Setting the Context for a Federal-Provincial Broadband Strategy

The Current State of Broadband Data/Telecommunications Infrastructure in the Province of Newfoundland and Labrador

Industry Canada Industrie Canada

GOVERNMENT OF NEWFOUNDLAND AND LABRADOR
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EXECUTIVE SUMMARY

The provincial Department of Innovation, Trade and Rural Development and Industry Canada in Newfoundland and Labrador, in cooperation with the Atlantic Canada Opportunities Agency (ACOA), intend to cooperatively lead a strategic effort to develop a comprehensive federal/provincial strategy for long-term broadband connectivity and strategic infrastructure deployment. This document - Setting the Context for a Federal-Provincial Broadband Strategy – will provide the background required by the Committee in terms of an overview of broadband and the investments to date in the province, the challenges and enablers to creating a provincial broadband strategy, and recommendations for the development of such a strategy. The methodology used in the development of this document included a review of several key documents as well as interviews with 29 key stakeholders representing public and private sector interests.

Industry Canada's National Broadband Task Force (NBTF) defines "broadband" as a high-capacity, two-way link that is capable of supporting full-motion, interactive video applications (NBTF, 2001). While definitions of broadband vary, it is generally agreed that digital subscriber lines (DSL) and cable TV are considered as basic broadband services. Broadband speeds also vary among countries. For example, Japan has the fastest residential Internet connection at 40 Mbps., Canada's is 10 Mbps. and the fastest in the United States is 7 Mbps. (Avery, 2004).

Broadband has the capacity to create an environment where everyone can have the same opportunities in commerce, education, health care, entertainment and government services. In this context, broadband has the potential to help bridge the economic and social gaps that currently exist in Newfoundland and Labrador, otherwise known as the digital divide. The availability of broadband capacity at reasonable prices will be a key factor in bridging this gap and ensuring that a geographic digital divide does not exist. Therefore, government assistance should focus on the development of the appropriate skills to maximize the social and economic opportunities and benefits of broadband connectivity within the community.

In terms of broadband access in Newfoundland and Labrador, once the Broadband for Rural and Northern Development (BRAND) projects are complete, approximately 80% of the population will have access, but only 40% of the communities will have access to these services.[1] It is important to note that most of the communities that are still not serviced are located in rural and remote areas where facilities that support broadband access are either inadequate or non-existent. There are also issues with respect to some key communities that currently do not have service nor is there any future service planned e.g., Norris Point. Overall, this province is close to the distribution of residential service that is seen in many provinces with the exception of New Brunswick and Alberta. At the mid-speed level such as that required by institutions for day-to-day business, the province is below average particularly in areas outside of the northeast Avalon. The availability of research network distribution is well below other provinces with only the institutions in St. John's having any significant capacity and that arguably, is a generation behind other provinces. In comparison, New Brunswick recently announced that by the end of 2006, 90% of its residences, 95% of its business lines, and 100% of its regional health care centres, business parks and First Nations'

[1] Extrapolated from figures provided by Government of Newfoundland and Labrador (2002) and provincial BRAND project figures provided by Industry Canada.

communities would have access to high-speed Internet (Government of New Brunswick, 2003).

Stakeholders identified many challenges to the deployment of broadband infrastructure in Newfoundland and Labrador. These challenges include the lack of perceived leadership, the lack of a provincial strategic approach, issues related to the demand and supply of services, and issues related to access in rural and remote areas. While there have been challenges, there has also been a strong enabling environment that supports such development. Some of the enabling factors include a strong collaborative environment, the creation of public networks, and external resources such as federal funding that is specifically identified for such initiatives.

Widespread availability of broadband access is important in order for citizens to participate in the information society; therefore government must take a leadership role in ensuring that this happens. In terms of the role of government in this process, firstly, it should ensure that steps are taken to increase competition in the telecommunication market. Secondly, government must be a model user in terms of aggregating its demand, and continuing to increase its use of broadband networks for the services it delivers. Thirdly, government should let the market drive the broadband network rollout in urban areas and its role should be to facilitate and encourage the process. In rural areas, government will have to play a far more extensive role and may have to consider the subsidization of a scalable solution that phases in various levels of infrastructure as the community and its stakeholders are able to support it. Fourthly, government should foster awareness among people about the potential impacts and applications of broadband in order to raise the level of understanding of the benefits of the technology and to promote its usage. Finally, in order to fully develop the capacity of communities throughout the province, government must strive to ensure that businesses, institutions and residents in all communities have an opportunity to participate in, and benefit from the broadband revolution. This will only be achieved through collaboration among all stakeholders i.e., the federal, provincial and municipal governments; the private sector; the providers of education, health care and other public services; local communities; and consumers.

In conclusion, there was consensus among those interviewed that they supported the development of a provincial broadband strategy as the current approach to development had been fragmented and had ultimately not been very collaborative. Based on the information contained in this document, it is recommended that the following be considered in the development of a provincial strategy.

- Provision of leadership that will facilitate the development of a strategic plan for the deployment of a provincial broadband infrastructure that is overseen by the Chief Information Officer and the Department of Innovation, Trade and Rural Development. This could be achieved by appointing a Broadband Stakeholder Group who would serve as an independent task group and whose role would be to advise government on the development of its broadband strategy.

- Aggregation of the provincial demand for services by requiring that the public sector work together when issuing requests for the provision of government services.

- Determination of government's role in creating demand.

- Analysis of the current availability and diffusion of broadband services in the province so that a determination can be made regarding what new development initiatives may be appropriate and how they should be structured.

- Determination of government's role in facilitating a reliable and affordable telecommunications service.

- Determination of the balance between residential access and the ability to provide access for social and economic programs.

- Development of a strategy that enables scalable infrastructure to be made available to communities that are unlikely to obtain broadband access as a result of market forces alone.

- Provision of opportunities for increasing knowledge about broadband and increasing skill development regarding broadband use and application, in order to promote the uptake and effective use of broadband services, and to make communities more effective in their dealings with service providers.

- Development of policies and programs that encourage investment in the development of suitable content and encourage the use of appropriate applications in order to ensure a broader uptake of broadband technology.

- Development and implementation of a strategy in collaboration with the federal government that will raise awareness of the benefits and applications of broadband services to citizens, businesses, social groups and communities.

- Build on the collaborative environment that has already been established among the managers of the provincial health and education networks who have developed a successful model of collaboration resulting in reduced cost and improved provision of services.

1. INTRODUCTION

1.1. Background

The provincial Department of Innovation, Trade and Rural Development and Industry Canada in Newfoundland and Labrador, in cooperation with the Atlantic Canada Opportunities Agency (ACOA), intend to cooperatively lead a strategic effort to develop a comprehensive federal/provincial strategy for long-term broadband connectivity and strategic infrastructure deployment for the long-term benefit of the province's social and economic agenda. This effort will build on the policy advocacy brought forth in the National Broadband Task Force (NBTF) report as well as the ongoing discussions of the recently reactivated Federal/Provincial/Territorial Broadband Panel. The mission of the Panel is to develop and advance a cohesive and coherent approach to broadband deployment in order to provide broadband connectivity to all Newfoundland and Labrador communities.

To produce this background document - Setting the Context for a Federal-Provincial Broadband Strategy – for the Broadband Panel, interviews were conducted with 29 key stakeholders (Appendix A) and several key documents were reviewed. This document will:

- provide an overview of broadband and its benefits;
- provide an overview of the investments to date by both the Federal and Provincial governments, post-secondary education institutions, and the private sector;
- identify the challenges and enablers to creating a broadband strategy; and
- provide recommendations regarding the development of a strategy for provincial broadband deployment.

1.2. Overview

1.2.1 What is Broadband?

Broadband refers to the amount of information that can be carried between a sender and a receiver over a telecommunications channel. The use of broadband implies that a lot of information can be transmitted when compared to traditional methods of accessing the Internet, typically referred to as "narrowband" or "dial-up" using a telephone line and standard modem. However, the term broadband is used differently by different groups depending on the complexity of their activities and what the term "a lot" means to them. This often makes for confusion in discussion and challenges for decision-making.

One use of the term is that put forward by Industry Canada's National Broadband Task Force, which defines "broadband" as a high-capacity, two-way link that is capable of supporting full-motion, interactive video applications (NBTF, 2001). It characterizes it as DSL, cable modem or wireless equivalent that has a high speed, "always on" connection and two-way capability that can support many applications including professional, entertainment and consumer activities. For example, in terms of professional applications, users can telecommute and establish home offices by using broadband to access corporate networks, e-mail systems, and desktop videoconferencing. Broadband can also facilitate home-based businesses though web serving, e-commerce capabilities and financial functions.

Consumer activities include the ability to shop, take advantage of public services including government online programs, research information, and desktop videoconference with friends and family. Consumers can also participate in many of the College of the North Atlantic's online e-learning programs. In terms of entertainment activities, broadband can allow a wider range of activities including high speed web surfing with rich video content, video on demand, and interactive, multi-player video games.

Another level of broadband often discussed is that needed by small (>30 people) businesses, businesses with high volume e-commerce sites, college campuses, regional hospitals, and larger high schools to accommodate their various daily business, academic and clinical activities. Usually these groups talk about a 10, 20 or 100 Mbps circuit as broadband. One example of this type of need and activity is demonstrated by Memorial's physical oceanography program, where a 10-100 Mbps circuit would allow them to transmit data from the ocean floor in Bonne Bay to their labs at the campus in St. John's. Access to the recently launched Teleoncology Program that supports cancer services throughout the province through tele-consultations, the transmission of medical information and the provision of education and training services would ideally require this level of service at the regional hospital level. Small hospitals could make do with less but not DSL or cable modem services as we know them, because of the need for private or dedicated bandwidth for security and "quality of service" requirements.

Large institutions (e.g., CNA, MUN) and large businesses (e.g., Hydro, Aliant), particularly those doing research, require an even "broader bandwidth" such as multiple Gigabit circuits. For example, research such as that in the Canada Genome Project requires this level of network.

For further information on broadband terms and definitions refer to Appendix B.

1.2.2 What are the Benefits of Broadband?

It is acknowledged that there is a systemic gap between the quality of life enjoyed by those living in or near urban areas and those living in rural and remote areas. For example, it is generally believed that much of the economic growth that has taken place in recent years has resulted from the use of broadband networks, in combination with the Internet, to improve productivity, provide new products and services, and support innovation in all sectors of the economy. The Organization for Economic Co-operation and Development supports the notion that broadband has had a significant impact on economic activity and is considered to be an accelerator for economic development (Xavier, 2003). In terms of social benefits, broadband can improve a community's access to health care e.g., through the use of video conferencing health care professionals in rural communities can treat patients in real-time as they consult with specialists at hospitals in urban areas. It can also provide access to new learning opportunities such as on-line video forums linking the provincial Science Centre's outreach programs to students on the coast of Labrador, thereby enabling students to participate in virtual field trips. Clearly, there are many key economic and social benefits related to broadband applications including benefits in the areas of business and consumer e-commerce, education, health care, entertainment, and e-government. However, the most revolutionary aspect of broadband is its potential to reduce and even to eliminate, distance and time as cost factors (NBTF, 2001).

2. INTERNATIONAL, NATIONAL AND PROVINCIAL PERSPECTIVES

2.1. International

Most Organization for Economic Co-operation and Development (OECD) countries have recognized the importance of broadband networks and the important role they play in encouraging economic activity. In a review of the OECD country reports, there is evidence that broadband grew faster than ever before during 2003 with the number of subscriptions increasing from 56 to 82 million. The number of broadband subscribers was expected to reach 100 million by mid-2004. Access to high-speed Internet is now available to 75% of households in OECD countries; in areas where it is available, the average subscription rate is approximately 25% (OECD, 2002a).

