic development agencies are aware of forthcoming broadband deployments under the U-CAN program, so these agencies can help rural and remote communities served through U-CAN capture the potential economic benefits of broadband.

Private and Public Ownership

The BRAND program emphasized private sector ownership in order to encourage the development of sustainable business models that would not require ongoing public subsidy. However, the Panel notes there are communities where local broadband access has been provided by municipal government, and some areas where local organizations or public authorities such as municipalities also own backhaul facilities. In addition, there are areas where there is a broadband point of presence but no local access network, because there is no business case for building one. In such areas, public ownership may be an option. On the other hand, there are also cases in which publicly owned or subsidized networks have duplicated existing or planned private sector network builds. In line with the general principle that the objectives of Canadian telecommunications policy should be achieved primarily through market forces, the Panel believes existing or planned privately owned networks should not be duplicated using public subsidies. At the same time, however, the Panel would not discourage public ownership or subsidies in areas where no such networks exist and where a business case for expansion of broadband networks is unlikely to emerge.

Recommendation 8-10

The U-CAN program should not promote the duplication of existing or planned network facilities with networks that are subsidized by municipal, provincial or federal government funds. However, investment and subsidies by public bodies such as municipalities should not be discouraged in areas where the market fails to provide broadband access.

Ensuring Open Access

The BRAND experience showed that even though the provision of open access to transmission and access facilities was a condition of funding, practical problems arose in the implementation of this condition. The Panel believes U-CAN-funded backhaul networks should be open to third-party providers of local access services as a condition of receiving subsidies. In addition, the rates charged to such third parties for access to subsidized networks should be discounted to reflect the subsidies received and to ensure a level playing field between competing service providers.

Recommendation 8-11

When subsidies are provided to network operators to expand backhaul networks into previously unserved areas, such operators should be required as a condition of obtaining the subsidy, or by regulation

(a) to provide transmission services to other local service providers who wish to serve the areas, and

(b) to provide these services at rates that are discounted to reflect the subsidies received.

Recommendation 8-12

Contracts entered into between the U-CAN program and providers of backhaul services should specify the technical, operational and financial requirements that must be met to ensure that the points of presence provided by backhaul operators are open to other service providers on a fair and reasonable basis. These specifications should include such matters as

(a) physical access to buildings and other facilities,

(b) performance quality standards,

(c) high standards of security and scalability,

(d) collocation and modification of equipment, and

(e) rates for access and interconnection.

U-CAN Program Guidelines

Using Market-based Mechanisms

The first step in developing the U-CAN program will be to identify areas unlikely to be served by market forces alone by 2010. As previously discussed, this exercise should be completed in consultation with private sector service providers, relevant federal and provincial government organizations and community representatives. Once these areas have been identified, the Panel believes the best approach to fund expansion of broadband access networks in each of these unserved areas is to hold least-cost subsidy auctions. Such auctions would act as the necessary catalyst to get the job of filling broadband access gaps done by 2010.

Under this approach, private sector service providers, including incumbents and new entrants as well as interested community-based groups, could submit proposals to provide broadband service in a defined area. The subsidy funding should be awarded to the proposal that requires the smallest subsidy, provided that it demonstrates it has the technical, financial and managerial capacity to construct and operate the necessary broadband network infrastructure.

This model contains market-like incentives that should encourage innovation. It also promotes "right size" solutions that would reduce the overall costs to the taxpayer and encourage use of the most efficient technological solution. Unlike BRAND, it would not require communities to organize themselves in order to aggregate demand, develop business plans and compete for funding, except in those cases where communities choose to do so.

Recommendation 8-13

The U-CAN program should provide subsidies to broadband network providers by means of least-cost subsidy auctions.

Recommendation 8-14

Auctions should be run for large service areas at a time, in order to increase efficiencies of service provision. These service areas should be designated in consultation with provincial or territorial governments, after assessing current and planned coverage of existing broadband network operators.