However, penetration varies widely between OECD countries (OECD, 2004b):

- The possibility of connecting to broadband services is already available to over 90% of households in Belgium, Denmark, Japan, Korea, Luxembourg, Spain, Switzerland and the United Kingdom. Other countries expected to join this group by the end of 2004 include Finland, France and Germany.
- Countries with larger geographical areas such as Australia, Canada, and the United States are likely to have DSL coverage of between 80% and 90% over the next few years. In Canada and the US, broadband via cable modem already reaches 85% and 80% of households respectively.
- A number of countries e.g., the Czech Republic, Greece, Hungary, and Ireland have only recently launched broadband services.

An overview of the varying rates of broadband adoption in OECD countries is provided in Figure 1 below. Refer to Appendix C for detailed information on the underlying data. As can be seen from the figure, the four countries with the highest broadband subscribers per 100 inhabitants in OECD countries are Korea, Denmark, Canada and the Netherlands (OECD, 2004b). The document - Development of Broadband Access in Rural and Remote Areas (Paltridge, 2004) - provides an overview of what is happening in each of these countries. A brief summary of this work is provided below; however, readers interested in the full details are referred to the original document.

Korea

Korea has by far the highest penetration of broadband access among OECD countries. By mid-2003 more than 70% of households had a broadband connection, 62.7% of all Korean businesses were using DSL to access the Internet and 21.9% were using leased lines. When coverage by satellite is included broadband access was available to 98% of towns and country areas. Beginning in 1995, the Korean government funded the development of national backbone networks to all Korean regions in return for use by the public sector. By 2002, the entire investment had been repaid through usage of these networks by the public sector.

In March 2002, the Korean government declared that broadband Internet service would become a universal service with a goal for 90% of Koreans to be able to access a 20 Mbps

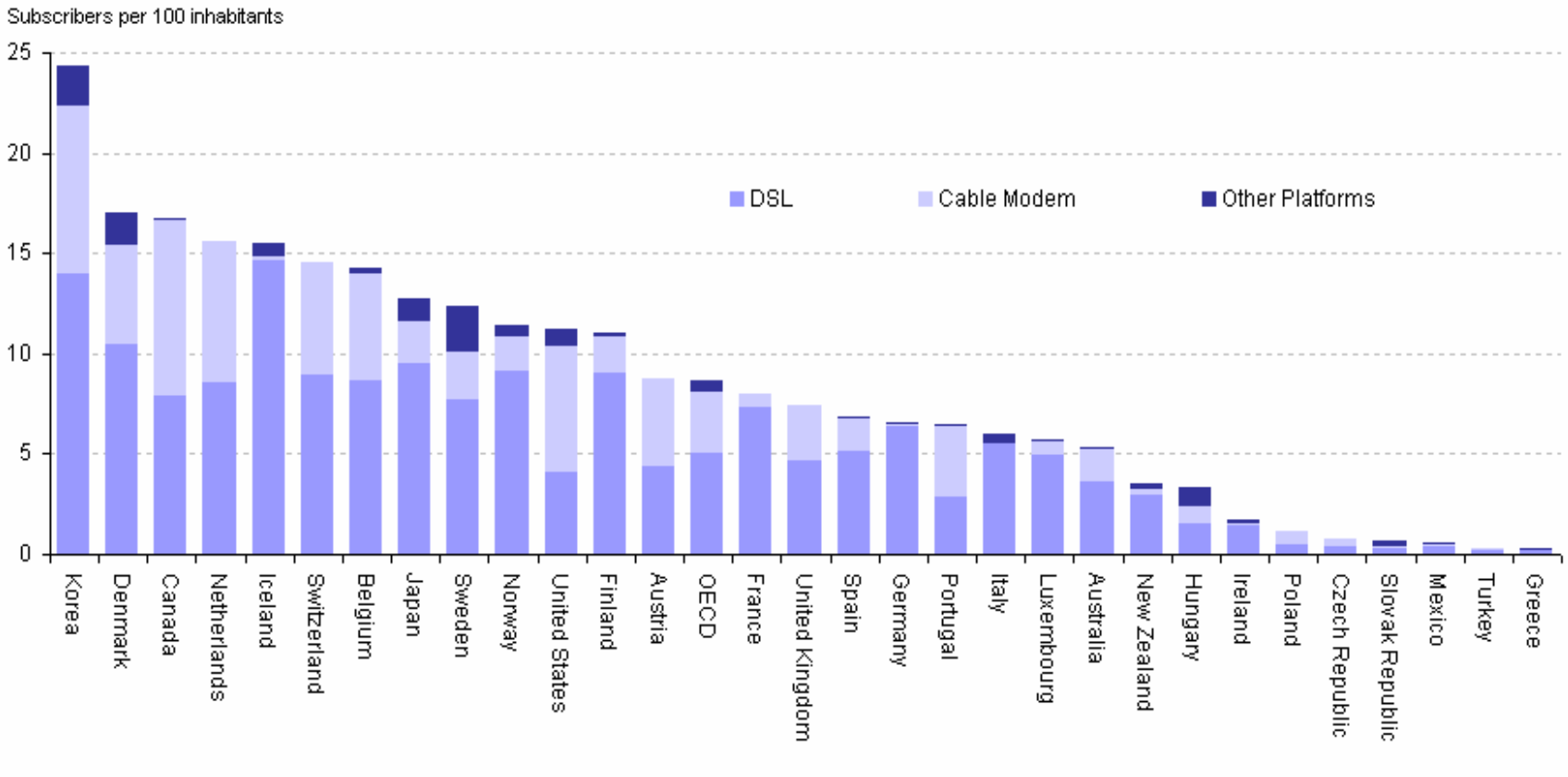

Figure 1: OECD Key ICT indicators - Broadband subscribers per 100 inhabitants in OECD countries, June 2004
Source: http://www.oecd.org/document/23/0,2340,en_2649_37441_33987543_1_1_1_37441,00.html

connection by 2007. In high-density areas, the government envisages that high-capacity local area networks, very high bit rate DSL (i.e., VDSL) and cable networks will be utilized. At the same time, the goals for rural broadband access are a baseline of 1 Mbps and up to 8 Mbps where DSL is made available. In February 2004, the Korean government announced that it planned to spend 60 million USD to expand broadband access in rural areas with more than 50 households. This is expected to lift broadband access levels in rural villages to 95% by the close of 2004.

Denmark

Denmark has the second highest availability of DSL in the OECD area. Officials expect that DSL coverage will be expanded to 96% during 2004 and reach 98% in 2005. Denmark is also the only country where fixed wireless broadband has a wider availability than DSL, which in part, explains the high availability of DSL. By the end of 2002, the wireless provider had reached coverage rates of 99% of the Danish population and 96% of all Danish territory, with the highest capacity offered at 4 Mbps downstream and 2 Mbps upstream.

Netherlands

The Netherlands has a relatively high availability of DSL and cable modems. The Netherlands also has one of the highest availabilities of cable television, with virtually all households in the country being passed by a cable operator. In March 2003, cable networks had around twice the number of broadband subscribers as DSL. Wireless networks are also being used in the Netherlands to reach areas that are not served by other broadband platforms.

2.2 National

In October 2000, the Federal Government of Canada set the goal that broadband networks and services be available to businesses and residents in every Canadian community by 2005. The National Broadband Task Force was established in January 2001 by the Minister of Industry for the purpose of developing a strategy for ensuring that this objective was met. The Task Force maintained that over the next 10 or 20 years, the development of broadband networks, services and applications would have a profound effect on all aspects of Canadian life. The Report indicated its support for extending broadband beyond a technology only for large private or public intra-organizational use, to use by all levels of government and to individual households and small businesses. The Report outlined a policy framework and action plan for extending broadband networks and services to those communities that are unlikely to be served by market forces alone, without some form of government assistance (NBTF, 2001).

In response to the Task Force's recommendations, the federal government established the Broadband for Rural and Northern Development (BRAND) Pilot Program in September 2002 to run until March 2005. The total funding for the program is $105 million and the program uses a competitive process to support the deployment of innovative and sustainable broadband services to Canadian communities that currently have no high-speed Internet access. Priority is given to First Nation, northern, remote and rural communities. The first two funding rounds focussed on business plan development and implementation, and a total of 154 projects representing approximately 2,055 communities were selected for funding with a total of $83.2 million invested.

In 2003, the Canadian government launched the National Satellite Initiative. This joint project between Infrastructure Canada, Industry Canada, and the Canadian Space Agency aims to provide broadband Internet access services via satellite to communities located in the Far and Mid North, and in isolated or remote areas of Canada. Industry Canada is contributing their

$20 million as part of the $155 million initiative to make satellite capacity available in remote communities where satellite is the only reasonable means of accessing broadband.

There have also been a number of provincial, territorial and municipal government programs launched with similar goals. According to the OECD (Paltridge, 2004), the total funding allocated for these initiatives over a number of years, is more than $437 million USD. The largest individual program was Alberta's "Supernet" initiative, aiming to connect 422 communities, with funding of 139 million USD. In order of magnitude, this was followed by Saskatchewan with $51 million USD, and an aim to connect 366 communities.

In September 2003, Statistics Canada produced its first comprehensive quantification of the demand for and supply of broadband technology - High-Speed on the Information Highway: Broadband in Canada (Statistics Canada, 2003). This Report stated that Canada is among the broadband leaders with close to one quarter (23.7%) of all Canadian households having a high-speed Internet connection in 2001, representing nearly half of all regular home Internet use households. Statistics Canada also noted that the proportion of high-speed Internet subscribers in Canada tends to increase from east to west, with the Atlantic provinces and Quebec lagging in terms of the share of homes adopting as a percentage of homes capable of receiving the service. Although penetration rates are lower in the Atlantic provinces and Quebec, these regions experienced the largest percentage growth in subscribers to Internet by cable between 2000 and 2001, with the number in the Atlantic provinces more than doubling over this one-year period. In terms of broadband access across Canada, it remains uneven with 1,712 communities served (32%) and 3,714 communities unserved (68%) as of April 2004 (Industry Canada, 2004). Industry Canada also notes that by 2005, it is expected that 44% of all Canadian households will subscribe to a residential broadband service and this number will increase to 52% by 2008. Refer to Diagram 1 in Appendix D for more information.

An overview of broadband infrastructure in each province in Canada is provided in Table 2 in Appendix E. With the recent addition of the BRAND communities, Newfoundland and Labrador is close to the distribution of residential service seen in many provinces with the exception of New Brunswick and Alberta. At the mid-speed level (i.e., 10-100 Mgbs) such as that required by institutions for day-to-day business, the province is below average particularly in areas outside of the northeast Avalon. The availability of research network distribution is well below other provinces with only the institutions in St. John's having any significant capacity and that arguably, is a generation behind other provinces.

The New Brunswick approach to development is noteworthy, as government has taken a unique approach to the building of its provincial broadband infrastructure. In 2003 they announced that by the end of 2006, 90% of New Brunswick residences would have access to high-speed Internet as a result of a public/private partnership agreement between the federal and provincial governments and Aliant. In addition, 95% of business lines, and 100% of regional health care centres, business parks and First Nations' communities would gain access. As New Brunswick's schools are already 100% connected, the expanded services for broadband builds upon the province's already existing school program. This proposed connectivity will be achieved by investments from the Government of Canada of $16.5 million and the Province of New Brunswick of $12.5 million. Aliant plans to invest $15.6 million, building on the $90 million they have previously invested in their provincial broadband network over the last four years (Government of New Brunswick, 2003).

2.3 Provincial

The technology currently utilized in Newfoundland and Labrador to deliver broadband Internet access includes digital subscriber line (DSL) service, currently provided by Aliant, and cable modem service, currently provided by the cable companies (e.g., Persona, Rogers). Other technologies such as wireless and satellite technologies (e.g., those provided by the Electronic Centre) are being used in limited ways throughout the province and have some use in Labrador. These technologies are still emerging and must be considered as an alternate means to address access in some of the more challenging areas of the province.

Even though the federal government committed to broadband access for all communities by 2005, Newfoundland and Labrador's rural, remote and northern communities are at risk of not securing these services. Considering our current situation, while the majority of the *population* in the province has access to broadband, only a minority of *communities* is within reach of these services. For example, once the BRAND projects are complete, approximately 80% of the population will have access to broadband services but only 40% of communities will have access to these services, the majority of which are located in urban areas.[2] In urban areas, the commercial marketplace has helped to accomplish the goal of broadband connectivity for all but in rural areas, market forces alone have not been sufficient to drive the provision of such service. One of the market drivers in rural areas is the need identified by many communities that broadband infrastructure is a key element of the socio-economic base for their community and therefore broadband access must be a priority. For many, broadband infrastructure is not just a benefit but is seen as the main contributor to the sustainability of rural communities. This is supported by the Newfoundland and Labrador Regional Economic Development Association (NLREDA) who have identified this and other issues for consideration in the development of a provincial strategy. Refer to Appendix F for an overview of the issues they have identified.

The current approach to the development of broadband infrastructure in the province has been fragmented and has not been very collaborative or consultative. Subsequently, the fragmented approach to date has had some unintended consequences. Infrastructure has been developed in many areas in isolation and without consultation with many potential users. For example, in some communities infrastructure has been developed for one public sector group without consulting with the other public sector users in the community to determine what their potential need for the service may be and their interest in sharing the cost of development. Other examples of fragmentation include communities with no infrastructure such as Norris Point. Norris Point is home to a Memorial University research centre in oceanography, a large high school and a hospital, however, none of the local providers intends to offer broadband service to this community at this time. Arnold's Cove and Argentia are examples of other communities in a similar situation.

SmartLabrador is an example of the challenges that local communities face in building and maintaining broadband networks. The SmartLabrador Initiative is Newfoundland and Labrador's Smart Community Demonstration Project under Industry Canada's Smart Communities Program. It secured funding in 2000 to develop an innovative hybrid network with nine smart services including distance education, government services, ICE technologies, telehealth, telejustice, the Labrador Heritage Mall, the Labrador Intranet, the Labrador News Network and the Labrador Virtual Museum. The network comprises a Wide Area Network spanning all of Labrador and provides access to 41 sites located in 23 Labrador communities

[2] Extrapolated from figures provided by Government of Newfoundland and Labrador (2002) and provincial BRAND project figures provided by Industry Canada.

and two Newfoundland communities. Advanced communications technologies including satellite, terrestrial, and wireless technology are blended in the SmartLabrador Network creating a hybrid network that is one of the largest, most innovative and most ambitious wide area networks in Canada today. Geographically, the SmartLabrador network is one of the largest networks in Canada and is one of the first to integrate telephone and satellite IP network technology. In spite of this innovative development, SmartLabrador is struggling to maintain its current infrastructure as much of it is currently cost prohibitive without some form of subsidization.

The province faces many challenges in terms of ensuring that broadband services are provided for all its citizens. In addressing this challenge, the context is made even more difficult as the provincial government has to make decisions within a fiscal environment that is currently experiencing a major budget deficit. The need to reduce this deficit impacts the types of decisions it has had to make, and will continue to have to make, regarding decreased operational expenditures in general. These decisions therefore have a significant impact on the challenge the government has of sustaining a long-term vision regarding strategic investments in areas such as innovation and technology.

While there have been various pockets of investment in broadband infrastructure in the province, the most significant investment by the provincial and federal government has been under the BRAND Pilot Broadband Program. To date, there has been a total of $23,053,856 in broadband investment in the province under the BRAND Program. The federal government through Industry Canada and ACOA, and the provincial government through the Department of Innovation, Trade and Rural Development (INTRD) have provided $14,824,336 of this investment. An overview of the government investment in broadband infrastructure in Newfoundland and Labrador is provided in Table 3 and a map of communities successful in BRAND Round 1 and 2 funding is included in Diagram 3 below.

The federal government's National Satellite Initiative (NSI) has not yet made an investment in this province under its first round of funding, as the only eligible applicant is Labrador and they did not make an application in the first round. Any application to the NSI program has to be endorsed by the provincial government.

Table 3: BRAND Projects for Newfoundland and Labrador – Total Federal & Provincial Investments (as of 09/22/05)

	BRAND R1	Total Project Cost	IC Funds	ACOA Funds	INTRD Funds	Gov't Support Totals
1	Humber Valley Net	$1,054,227	$368,332	$231,272	$57,000	$656,604
2	Nordic	$3,393,737	$1,607,368	$695,297	$84,987	$2,387,652
3	Excite/ExploreNet	$2,070,724	$1,021,569	$446,525	$69,193	$1,537,287
4	Irish Loop	$3,990,011	$1,776,316	$797,997	$285,000	$2,859,313
5(a)	Labrador Phase 1	$2,479,667	$1,235,955	$1,156,891	$0	$2,392,846
5(b)	Labrador Phase 2	$3,442,683	$1,125,938	$0	$0	$1,125,938
	SubTotals	**$16,431,049**	**$7,135,478**	**$3,327,982**	**$496,180**	**$10,959,640**
	BRAND R2	**Total Project Cost**	**IC Funds**	**ACOA Funds**	**INTRD Funds**	**Gov't Support Totals**
1	Baie Verte	$857,108	$394,252	$101,322	$5,286	$500,860
2	Harbour Breton-Connaigre	$2,057,078	$995,339	$368,299	$43,200	$1,406,838
3	Eastern School District	$1,971,794	$859,693	$0	$0	$859,693
4	Marine & Mountain Zone	$1,736,827	$726,274	$371,031	TBC	$1,097,305
	SubTotals	**$6,622,807**	**$2,975,558**	**$840,652**	**$48,486**	**$3,864,696**
	Grand Totals	**$23,053,856**	**$10,111,036**	**$4,168,634**	**$544,666**	**$14,824,336**

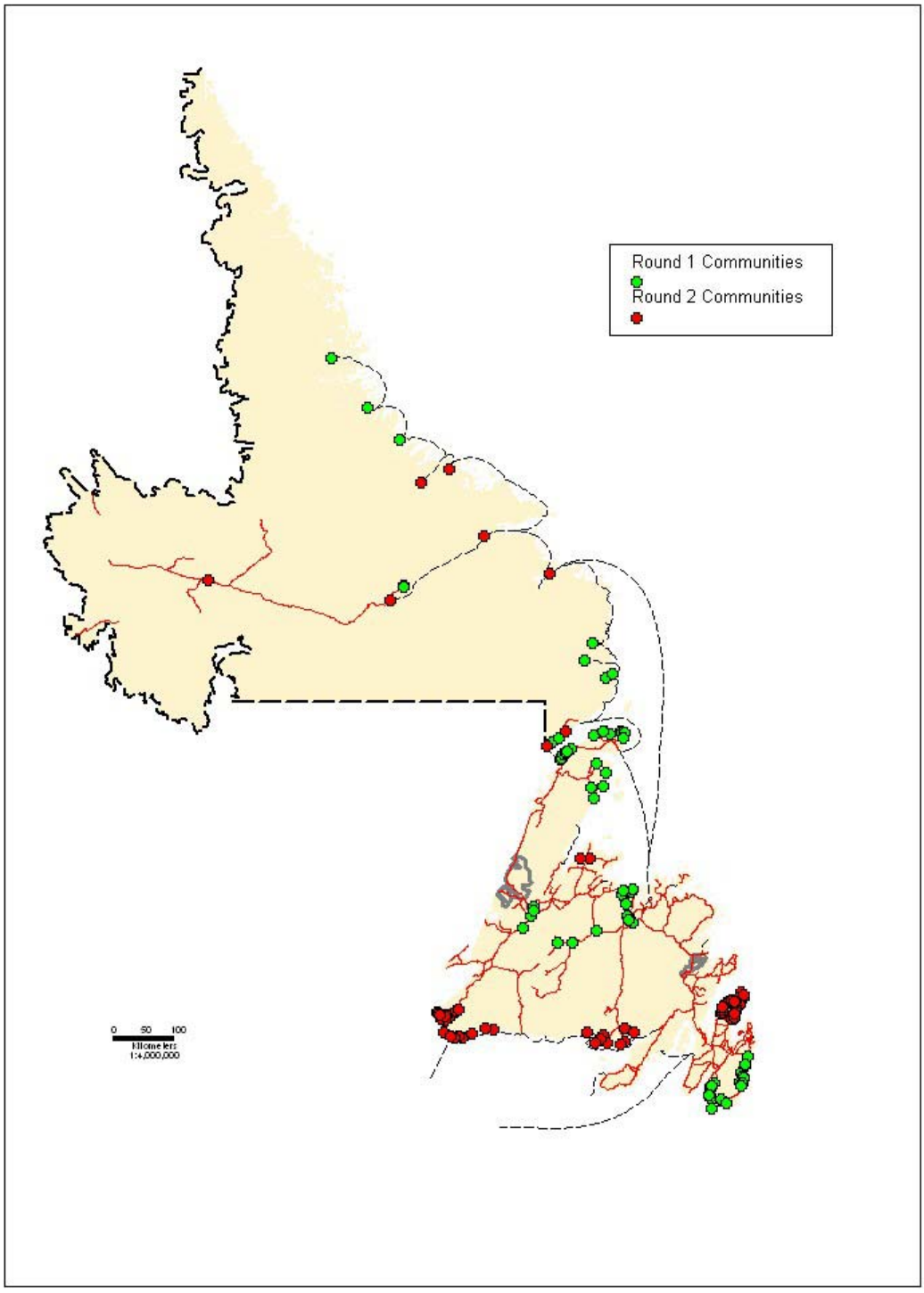

Diagram 3: Overview of Communities Receiving BRAND Funding – Round 1& 2

While broadband coverage and therefore broadband activity in the province generally remain low, a number of public sector groups are currently active in providing advanced applications such as telehealth, distance learning, government services online and e-business that utilize broadband or high-capacity Internet access. These applications have enhanced people's lives through better access to health care and increased learning opportunities, and contributed in small ways to economic and social development in the province through improved business opportunities. An overview of select activities that utilize broadband networks in these sectors follows.

2.3.1 Health

Broadband networks can significantly enhance the capacity of healthcare professionals to access information and deliver services wherever they are located. Some of the health agencies within the province (e.g., NLCHI, TETRA and the Regional Health Boards) are currently utilizing a broadband network for applications ranging from data transfer to the electronic health record to telehealth services to continuing professional education. The health sector's needs are unique as they have major requirements for broadband in that the size of the data transmission between sites is incredibly large and anything that affects the accuracy and security of this information transfer (e.g., lack of bandwidth) can have a huge impact on the appropriate and accurate delivery of the specific health service required.

The Newfoundland and Labrador Centre for Health Information (NLCHI) is an example of a health agency that uses broadband infrastructure to support its applications. NLCHI has connected all the regional wide-area health networks through equipment at their St. John's office. This connection includes a firewall that provides security between and among the networks, and from the outside world. The connection of the health networks also includes connectivity to MCP as part of the development of a province-wide Health Information Network (HIN). The HIN will allow health professionals to electronically share information with other health professionals and thereby help support decision-making, planning, and research with reliable statistics and other information. It will support several applications including an Electronic Health Record (EHR), a Client Registry, a Pharmacy Network, Laboratory Systems and Diagnostic Imaging (PACs). In January 2005 NLCHI launched the first provincial client registry in Canada and it is anticipated that the other applications should be fully operational by 2007. The Telehealth and Educational Resource Agency (TETRA) has also been active in using broadband technologies that support the delivery of audio, video and web conferencing services. The Regional Health Boards in the province also use broadband networks to provide professional development opportunities, telehealth services, research transfer programs and administrative support for their members.