Separating Access and Backhaul

The Panel notes that the challenge of providing a broadband network point of presence (PoP) in an unserved area and of providing backhaul from that PoP to regional, national and international backbone networks is significantly greater than the challenge of providing local broadband access within an unserved area, once a PoP has been established.

The cost of providing local access networks in many cases is relatively low compared with the cost of providing high-capacity links between backbone networks and local PoP, even when least-cost technologies are used. Different technical, operational and financial capacities are needed to design, build and operate local access and backhaul networks, to scale their capacity in response to changing demand and to upgrade as new technologies become available.

As a general rule, access and backhaul should be treated as separate components of the U-CAN network expansion initiatives. Backhaul typically involves provision of high-speed microwave or fibre transport facilities between Internet access points and designated PoPs within the service area. Access, on the other hand, involves providing service on demand to users within the service area, by means of technologies chosen by the bidders in an auction, such as fixed wireless, DSL or cable.

Recommendation 8-15

In most cases, the U-CAN program should hold separate auctions for the backhaul network and local access facilities within each unserved area. Such auctions should generally be held at the same time.

Recommendation 8-16

The U-CAN program should enter into contracts for access and backhaul services with the service provider who

(a) demonstrates it has the necessary technical and financial qualifications to successfully deploy and operate the broadband backhaul or access service for the duration of the contract, and

(b) submits the lowest bid for the subsidy it requires to implement and operate the project.

Recommendation 8-17

Sufficient amounts of appropriate spectrum should be made available on a licensed or unlicensed basis to service providers who are awarded subsidies under the U-CAN program.

Enforcing Commitments

In U-CAN, as in any publicly funded program, it is essential to ensure that subsidies and assigned spectrum resources are used only for the purposes of expanding broadband access in the unserved areas. Contracts between the U-CAN program and successful bidders to provide backhaul and access services should specify that subsidies and licensed spectrum will be forfeited if service providers do not comply with contractual provisions concerning time frames for introducing service and providing open access.

Recommendation 8-18

Recipients of U-CAN broadband access subsidies who fail to provide service on time and in accordance with U-CAN contract specifications should forfeit the subsidy and any spectrum assigned to them, and should be subject to contractual penalties. The U-CAN program should then hold a new auction to serve the area and reassign the related spectrum.

Ensuring Competitive and Technological Neutrality

Because of the rapid evolution of technology, it is critical for U-CAN to be technologically neutral. The Panel believes there is great potential for the delivery of broadband to remote communities via new wireless access technologies such as WiMAX. However, no one can say for certain what technology will be the best two, three or five years from now. The Panel is recommending that the U-CAN program adopt a competitive technologically neutral approach. This approach should stimulate innovation and ensure that government subsidies are not used inefficiently or for obsolescent technologies.

Recommendation 8-19

The U-CAN auction process should be technologically and competitively neutral. Private sector service providers as well as regional and community organizations should be permitted to participate in the auctions, provided that they can demonstrate technical capability and financially sustainable business plans.

Evaluating Progress

The lessons the Panel learned from the experience of previous broadband programs were very helpful in developing recommendations for U-CAN. However, in identifying these lessons, the Panel had to rely on material contained in submissions, in presentations and discussions that took place at the Whitehorse and Ottawa forums, and in consultations with stakeholders, rather than on any formal program evaluation or assessment reports.

The Panel believes formal program evaluation requirements should be built into U-CAN from the beginning, and that efforts should be made to learn lessons from previous connectivity programs, particularly those that are still in place. The National ICT Adoption Centre should administer this program in order to examine lessons learned, and to identify "best-case, worst-case" projects. The results of this review should be used to provide information on "best practices," avoidable problems, and available technical and other solutions.

Recommendation 8-20

There should be effective tracking and periodic evaluation of the U-CAN program, and improved tracking and evaluation of other ongoing federal government broadband and connectivity programs.