The challenges facing the health sector continue to be how to best utilize communications networks in order to provide accessible health care services to patients, and opportunities for professionals to continue to upgrade their skills and access the latest medical information regardless of where they live. The health sector in this province has demonstrated through its many agencies e.g. NLCHI, TETRA that it has been a strong collaborator with other provincial network providers in an attempt to utilize public resources more efficiently.

2.3.2 Education

The Department of Education has a long-term objective of ensuring that all schools in the province, and the communities within which they reside, have access to affordable broadband Internet services. For example, the Centre for Distance Learning and Innovation (CDLI) is mandated to provide a variety of Internet services and applications for all schools in the province, most particularly network/Internet access for students, teachers and administrators.

It also works closely with the Virtual Teacher Centre, which has a mandate to develop, facilitate and deliver on-line professional development opportunities for educators. CDLI is mandated with the development and delivery of e-learning programs and services to a large number of rural schools. It has recently issued an RFP for services to provide access to a broadband infrastructure that will connect learners and communities including all CDLI schools in the province. This proposed infrastructure build will provide scalable broadband Internet access services and infrastructure to at least 69 target communities throughout the province at requested speeds ranging from at least 1 Mbps to 100 Mbps. Currently, 44 of the CDLI schools are using a frame relay service and 14 schools are using a satellite service, both of which are expensive to maintain. The funding for this project includes $5 million from the federal Canada Strategic Infrastructure Fund (CSIF) with matching funds from the provincial government ($5 million) and at least $5 million from the successful service provider. CDLI currently uses Elluminate, a synchronous Internet based software that allows for sharing of audio, web space and blackboard functionality.

Memorial University and the College of the North Atlantic also provide services to their learners and staff using broadband technologies. The CNA uses an asynchronous tool, WebCT, as an access tool for its distance learners and videoconferencing as an administrative tool to link its campuses throughout the province. Memorial University uses WebCT and Elluminate to support its distance learners. MUN also maintains and supervises the technical network for a number of external clients including CDLI.

2.3.3 Justice

The Provincial Court of Newfoundland and Labrador is mandated to deliver "front line" judicial services throughout the province and is using technology in a number of ways to meet this mandate. The province is divided into 12 judicial districts, each with a court centre and a branch of the court located therein. The court sits "on circuit" in 27 other places where no provincial court or court office is regularly maintained. With the decrease in the number of courthouses and circuit courts in recent years, the Provincial Court is now looking at alternate ways of delivering its services. They have been using audio conferencing, video conferencing and the Internet to deliver some of their services. For example, they have a website that provides access to forms needed by litigants and enforcement agencies but online submission is not yet available. In terms of audio conferencing, the Court is using the system for arraignments and some criminal and family matters, and video conferencing is currently being used by the circuit court in Wabush and Happy Valley/Goose Bay where the Provincial Court has partnered with SmartLabrador and the RCMP. Litigants are accessing videoconferencing units located on the SmartLabrador network or at the hospital location in Clarenville. The Provincial Court was also involved in a pilot project in 2000 that involved delivery of services related to family matters between Corner Brook and Port aux Basques but this service is no longer being delivered by videoconference.

2.3.4 Government

The provincial government owns its own broadband network that delivers enterprise-wide and departmental applications across Newfoundland and Labrador. The Department of Transportation and Works and Treasury Board currently co-manage the network. The main service provider for the broadband network is Aliant while Persona and Rogers provide service in a few rural communities. The current broadband capacity ranges from 56K in some small rural areas to 10 Mgbs in larger centres outside of St. John’s to 100 Mgbs service in metropolitan St. John’s. There are currently approximately 6,000 networked users representing 18 government departments. The network was upgraded in 2001 when it upgraded service to most major public buildings and the departments within the buildings to a 10 Mgbs service.

3. PROVINCIAL NETWORKS

3.1 Overview of Current Networks

Newfoundland and Labrador has a variety of networks or quasi-networks maintained by various public sector bodies and private sector entities. These networks range from sophisticated well-supported networks to small "patchwork" networks. For example, the province currently has no research level wide area network that extends to communities outside of St. John's (as defined by speeds of 1 Gbps or higher) and only a limited level of institutional activity networks (as defined by speeds of 10 - 100 Mbps).

There are a number of commercial network providers that currently provide services throughout Newfoundland and Labrador. For example, relatively large network providers such as Aliant, Group Telecom, Persona, Rogers and Sprint operate in urban areas of the province, and in rural areas Aliant dominates the space with Persona and Group Telecom providing minimal service in a small number of communities. There are also a number of smaller, independent networks such as Burgeo Broadcasting Service (BBS) and CRRS TV in Labrador City, as well as a few wireless providers such as the Electronic Centre that provide alternate services.

There are currently five large public sector networks that provide service to various regions of the province. This includes education networks such as the College of the North Atlantic, the Centre for Distance Learning and Innovation and Memorial University; and health networks such as the Newfoundland and Labrador Centre for Health Information and the Telehealth and Educational Technology Resource Agency.

3.1.1 College of the North Atlantic (CNA)

The College of the North Atlantic has one of the largest and most sophisticated Wide Area Networks (WAN) in the province. This network stretches from the western point of Labrador West to the very east in St. John's. This connectivity between the campuses, as well as to the world via the Internet, is currently provided by Aliant. The two campuses in the St. John's area are connected at 1 Gbps using gigabit Ethernet technology, the seven campuses outside the St. John's area are linked via 100 Mbps switched Ethernet, and the eight relatively smaller campuses are connected at 1.5 Mbps frame relay.

All campuses communicate via an Internet protocol system that not only allows connectivity to the Internet, but also connectivity to various business systems including financial, student and human resources applications. The College has also invested in a considerable infrastructure used for Internet based video conferencing and each campus has at least one video suite.

Refer to Appendix G for more detail and a diagram of the CNA network.

3.1.2 Centre for Distance Learning and Innovation (CDLI)

The Centre for Distance Learning and Innovation purchases different forms of bandwidth ranging from dial-up, 512 Mbps and frame relay directly from Aliant; a 10 Mgbs service from Persona; and a variety of satellite services from other providers. The maintenance and supervision of the CDLI network is provided by Memorial University under contract from the provincial government.

Refer to Appendix H for a diagram of the CDLI network.

3.1.3 Memorial University of Newfoundland (MUN)

Memorial University of Newfoundland currently has modern data networks in its three campuses in the province - the main campus in St. John's, the Sir Wilfred Grenfell College campus in Corner Brook and the Marine Institute campus located in St. John's. The three campuses are interconnected through a managed transparent 10/100 Mbps LAN service, and a cross-island managed 10 Mbps ATM service.

The main campus network connects 43 buildings providing network service capable of supporting 10+ Gbps speeds for approximately 6,000 wired computers, and approximately 2,000 wireless devices. The wireless network which provides complete coverage of the student residences and approximately one third of the academic area, allows access to network services through over 170 wireless access points located about the campus at speeds of up to 54 Mbits/s.

Memorial University also maintains and supervises the technical network for a number of external clients including CDLI and the National Research Council. In addition, MUN is part of a high speed network called CA*net, the national advanced research network funded by CANARIE. While most of the country is currently on the fourth generation of networks, Newfoundland and Labrador is only on the third generation of the network.

Refer to Appendix I for a diagram of the MUN network.

3.1.4 Newfoundland and Labrador Centre for Health Information (NLCHI)

The Newfoundland and Labrador Centre for Health Information has connected all regional wide area networks at the firewall level and also connected to the provincial government network in order to get connectivity with MCP and the Community Referral Management System (CRMS). These links are mostly 1 Mgbs but all are scaleable and several links are 10 Mgbs. The Client Registry that was recently launched does not currently require large bandwidth to operate but the bandwidth will have to increase once more "graphical" applications are introduced province-wide.

The evolution of the provincial Electronic Health Record (EHR) is ongoing and network requirements related to the Pharmacy Network will be addressed in the near future. This initiative will require the provincial Health Information Network (HIN) to access more remote areas than the current model requires. The current set up allows for access into more remote areas by accessing Regional Health Board WANs but these WANs do not currently connect community pharmacies. The provincial DI/PACS project is also driving the need for expansion of the HIN. The HIN is being developed incrementally and it will be the applications that drive the network requirements in order to avoid what has occurred in other provinces where there are huge bandwidth networks and very little traffic to justify the infrastructure.

Refer to Appendix J for a network diagram of the Health Information Network.

3.1.5 Telehealth and Educational Technology Resource Agency (TETRA)

The Telehealth and Educational Technology Resource Agency (TETRA) at Memorial University of Newfoundland, develops technology and networking platforms for effective delivery of audio, video and web conferencing. TETRA provides all these services on a fee for service basis to clients in the public, private and community based sectors. Sample clients in health, education and justice include: the Department of Health and Community Services; Programs in Paramedicine - Health Care Corporation of St. John's; and the Provincial Court and Provincial Department of Justice.

In terms of network infrastructure, large scale, service bureau class, multi-point and dial access video and audio conferencing bridges provide “hub” type connectivity between existing network infrastructures. These linkages include connectivity to:

- *The College System* (College of the North Atlantic) that networks each of the colleges’ provincial locations.
- *Smart Labrador* that enables 23 communities throughout the north, in Labrador, to join the ranks of community based IP networking.
- *The Provincial Government of Newfoundland and Labrador*, that has invested in network connectivity to the TETRA facilities.
- *MUnet*, Memorial University’s wide area IP network, as well as connectivity to *CAnet*, a national IP research and education network.
- *Regional Health Care Boards* that includes connectivity to hospitals within St. John’s, Western, Central West and Central East Boards
  NOTE: The Peninsulas Regional Board takes advantage of a network linkage with the College of the North Atlantic to add two hospital sites within their region to TETRA.

Network interconnectivity through TETRA technologies, results in linkages to over sixty health, education and community sites throughout the province.

Refer to Appendix K for a diagram of the TETRA network.

4. CHALLENGES AND ENABLERS

A review of the literature and an analysis of the interviews conducted with 29 key stakeholders provide the context in which the following challenges and enablers are identified. This represents an overview of the thinking of the private sector, the public sector, the community and other stakeholders in the province.

There have been many challenges to the provincial deployment of a broadband infrastructure in this province. The challenges identified include issues related to the supply and demand of services, issues related to access in rural and remote areas, the lack of perceived leadership, and the need for a provincial strategic approach. While there have been challenges, there has also been a strong enabling environment that supports such development. Some of the enabling factors include a strong collaborative environment, the creation of public networks, and external resources such as federal funding that is specifically identified for such initiatives.

4.1 Supply of Services

In looking at the challenges associated with rural broadband service delivery, two recurring themes were noted – those related to the supply of services and those related to demand for services. While the demand issue is related to the users and is addressed in Section 4.4 Demand for Services, supply issues stem from the unwillingness of service providers to enter rural markets. For example, in this province the competitive marketplace is defined rather differently than the rest of Canada, as true competition doesn't exist. Aliant owns the fibre backbone that runs across the province and therefore dictates who can have access and at what cost. They also own the fibres across the Gulf and all other providers in the province must therefore purchase from them in order to provide access off of the island. The fact that Aliant does not provide a dark fibre tariff results in higher than normal prices. Therefore, while access may be available within the province and off the island, the cost often proves to be prohibitive for many consumers and service providers. Finding ways to deal with these challenges would be a significant step toward addressing the competition issue and also a significant step in resolving the CA*net 4 issue. In the absence of credible competition, some suggest that government consider collaborating with its public sector partners and create it as was done in Quebec and northern parts of British Columbia (refer to Appendix E). Government must also look to the enablers on the social side to create the demand and support for such infrastructure.

There were a number of suggestions in terms of what role government could play in addressing this issue in Newfoundland and Labrador. While some individuals argued that government policies should continue to emphasize the role of competition in stimulating broadband development and should avoid direct intervention in the broadband market, others felt that government's role should be to facilitate such developments and intervene in areas where it has become clear that there will be no private infrastructure investment because of a marginal or non-existent business case.

One of the challenges is lack of competition, which in turn produces issues related to supply. It is perceived that government could assist in two ways to help address this challenge. A significant part of the inability of small players to make a business case is the single competitor owned cross-island facility. It was suggested that government could play a key role in reducing the risk for the private sector in terms of developing and maintaining an alternate cross-island facility, by aggregating its demand for the technology in government contracts. Government could thereby use its ability to purchase as an economic development

tool, stimulating both the public and the private sector in the province. To this end, government could issue a request representing an aggregated demand and let the private sector players come together independently in response to the call. On the other hand, some individuals felt that forced aggregation would not work and that government should be focused on the creation or stimulation of a competitive environment that would enable traditional supply and demand forces to prevail.

4.2 Demand for Services

In order for rural broadband to be sustainable, businesses and private citizens have to not only want it, but also be willing to pay for the service. With the increased awareness of broadband, communities are beginning to understand the social and economic benefits that broadband can bring to their communities. Local communities who are proactive in their approach are critical to influencing the development and use of local broadband infrastructure, so that it can begin to deliver community benefits in areas such as education, health care, economic development, community services, and job creation.

The National Broadband Task Force suggested that it is more than infrastructure that is required when we address the issue of broadband access - we must also encourage use and content development. The challenge is to foster the use of broadband so that it ultimately influences innovation in economic, social, cultural and political arenas, and in the governance of society. The challenge lies in the redesign of structures and processes that will take advantage of the transformative potential of the new technology.

The challenge in nurturing this demand is developing strategies that are appropriate for communities to stimulate knowledge of, interest in, and demand for broadband services within their community. As part of developing the business case for the provision of services, both communities and the different levels of government must be proactive in their efforts to generate these conditions. There are numerous ways to accomplish this objective and the government and communities throughout this province have been actively engaged in this process. For example, communities have built demand through providing free public access points through programs such as Industry Canada's Community Access Program (CAP). This program has shown people not only what the Internet has to offer, but how broadband access can enhance that utility. Urban communities have used the existing business infrastructure to build knowledge and demand. As employees became accustomed to the speed and availability of the Internet at work, they tended to want the same availability of services at home.

Another example of building demand is the current federal initiative i.e., BRAND which is based upon a community champion aggregating the demand in a community, selecting a service provider and overseeing the implementation of the program. In terms of the success of this approach, there is a feeling that it places too much reliance upon the technical skills of the community champion. Also, it produces a patchwork of implementation because community champions were not forthcoming in some regions which was also aggravated by a complicated process and limited funds. This patchwork of implementation meant that certain key mid-sized communities are now without broadband infrastructure. To this end, a strategy to provide broadband at appropriate levels for each community should be considered as a provincial approach is developed.

Within this province, there are still many stakeholders that have a very rudimentary understanding of broadband. They do not have a working knowledge of the benefits of broadband or what the range of broadband services and applications currently available are.

This has implications at many levels including the need to develop programs that can help increase the skills and knowledge in this area. Both government and communities need to increase their understanding of not only how broadband can impact the residential customer, but also the impact it can have on the delivery of services such as health, education and government services. For example, government may be able to save money by aggregating this demand and communities may have better access to services by utilizing the technology.

4.3 Rural Access

Although Canada has emerged as a world leader in broadband use, there are many challenges with respect to deployment in rural and remote areas. The Statistics Canada Report (2003) indicates that access (note that this this does not necessarily translate into subscriptions) to high-speed Internet via DSL and/or cable modem services was available in 1,525 communities, representing about 86% of the Canadian population and 28% of Canadian communities. While these areas are home to most Canadians, it is important to note that 72% of Canadian communities are located mostly in rural and remote areas where facilities that support broadband access are either inadequate or non-existent. In Newfoundland, the penetration rates are quite similar. In October 2002, approximately 17% of communities and 68% of the population had access to broadband services. However, the BRAND program has increased the penetration rates and currently approximately 40% of the communities and 80% of the population in the province have access to broadband services. One of the primary issues regarding rural access was discussed earlier (refer to section 2.3 Provincial), that is, some key communities continue to be without access due to the fragmented approach to implementation.

A second and more difficult issue to gather publicly available statistics on is the robustness and capacity of the networks between rural and urban centres. DSL and cable modems are access tools that join you to the main network. The issue with the main network is that the network speed in some areas is still slow and therefore given to congestion, which in turn is problematic for supporting more sophisticated applications such as the electronic health record or very active e-business applications. Therefore, while we indicate that 40% of the communities in the province have access to broadband service, the quality of that service is sometimes questionable. Subsequently, as part of the development of a provincial strategy more information is required in terms of where this problem exists.

There are many components to broadband technology including access technology, electronics and the basic transport infrastructure e.g., fibre. Unfortunately, the cost per household/person of providing some of these broadband components in rural areas is typically higher than in urban areas. Recent experiences in the deployment of broadband infrastructure has demonstrated that the future direction of broadband technologies and how they are funded is not likely to be uniform in nature, but will instead reflect the variety of economic and geographic factors in these rural and remote areas. The challenge therefore, is in providing access technologies in a cost-effective manner so that the demand for more capacity can be met at a reasonable price. While it appears that the Internet access infrastructure will be provided by the private sector where reasonable rates of return can be realized, in higher cost areas such as rural and remote communities, government incentives may be required to provide equivalent affordable levels of service.

On the other hand, it is important to consider that some of the paradigms related to supply/demand and access in rural areas are currently being challenged (Paltridge, 2004). One of these is that rural areas are unlikely to attract new suppliers because they are high cost areas to serve and do not have sufficient demand. Another is that if rural areas receive

service, prices will need to be higher than urban areas and therefore networks will need to be subsidized, and the levels of service will be lower. Some examples across the OECD which counter these assumptions include: there is a rapidly increasing amount of new private sector entry occurring in the provision of broadband access in rural areas; in some areas the prices are lower than those available in urban areas; and performance is sometimes superior. In a number of countries, demand is proving to be sufficient enough to attract innovative and low-cost service providers.

As the National Broadband Task Force (NBTF, 2001) suggests, the challenge for governments is to reduce or eliminate these problems by fostering a competitive environment in high-density markets, leveraging competitive forces where appropriate and providing direct incentives to encourage private sector investment in high cost areas.

4.4 Leadership

There is currently a perception that there is a lack of leadership in the province around broadband strategy development and many are unsure of who should be driving the development of such an initiative. While it is acknowledged that all have a role to play, some indicate that the leadership role should be embraced by the provincial government at all senior levels including the Premier's Office. It is generally felt that this issue is significant enough that the Chief Information Officer should champion the initiative by bringing the stakeholders together. Most thought that government should spearhead this leadership but ultimately the mandate and membership of this group should be developed in consultation with appropriate stakeholders from corporations and organisations throughout the broadband value chain. This would include the federal, provincial and municipal governments; broadband service providers; broadband product suppliers; members of the broadband content industry; and consumers such as business and providers of education and health care. Alternatively, some individuals suggested that consideration should be given to locating the function outside government as an arms length entity that provides the services of an "honest broker".

Some individuals felt that the absence of a government focus and commitment to a provincial broadband strategy has allowed a few things to occur. The lack of leadership has enabled the private sector, particularly influenced by a monopoly service, to control what happens in the province. Also, because there has not been designated responsibility around coordination and delivery of information and communication technologies (ICT), the province has not been allocating resources in the most efficient way possible. Many feel that there needs to be coordination around aggregating all government ICT services and developing a strategy to address required bundling of this demand in order to obtain better value for the resources that are currently allocated. Affordability was seen to be as important as accessibility, and integration of the services and infrastructure builds was seen as important in terms of developing the synergy required to maximize the province's return on its investment.

4.5 Collaboration

A strong collaborative environment is one of the strengths that the stakeholders offer. In particular, the managers of the provincial health and education networks have worked together on a number of different broadband infrastructure and network initiatives. They strongly support the merits of working together as each of them is responsible for providing and maintaining infrastructure that supports various broadband applications. As many of these network managers have client groups that live in rural Newfoundland and Labrador, the challenges to providing services whether in health, education or justice are immense. This

group has developed a process that supports collaborative working styles in an attempt to address the challenges of access. Through the sharing of access to infrastructure and resources, some of the services they are responsible for are being delivered in a more efficient way. While they strongly support the notion of an integrated system that will ultimately provide higher access speeds for less money, they feel that leadership is critical to ensuring that duplication of services across departments and regions does not continue. Collaborative partnerships can provide an innovative solution to the demand for the deployment of advanced networks in many of the province's hard to reach communities.

4.6 Public Networks in the Province

Over the years business requirements and academic requirements, such as those of the regional health boards and educational institutions such as the College of the North Atlantic, have been critical drivers of the development of capacity in certain areas. This capacity has been developed predominantly in the health and education sectors and ultimately funds for this development have come from the provincial public purse. The provincial government, through its commitment to the development of these public networks, has been a strong contributor to the infrastructure that currently exists in the province.

4.7 External Resources

External funding sources such as the federal government and funds from other jurisdictions have sponsored a number of funding initiatives to encourage the development of broadband infrastructure across the country. Newfoundland and Labrador has received a great deal of funding from initiatives such as BRAND, CANARIE, the Canadian Strategic Investment Fund, the Community Access Program and the Smart Communities Program. In this way local communities have been able to complement external funding sources with local funds to facilitate the development of broadband telecommunications infrastructure.

4.8 Need for a Strategy

There was unanimous support for the development of a strategic approach that would outline a model for deploying broadband service through this province. Many feel that much of the current development has occurred in the absence of a provincial strategy for broadband and therefore a lot of duplication has occurred with resources not being administered in the most efficient way possible. It was also felt that a political agenda often drives the deployment of resources and in the absence of a strategy this is seen as acceptable.

5. RECOMMENDATIONS

There was consensus among those interviewed that they supported the development of a provincial broadband strategy as the current approach to development had been fragmented and had ultimately not been very collaborative. Based on the information contained in this document, it is recommended that the following be considered in the development of a provincial strategy.

- Provision of leadership that will facilitate the development of a strategic plan for the deployment of a provincial broadband infrastructure that is overseen by the Chief Information Officer and the Department of Innovation, Trade and Rural Development. This could be achieved by appointing a Broadband Stakeholder Group who would serve as an independent task group and whose role would be to advise government on the development of its broadband strategy.

- Aggregation of the provincial demand for services by requiring that the public sector work together when issuing requests for the provision of government services.

- Determination of government's role in creating demand.

- Analysis of the current availability and diffusion of broadband services in the province so that a determination can be made regarding what new development initiatives may be appropriate and how they should be structured.

- Determination of government's role in facilitating a reliable and affordable telecommunications service.

- Determination of the balance between residential access and the ability to provide access for social and economic programs.

- Development of a strategy that enables scalable infrastructure to be made available to communities that are unlikely to obtain broadband access as a result of market forces alone.

- Provision of opportunities for increasing knowledge about broadband and increasing skill development regarding broadband use and application, in order to promote the uptake and effective use of broadband services, and to make communities more effective in their dealings with service providers.

- Development of policies and programs that encourage investment in the development of suitable content and encourage the use of appropriate applications in order to ensure a broader uptake of broadband technology.

- Development and implementation of a strategy in collaboration with the federal government that will raise awareness of the benefits and applications of broadband services to citizens, businesses, social groups and communities.

- Build on the collaborative environment that has already been established among the managers of the provincial health and education networks who have developed a successful model of collaboration resulting in reduced cost and improved provision of services.

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APPENDIX A

INTERVIEWS	
1. Patricia Hearn	Industry Canada
2. Karen Skinner	ACOA
3. Gerald Galway	Government of Newfoundland and Labrador – Department of Education
4. Brian Evans	Government of Newfoundland and Labrador - Department of Education
5. Pamela Ryder-Lahey	Government of Newfoundland and Labrador - Department of Justice
6. Juanita Barrett	Government of Newfoundland and Labrador - Department of Health and Community Services
7. Peter Shea	Government of Newfoundland and Labrador - Department of Business
8. Doug House	Government of Newfoundland and Labrador - Department of Innovation, Trade and Rural Development
9. Dave Penney	Government of Newfoundland and Labrador - Department of Transportation and Works
10. Mike Mooney	Telemedicine and Educational Technology Resources Agency (TETRA)
11. Wade Sheppard	Centre for Distance Learning and Innovation (CDLI)
12. Frank Shapleigh	Centre for Distance Learning and Innovation (CDLI)
13. Wayne Hann	College of the North Atlantic
14. Steve Quinton	College of the North Atlantic
15. Rod Campbell	Memorial University – Computing and Communications
16. Wilf Bussey	Memorial University – Computing and Communications
17. Steve O'Reilly	Newfoundland and Labrador Centre for Health Information (NLCHI)
18. Mike Barron	Newfoundland and Labrador Centre for Health Information (NLCHI)
19. Jeff Howard	Group Telecom
20. Ray Dillon	Sprint
21. Alfred Whiffen	Aliant
22. Ken Marshall	Rogers
23. Dean MacDonald	Persona Communications

INTERVIEWS	
24. Sheila Downer	Smart Labrador
25. Jeannie House	Newfoundland and Labrador Health Boards Association (NLHBA)
26. Victoria Belbin	Newfoundland and Labrador Regional Economic Development Association
27. Ann Marie Vaughan	Newfoundland and Labrador Regional Economic Development Association
28. Clyde Wells	Newfoundland and Labrador Regional Economic Development Association
29. Sean Wiltshire	Newfoundland and Labrador Regional Economic Development Association

APPENDIX B

BROADBAND DICTIONARY [3]

Analog: Continuous and variable electrical waves that represent an infinite number of values. Opposite of analog is digital.

ATM: Asynchronous Transfer Mode. A method for the dynamic allocation of bandwidth using a fixed size packet (called a cell). ATM is also known as "fast packet".

Backbone: The primary connectivity mechanism of a hierarchical distributed system. All systems which have connectivity to an intermediate system on the backbone are assured of connectivity to each other. This does not prevent systems from setting up private arrangements with each other to bypass the backbone for reasons of cost, performance, or security.

Bandwidth: Bandwidth refers to how fast data flows through the path that it travels to your computer; it's usually measured in kilobits, megabits or gigabits per second.

Broadband: Broadband comes from the words "broad bandwidth" and is used to describe a high-capacity, two-way link between an end user and access network suppliers capable of supporting full-motion, interactive video applications.

Cable modem: Refers to the type of broadband connection that brings information to homes and businesses over ordinary television cable lines.

Downstream speed: Refers to the speed at which data flows from the information server to your computer.

DSL: Stands for digital subscriber line; it refers to the type of broadband connection that brings information to homes and businesses over ordinary copper telephone lines.

Ethernet: A computer network cabling system designed by Xerox in the late 1970s. Originally transmission rates were 3 Megabits per second (Mb/s) over thick coaxial cable. Media today include fiber, twisted-pair (copper), and several coaxial cable types. Rates are upto 10 Gigabits per second or 10,000 Mb/s.

Fast Ethernet: A version of Ethernet that operates at 100 Mbps. Fast Ethernet is in the form of an Ethernet hub with an internal bus that runs at 100 Mbps.

Gigabit: One thousand million bits. The number of bits that be transmitted in one second.

Gigabit Ethernet: A variant of Ethernet that operates over multimode fiber optic cable, single mode fiber optic cable, or unshielded twisted pair, at 1000 Mbps.

Hub: A common connection point for devices in a network that takes an incoming signal and repeats it on all other ports. Hubs operate at the physical layer.

Kbps: Stands for Kilobits per second, or thousands of bits per second. For example, most analog modems transmit at 56 Kbps or 28.8 Kbps.

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[3] http://broadband.gc.ca/pub/technologies/bbdictionary.html retrieved on December 27, 2004

LAN: Local Area Network. A data network intended to serve an area of only a few square kilometres or less. Because the network is known to cover only a small area, optimizations can be made in the network signal protocols that permit data rates up to 1000Mb/s.

MAN: Metropolitan Area Network. A data network designed for a town or city. In terms of geographic breadth, MANs are larger than local-area networks (LANs), but smaller than wide-area networks (WANs). MANs are usually characterized by very high-speed connections using fiber optical cable or other digital media.

Mbps: Stands for Megabits per second, or millions of bits per second. This is a measurement of how much data can be transmitted through a connection. For example, 6.0 Mbps is 200 times faster than a 28.8 Kbps analog modem.

Network: A computer network is a data communications system which interconnects computer systems at various different sites. A network may be composed of any combination of LANs, or WANs.

Packet: The unit of data sent across a network. "Packet" a generic term used to describe unit of data at all levels of the protocol stack, but it is most correctly used to describe application data units.

Protocol: A formal description of message formats and the rules two computers must follow to exchange those messages. Protocols can describe low-level details of machine-to-machine interfaces (e.g., the order in which bits and bytes are sent across a wire) or high-level exchanges between allocation programs (e.g., the way in which two programs transfer a file across the Internet).

Router: A system responsible for making decisions about which of several paths network (or Internet) traffic will follow. To do this it uses a routing protocol to gain information about the network, and algorithms to choose the best route based on several criteria known as "routing metrics.

Satellite: Refers to the type of broadband connection where information is sent from and arrives at a computer through satellite dishes.

Switching hub: A switching hub remembers what devices are connected to each port and only sends data to the required port. Each port has the full bandwidth and is not required to share it unlike ordinary hubs.

Switch: Controls the traffic flow of frames across a network by providing a dedicated connection. Switches operate at the data link layer.

Twisted pair: A wiring scheme that uses standard pairs of copper wires. Twisted pair might be used for normal telephone connections, serial data links, or twisted pair Ethernet.

Upstream speed: Refers to the speed at which data flows from your computer to the information server.

Wireless: Refers to the type of broadband connection where information is sent from and arrives at a computer through transmission towers.

TECHNOLOGY FACT SHEETS [4]

CABLE MODEM
Cable modem service is a high-capacity connection to the Internet that uses your existing cable television wires without interfering with your channels.

How Cable Modems Work
Each television channel you receive from cable occupies 6 MHz of bandwidth on that cable. The physical cable itself is capable of carrying hundreds of channel, so Internet data is simply packaged into another 6 MHz channel and sent along the cable with the rest of the television signals. Since people generally download more than they upload, only 2 MHz needs to be allotted on the cable for the return stream.

Strictly cable television networks are one-way, that is, they are designed to send television programming from the source to the users only. For cable modems to work, the network must be made to allow data to travel both directions. A cable modem termination system (CMTS) at the source end of the network enables the two-way traffic to individual users and forwards that data on to the service provider.

The Advantages
Cable modems are “always on”, you don’t have to dial in or connect.
Cable modem service speed is higher than a 56Kbps dialup modem.
Cable modem service does not necessarily require additional wiring to work.
Cable modem speed is not limited by distance.
Cable modems are a relatively inexpensive and established technology for residential use.
Surfing the Internet does not interfere with your cable TV.

DSL
A Digital Subscriber Loop (DSL) is a high-capacity connections to the Internet that uses existing telephone wires without interfering with your telephone service.

How DSL Works
Telephone lines were originally installed for voice conversations, which only occupy a small or narrow band of frequencies at the lower end of the spectrum (between 0 and 3400 Hz). In addition, these copper wires are capable of transmitting signals at much higher frequencies. This means that by sending data signals over higher frequencies, the voice conversation can still carry on undisturbed in the lower frequencies.

A simple analogy would be lanes on a highway. Voice conversations would be like people driving in the right lane, while data transfers would be like transports driving in the left lane. As long as the vehicles stay in their own lanes, the people and the cargo get to where they were intended to go.

The Advantages
- DSL is “always on” and doesn’t tie up your phone line.
- DSL speeds are much higher than dialup (1.5 Mbps vs. 56 kbsp).
- DSL does not necessarily require additional wiring to work.
- DSL download speeds are not affected by the number of users.

[4] http://broadband.gc.ca/pub/technologies/tech_factsheets/index.html

FIXED WIRELESS

Fixed wireless in a high-capacity connection to the Internet and often the only option for sparsely populated areas or where challenging terrain prohibits traditional wireline connections.

How Fixed Wireless Works

Unlike conventional wireless networks (such as cellular telephones and PDAs), fixed wireless implies that the transmitter and receivers are stationary (i.e. a modem on a desk or an antenna fixed to the side of a house). The base station is generally a radio mounted on a local high point (i.e. on a microwave tower, water tower, or the top of a tall building). It transmits in and receives from all directions or can be focused in a certain direction to improve range or split the subscriber base. Subscriber modems can easily receive from and transmit to the base station.

Radio systems operate at particular frequencies; some of which are licensed and others which are license-exempt or unmoderated. Licensed frequencies are managed and when a license is granted (fees do apply), that spectrum (a set of frequencies) is protected from interference by other systems. Amongst other things, cellular telephones, pagers, and high-capacity microwave backhaul networks, operate in licensed spectrum. On the other hand, license-exempt spectrum is free but offers no recourse in the event of interference. Portable telephones, remote-controlled toys and even microwave ovens operate at license-exempt frequencies.

The Advantages

- Wireless modems can be “always on”, you don’t have to dial in or connect
- Fixed wireless service can range from 128Kbps up to 50Mbps
- You do not need any wiring to your house for wireless to work
- Surfing the Internet does not interfere with your cable TV or telephone
- Wireless service is generally syncronous, that is speed to upload (send and e-mail) and download (receive an e-mail) is generally the same
- Wireless is often the only choice for non-urban areas or difficult terrain

SATELLITE

This document is intended to provide a brief description of satellite technology, satellite frequency bands, satellite network components, the advantages of satellite service, the different classes of service, the evolution of satellite technology, satellite performance enhancements, bandwidth efficiency techniques and community benefits of satellite technology.

How Satellites Work

A satellite is a special wireless receiver/transmitter that repeats radio frequencies. It is launched by a rocket and placed in orbit around the earth. There are hundreds of commercial satellites in operation throughout the world. These satellites are use for a wide range of purposes including internet access, television broadcasting, wide-area network communication, weather forecasting, amateur radio communications and the Global Positioning System.

The Advantages

- Available everywhere
- Broadcast distribution
- Economically sound
- Reliability
- Fast deployment and installation
- Network capacity expansion
- Flexibility and expandability

APPENDIX C

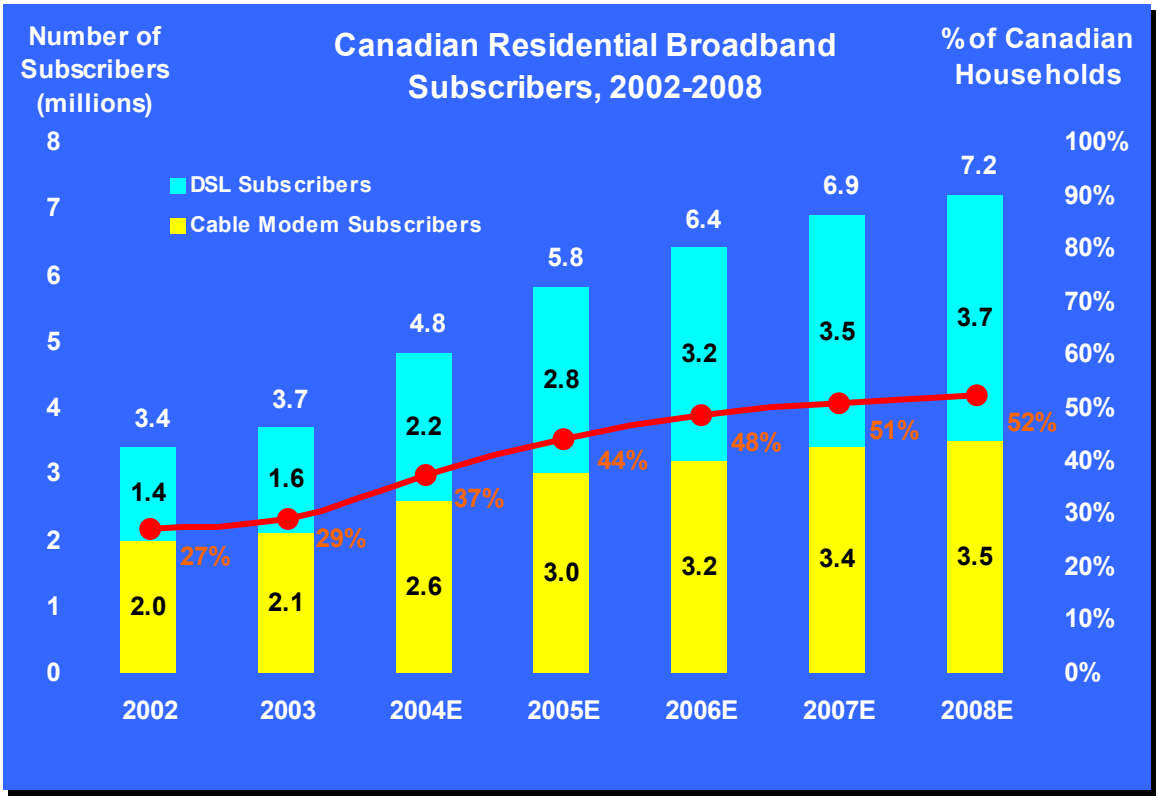
Table 1. Broadband subscribers per 100 inhabitants in OECD countries, June 2004

	DSL	Cable Modem	Other Platforms	Total
Korea	14.0	8.4	2.0	24.4
Denmark	10.5	5.0	1.6	17.0
Canada	7.9	8.7	0.2	16.7
Netherlands	8.5	7.0	0.0	15.6
Iceland	14.6	0.2	0.7	15.5
Switzerland	8.9	5.6	0.0	14.5
Belgium	8.6	5.4	0.3	14.3
Japan	9.5	2.1	1.1	12.7
Sweden	7.7	2.4	2.2	12.3
Norway	9.1	1.8	0.5	11.4
United States	4.0	6.3	0.9	11.2
Finland	9.0	1.9	0.1	11.0
Austria	4.4	4.4	0.0	8.8
OECD	5.1	3.0	0.5	8.6
France	7.3	0.7	0.0	8.0
United Kingdom	4.7	2.8	0.0	7.4
Spain	5.2	1.6	0.0	6.8
Germany	6.4	0.1	0.1	6.6
Portugal	2.9	3.5	0.0	6.4
Italy	5.6	0.0	0.5	6.0
Luxembourg	5.0	0.7	0.1	5.7
Australia	3.6	1.6	0.1	5.3
New Zealand	3.0	0.2	0.3	3.6
Hungary	1.5	0.9	0.9	3.3
Ireland	1.4	0.1	0.1	1.7
Poland	0.5	0.7	0.0	1.2
Czech Republic	0.4	0.4	0.0	0.8
Slovak Republic	0.3	0.1	0.2	0.6
Mexico	0.3	0.2	0.1	0.5
Turkey	0.2	0.1	0.0	0.3
Greece	0.2	0.0	0.0	0.2

Source: OECD Communications Outlook 2005 (forthcoming)
http://www.oecd.org/document/31/0,2340,en_2649_34225_32248351_1_1_1_1,00.html

APPENDIX D

Diagram 1: Canadian Residential Broadband Subscribers 2002-2008
Source: Yankee Group, North America Consumer Fixed-Line & Media Forecast (March 2004) in http://broadband.ic.gc.ca/pub/media/presentations/binder/icca061104_en.pdf



APPENDIX E

Table 2. Overview of Provincial Infrastructure Across Canada

	RESEARCH LEVEL	INSTITUTIONAL LEVEL	RESIDENTIAL LEVEL	HOW
NEWFOUNDLAND AND LABRADOR	• NL has no Gbs networks • However, there is 640 Mbs between St. John's and Halifax as part of CaNet*4 and paid for by the backbone funding from CANARIE	• College of the North Atlantic (100 Mbs on backbone and 1-10 Mbs to various campuses) • MUN-Grenfell College, Corner Brook link; 10 Mbs • St. John's Health Care Board • Two health care boards have 10 Mbs links to St. John's	• All School Boards and CDLI Schools • All non-St. John's Institutional Health Boards	• NL has no real research level WAN and limited institutional level of network activity
PRINCE EDWARD ISLAND	• Two, 1Gbs fibre-base – light paths (IRU's) links as part of CaNet*4 • UPEI / Holland College (Charlottetown and Sunnyside) on the Gb route from New Brunswick • Charlottetown → Sunnyside also a Gbs connection through Halifax on the redundant circuit	• 100 Mbs link to the Department of Education which is the school link to CaNet*4 • Urban schools generally have 45 Mbs (T-3) connectivity	• Rural schools fractional T-1 • Hospitals fractional T-1 to T-1	• A "Ring (fibre) around PEI" has been in the planning phase for some time and therefore provides a direction for ongoing activities. It is anticipated that $38M will be expended over 5 years. The Province and the Strategic Infrastructure Fund (S.I.F) will partner in funding this plan. It is part of PEI's prosperity plan. As part of this activity, PEI anticipates up-grading the link between CaNet*4 and the Department of Education to 1 Gbs
NOVA SCOTIA	• Two fibre-based light-path routes (IRUs) as part of	• University College of Cape Breton (UCCB) – Cape	• All schools varying from 512 K – T-1. Higher	• The dark fibre ring in Halifax was paid for by

Table 2. Overview of Provincial Infrastructure Across Canada

	RESEARCH LEVEL	INSTITUTIONAL LEVEL	RESIDENTIAL LEVEL	HOW
	CaNet*4 • Fibre (36 strand) ring in Halifax joining Dalhousie, St. Mary's, I.W. Killam, Mount St. Vincent, NRC, and TARA – a business research alliance • A community-owned fibre build in Annapolis Valley joins municipalities, colleges and schools	Breton 155 Mbs • 10 other research organizations join CaNet*4 at speeds between 20-100 Mbs • Department of Education link to the school network is 20 Mbs	bandwidth is available in some urban schools	the 36 members of the Nova Scotia ORAN in exchange for 20-year IRU access. • Eastlink sells IRU's to rural areas. These links are paid for by institutions. • Western Valley Development Corporation paid for the extensive fibre build in Annapolis Valley
NEW BRUNSWICK	• 2 fibre-based light paths (IRU's) to CaNet*4 at Gb speeds • 1 Gbs fibre-based ring to all campuses and NRC locations – St. John, Moncton, Sackville, Bathurst, Edmonton, Shippigan, and Fredericton • Department of Education to link schools	• Some urban schools and hospitals have networks between 10-100 Mbs range	• Rural schools and hospitals, T-1 and fractional T-1	• Research – The provincial fibre connectivity was paid for by the universities ($3M), NRC ($3M), ACOA and CANARIE. Total cost of the build was $11M. While CANARIE and the universities played a role in evolving this consortium the kingpin was NRC which insisted that its e-commerce research centres had to be connected at Gbs speeds. The telecommunications provider is Group Telecom. • Residential – Planned The provincial government is working

Table 2. Overview of Provincial Infrastructure Across Canada				
	RESEARCH LEVEL	**INSTITUTIONAL LEVEL**	**RESIDENTIAL LEVEL**	**HOW**
				with CSIF and Indian and Northern Affairs Canada (INAC) to extend residential level access to 90% of communities, 95% of population, and 100% institutions. This will be a BRAND type service connecting DSL and other digital infrastructure (within the next 3-4 years). Total project $44.6 M. It is part of NB's innovations.
QUEBEC	• Two fibre strands are part of the CaNet*4 backbone. In Quebec the ORAN, not a commercial carrier, actually sells this fibre access to CANARIE. (Fibre strands not IRU's) • All university campuses – fibre strands • Most school boards and schools • A number of research centres in various cities	Rural School Boards	• Extensive coverage through Village Branches. An early entry and substantial programme (in excess of $100M) which partners with public agencies like schools, hospitals and municipal buildings to "cause" commercial Internet, and now broadband, to be built through communities.	• Quebec used a "fibre-condo approach" i.e. many groups (universities, hospital and school boards, Quebec Hydro etc.) had a certain amount of fibre networking in place to address their individual needs. They all joined forces and "swapped" fibre strands in their networks to create an extensive fibre network throughout many areas in the province. They then collectively paid to have any extra they needed constructed. Eventually even the incumbent telephone

Table 2. Overview of Provincial Infrastructure Across Canada

	RESEARCH LEVEL	INSTITUTIONAL LEVEL	RESIDENTIAL LEVEL	HOW
				company joined the "condo". The Village Branches Programme was a partner in the some of the school settings. Quebec also has an aggressive e-commerce plan that helps drive the need and rationale for investment in the high speed networks.

ONTARIO	• 8200 km optical fibre that joins 23 points of presence (ORION) throughout the Province. Part of this network rides on the two CaNet*4 light paths through Ontario.
	• There are additional fibre networks that join this one.
	• LARGE-Net London – 26 members – schools, health, research/Post-secondary
	  • WED-Net - Windsor / Essex (There are fibre connections in towns which are linked to ORION by 155 Mbs networks)
	  • OCRINet - Fibre ring around all Ottawa/Carlton
		• Many school boards	• In southern Ontario there is extensive coverage driven by the competition in the industry. The same is true in larger cities in the north. However, rural and northern areas of Ontario have many of the same challenges with connectivity as NL and rural areas of other provinces.	• Sufficient competition exists in Ontario to allow groups to secure good prices for a variety of services including access to IRU's or fibre strands if requested. There is also considerable aggregation of demand by groups like OCRI-Net, LARGE-Net, etc., to be drivers for change to encourage carriers to sell IRU's or dark fibre access.
				• Ontario had a $50M funding programme "COBRA" that co-funded projects that was quite similar to Broadband for Rural and Northern Development

Table 2. Overview of Provincial Infrastructure Across Canada

	RESEARCH LEVEL	INSTITUTIONAL LEVEL	RESIDENTIAL LEVEL	HOW
	including post-secondary and some health institutions, all research centres and numerous large IT business (640 members).			programme. Note: COBRA has not been funded this year although it will continue to fund projects already approved. It is anticipated that the COBRA programme will seek refunding in the next fiscal year or new activity will be funded from within another branch of government.
MANITOBA	• Two, 1 Gbs links to the CaNet*4 • 13 institutions in Winnipeg – including University of Manitoba, post-secondary institutions, federal and provincial research centres including NRC Biodiagnostics Institute and TR-Labs (a university, government, industry collaboration that operates 5 laboratories in telecommunications in Western Canada), the Medical campus of University of Manitoba, government departments, private sector, a “Smart Park” and MERLIN. The IRU network is provided by Group Telecom.		• School system: Between 128Kbs in northern and 2 Mbs in urban schools. (120 schools were 1Mbs or higher as of 2002.) • Direct PC (2Mbs/56K) to all schools for Interactive Television	• The provincial government uses the aggregated buying power public sector and its need for very high-speed networks to enable the carrier (MTS) to continue to extend its fibre network and thus to be able to provide high speed services of various types to all clients. Thirty-six communities in southern Manitoba were added to the commercial fibre network recently.

Table 2. Overview of Provincial Infrastructure Across Canada

	RESEARCH LEVEL	INSTITUTIONAL LEVEL	RESIDENTIAL LEVEL	HOW
	• City of Winnipeg is in the planning process for fibre runs for all public institutions including education libraries, fire/paramedic stations, hospitals, medical clinics, government offices, etc. • A 1Gbs link from CaNet*4 to the schools through MERLIN (MERLIN provides a number of IT services to schools including connectivity) • Commercial fibre extended to many communities enabled by "bulk buying" by government on behalf of the public sector. Different groups can then purchase the desired speeds required by their agencies.			
SASKATCHEWAN	• The universities in Regina and Saskatoon are on the two different paths of the CaNet*4 backbone	• Capacity in 237 communities to purchase at speeds of DSL (1.5M), 10 Mbs or 100Mbs.	• Capacity in 237 communities to purchase at speeds of DSL (1.5M), 10 Mbs or 100Mbs.	• Research connectivity funded by CANARIE • Residential/Institutional has been provided through the Community Net initiative through which the government of Saskatchewan is an anchor tenant requiring that high speed networking be delivered a total of 1528 public agencies (government

Table 2. Overview of Provincial Infrastructure Across Canada

	RESEARCH LEVEL	INSTITUTIONAL LEVEL	RESIDENTIAL LEVEL	HOW
				offices, schools, hospitals, libraries) in 366 communities ($76M over 6 years). This allowed SaskTel to expand commercial broadband service to 237 new communities.
ALBERTA	• Two 4Gbs circuits on CaNet*4 • 4 Gbs circuits between Calgary – Edmonton including all institutions post-secondary and research centres in these cities • Gbs circuits to post secondary, research institutions, Department of Education • Some private sector groups buy Gbs circuits linking to CaNet*4	• 100 Mbs links to Lethbridge and Banff including post-secondary and research centres • SuperNet – connects 420 rural communities – 3000 km fibre will join all public buildings in these communities: some very remote communities are connected by wireless o Schools = 10 M base service at $503per month o Health = 10 M base service (VPN) at $503 per month - 100 M at $697 per month	• Universal coverage by 2005 as part of SuperNet rollout	• Some 3 years ago Government of Alberta issued an RFP, which was won by Bell Nexia, to build a fibre backbone to 420 communities. The government negotiated very good institutional rates for very high speed access to this network (Budget to Government $198M over 5 years).
BRITISH COLUMBIA	• 1 Gbs fibre-based light wave as part of CaNet*4 • Fibre (24 strands) around Vancouver joining UBC, SFU, BCIT and associated research institutes • Dark fibre strands	• Health Authorities, some private sector firms, CBC • Some urban locations on PLN (Public Learning Network)	• Schools/Colleges – Fractional T-1 to T-1 on Public Learning Network	• British Columbia uses a different model for constructing its high speed network based on neutral “transit exchanges”. Each stakeholder group pays

Table 2. Overview of Provincial Infrastructure Across Canada

	RESEARCH LEVEL	INSTITUTIONAL LEVEL	RESIDENTIAL LEVEL	HOW
	connecting University of Victoria to a downtown node referred to as a "transit exchange" (neutral high-speed network, service hub, used by many agencies including some carriers). • University of Northern British Columbia in Prince George is linked to this same transit exchange using 100 Mbs channels • Prince George has built and operates a community-owned fibre network. The University is one of the institutions, which are anchor tenants on this community network.			either for fibre builds or IRU costs which links them to the exchange. It is worthy of note that the BC telecom market is fairly competitive in the south. In the north where there is less competition a community owned fibre network was the solution. • The Public Learning Network is a multimillion-dollar multi-year investment of the BC government that connects schools and colleges.

Source: Broadband Availability in Canada. Erin Keough (2004) - Open Learning and Information Network.

Regional Economic Development Boards

Newfoundland and Labrador
Regional Economic Development Association

Regional Economic Development Boards and Broadband Delivery

January 21, 2005

The Newfoundland and Labrador Regional Economic Development Association (NLREDA) is the umbrella organization for the Regional Economic Development Boards. The 20 Boards assist in the strategic coordination and organization of economic initiatives across the province, from the Avalon peninsula to Northern Labrador. Incorporated in February of 2003, NLREDA's board of directors represents the four main geographical regions of the province: Labrador, Western, Central and Avalon. NLREDA's mandate consists of several goals, including strengthening the identity of the 20 Boards, public relations and marketing, representing collective interests, promoting inter-board communications, advocacy, events planning and more.

Early in 2005, NLREDA was contacted by Janice Cooper, a consultant working on behalf of Industry Canada and the provincial government, to identify important issues related to broadband delivery. As a stakeholder in regional economic development, the association was asked to provide feedback and input into the current status of broadband delivery in the province.

On January 12, 2005, representatives of the NLREDA board of directors met with Ms. Cooper to discuss these issues. Prior to this meeting, feedback had been obtained from the Regional Economic Development Boards. Ms. Cooper provided the association with four questions to put to the Boards, in an effort to obtain comprehensive feedback concerning broadband. They were:

1.) What are the challenges and the enablers that Boards have experienced from an economic development perspective in terms of broadband infrastructure?
2.) What are Board program areas that require broadband infrastructure?
3.) What are the policy issues that need to be addressed from a government policy perspective?
4.) What needs to be given priority in terms of moving a provincial broadband strategy forward?

Most Regional Economic Development Boards played a significant role in rural Newfoundland and Labrador on this issue by facilitating the proposals that have ultimately brought broadband to their regions. Access to broadband infrastructure is identified as the main component to the sustainability of rural communities. Without this technology, Boards would have significant difficulty in fulfilling their role as the leading economic development facilitator within their regions. Based on their

experiences in identifying their regions needs, facilitating the proposals and ultimate success in the broadband initiatives, Regional Economic Development Boards are in a good position to offer insight into the challenges and opportunities of current and future broadband delivery.

Challenges

Without a comprehensive provincial broadband plan, direction or strategy, applicants have been lead to identify their needs without guidance. In some cases, what has resulted is a disconnected infrastructure that is dealing with short term issues rather than identifying future needs of it regions. The public do not generally understand the future benefits of broadband and the opportunities it could present. The lack of provincial strategy has resulted in general confusion and a lack of knowledge about broadband. This disjointed approach has exposed the need for accountability. There needs to be someone in charge of this sector. Without accountability of one partner, this sector has evolved to allow for the main provider (Aliant) with a monopoly and this position has allowed for a significant barrier for advancement of the technology. Another challenge is in the financial area: finding local contributions to meet the financial obligations of the broadband infrastructure programs and sustainability of local networks has been difficult.

Opportunities

Access to broadband infrastructure opens up numerous opportunities to all stakeholders. In particular there will be more opportunities for business development, increased training options and improvements in service delivery for health, education and justice. Broadband infrastructure will also play a key role in the marketing initiatives and in the communications of the Boards. Strategic broadband planning will provide opportunities for individuals to make the choices to remain in their rural communities. With effective broadband services, communities will have access to distance education, chances for small businesses to develop global export opportunities, access to health and other on-line services.

Policy Issues

In order to offer these opportunities, a provincial strategy needs to be developed, however there are many policy issues which must be addressed before this process begins. The public have to be aware of the change from a resource-based economy to a knowledge-based economy. There needs to be more public awareness of the importance of connecting with other networks in the region. Since this can not happen until there is a more coordinated approach, policy changes should be implemented provincially to ensure that there is coordination in the development and utilization of IT/broadband infrastructure. Policies also need to address the issue/need for training and awareness building of the capabilities and opportunities offered by broadband capacity. The notion that broadband will bring with it more than just faster Internet must be communicated. It is also important to recognize that policies are required to provide support to Regional Economic Development Boards to ensure that they remain active in addressing local/IT needs.

The government through policy should assign responsibility. Policies need to ensure that government takes an active role in helping to ensure that the primary service provider (Aliant) remains a responsible corporate citizen within communities. This will guarantee that the provider maintains the broadband capacity and expands the service, as required, by the town. It is not recommended that government limit or control competition in this sector, but allow it to happen. It is important that the government identifies what is required and to deal with elements of competition that impedes progress. The government needs to protect the applications and partners with funding while creating the opportunity of competition to allow it to happen.

Priorities

In the future development of a provincial strategy on broadband, there are priorities which in particular impact on regions which need to be considered. First, the strategy should focus on starting from the beginning by defining the needs and technology that previously exists–the strategy should bring all the partners together to discuss what is required to move forward. A provincial broadband strategy must address common issues within our province as they relate to information technology development, but must also recognize that there are different needs that require different approaches for both the urban and rural regions. Increasing awareness of the benefits and potential of information technology will expose the opportunities this technology will provide communities. Individuals will have the opportunity to remain in rural communities, with health, education and government services available on-line. By providing equal access to the information highway for all communities, there will be an increase in the development of IT business opportunities and partnerships.

NLREDA and its board of directors, on behalf of its membership, would like to thank both Industry Canada and the government of Newfoundland and Labrador for the opportunity to participate in these consultations. Broadband technology and a comprehensive provincial broadband strategy are key to the future success and strength of all regions of the province and we look forward to working with you in the future on this initiative.

TETRA
Bridging the distance

Memorial
University of Newfoundland

VIDEOCONFERENCE SITES IN NEWFOUNDLAND AND LABRADOR

ONCE SITES HAVE BEEN IDENTIFIED, PLEASE CONTACT MARY SQUIRES (758-8313) FOR AVAILABILITY AND COSTING INFORMATION

NEWFOUNDLAND SITES	LABRADOR SITES
Baie Verte College of the North Atlantic	**Black Tickle** St. Peter's School Black Tickle Nursing Station
Bonavista College of the North Atlantic Bonavista Peninsula Community Health Centre	**Cartwright** Henry Gordon Academy School Cartwright Nursing Station
Brookfield Brookfield Hospital	**Charlottetown** William Gillett Academy School Charlottetown Nursing Station
Burin College of the North Atlantic	**Churchill Falls** Churchill Falls Clinic Town Centre
Carbonear College of the North Atlantic	**Forteau** Southern Labrador Telecentre Labrador South Health Centre
Clarenville Dr. G.B. Cross Memorial Hospital College of the North Atlantic	**Happy Valley-Goose Bay** Labrador Health Centre College of the North Atlantic
Corner Brook Western Memorial Hospital College of the North Atlantic Aliant Videoconference Room	**Hopedale** Hopedale Nursing Station Amos Comenius Memorial School
Fogo Fogo Island Hospital	**L'anse au Loup** Community Center
Gander James Paton Memorial Hospital College of the North Atlantic Aliant Videoconference Room	**Labrador City** Captain Wm Jackman Memorial Hospital Labrador West Centre for Interactive Learning
Grand Falls-Windsor College of the North Atlantic Central Newfoundland Regional Health Centre	**Makkovik** Makkovik Nursing Station Development Corporation Building
Placentia College of the North Atlantic	**Mary's Harbour** Mary's Harbour Nursing Station Mary's Harbour All Grade School
Port aux Basques	**Nain**

NEWFOUNDLAND SITES	LABRADOR SITES
Dr. Charles L. LeGrow Health Centre College of the North Atlantic	Nain Health Centre College of the North Atlantic
Seal Cove College of the North Atlantic	**Natuashish** Community Clinic
St. Anthony Curtis Memorial Hospital College of the North Atlantic	**North West River** TVCR Building.
St. John's TETRA Spencer Hall	**Port Hope Simpson** Port Hope Simpson Nursing Station D. C. Young School
Stephenville Sir Thomas Roddick Hospital College of the North Atlantic	**Postville** Postville Nursing Station B.L. Morrison All Grade School
Twillingate Notre Dame Bay Memorial Health Centre	**Rigolet** Rigolet Nursing Station Town Council Office
	Sheshatshiu Mani Ashini Health Centre Charles J. Andrew Treatment Centre
	St. Lewis St. Lewis Academy
	Wabush J. R. Smallwood Collegiate School
	West St. Modeste Learning Centre
	William's Harbour William's Harbour School

Please note:
An eight (8) site maximum is recommended for an interactive videoconference session.