PROJECT TO IMPLEMENT THE EEYOU ISTCHEE BROADBAND COMMUNICATIONS NETWORK (ECN)

Case study

Canada Economic Development for Quebec Regions
Développement économique Canada pour les régions du Québec

Canada

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Executive summary

In 2009-2010, Canada Economic Development for the Regions of Quebec (CED) prowded funding for the *Project to Implement the Eeyou Communications Network* (ECN) by means of a non-repayable contribution of $9.6 million for construction and commissioning of a broadband telecommunications network. The overall purpose of the project was to enable the project proponent to offer secure and reliable connectivity services (voice, data and video) in the Nord-du-Québec region.

Execution of the project was expected to generate significant benefits for both the Cree and Jamesian (non-Aboriginal) communities[1] targeted:

- access to broadband services could be expected to maximize the development potential of local enterprises by tapping business opportunities that would otherwise be beyond their reach, and
- the network should also help improve quality of life and promote social development by upgrading delivery, by electronic means, of public services such as governmental, on-line health care and education services.

Since the project had not achieved the maturity needed to measure socio-economic spin-off at the time of writing this case study (2014), this study will focus on three issues:

- how effectively the project was implemented;
- the usefulness of the project to the region, its enterprises and its organizations, and
- attainment of the expected immediate outcomes.

The project's socio-economic spin-off can be documented later.

The methodology combines a review of the literature, analysis of performance data and interviews.

General findings

Effectiveness of implementation:

- The project came within the planned budgets, but there were delays in commissioning because the supplier had to replace outdated equipment to ensure that the network would operate;
- Siting, choice of equipment and certain administrative matters, such as compliance with deadlines and annual expenditures, created difficulties in getting the project up and running;
- The communities targeted were served by the project, but a lack of local Internet distributors limited the access of recipients (residents and small businesses) to on-line services, and
- The best practices identified in the case study are:

[1] Jamesian: someone born in or living in the James Bay region.

  - rigorous planning by the proponent;
  - the contractual provisions with the supplier (eg: legal warranties in case of failure);
  - the presence of technical expertise, and
  - the coordination of efforts among those involved.

- The lessons learned include the importance of taking into consideration challenges such as those posed by local capacity to provide technical expertise to support the deployment and maintenance of the network right from the project design phase, and
- The governance model is a contributing factor to the smooth operation of the *Eeyou Communications Network.*

Usefulness:

- The Eeyou Broadband Network is an asset and a lever for economic development;
- However, regional capacity to handle the technology associated with broadband represents a challenge for the targeted communities, and
- The project is expected to generate medium-term social development and long-term economic development, with potential benefits such as cloud computing, increased numbers of North-South business transactions, messaging and IP telephony, video conferencing, data centralization, etc.

Effectiveness:

- The project has not yet produced all the anticipated immediate results: two people were employed full time, compared to the 28 direct jobs initially planned;
- Recurring sales were $1.6 million, whereas forecasts on March 31, 2013 were for $2.3 million. In all, 91% of anticipated connections were made (141 out of 155);
- The project has fostered development of cooperation between communities and government agencies, in particular with [Cree Human Resources Development*]* and the Quebec Department of Health and Social Services;
- Government programs, including those for regional economic development, are necessary to support major projects like broadband in remote areas. Longer times are therefore needed to see whether the results sought by CED materialize;
- Though not all fall within the scope of CED's mandate, suggestions for improving attainment of the anticipated outcomes include capacity building in terms of technological expertise and competencies, planning for access to capital, flexible government regional programs, and coordination of decision-making procedures and government efforts;

- A comparison with CED-funded broadband projects in other regions of Quebec, analysis of the effects (terms and conditions, regulations, etc) and the prerequisites for creation of a monopoly for a broadband telecommunications network in a remote region, and a study of potential avenues of interdepartmental collaboration could be food for thought on anticipated outcomes and factors in the success of such projects.

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Introduction

1.1 Project description

Since 2001, the communities to which the project applies (Cree, Jamesian and Innu) have striven to establish a fibre-optic broadband telecommunications network in the Nord-du-Québec region. The project's rationale derives from the conclusions of a feasibility study carried out by a consulting engineering firm.[2]

The broadband project should enable its proponent, *Eeyou Communications Network* (ECN)[3] to provide secure, highly reliable and high-capacity connectivity services capable of delivering voice, data and video services. The proposed broadband service is slated to serve a group of isolated communities with an aggregate population of nearly 30,000 people, 155 private companies, 30 schools and school boards, health care establishments, and public safety agencies.

The communities affected by the project, including the Cree and Jamesian communities, have an *Economic Development Index* (EDI)[4] among the lowest[5]. In fact, economic development in these northerly communities presents significant challenges, among them remoteness, scattered population, lack of qualified labour, and climate. On the other hand, the development opportunities offered by these areas are many, especially in the fields of energy, mines, forestry, fisheries, aquaculture, organic food production, and tourism.

The project covered deployment of a network spreading out from a fibre-optic trunk running from Hydro Quebec's Saint-Félicien facility to the LG-1 generating station near Radisson.

First, this existing 803-km infrastructure was purchased by ECN. Subsequent fibre-optic installation work (both buried and overhead lines) was designed to link:

- nine Cree communities (Chisasibi, Wemindji, Nemaska, Mistissini, Ouje-Bougoumou, Waswanipi, Waskaganish, Whapmagoostui (Poste de la Baleine) and Eastmain) and
- five Jamesian communities (Radisson, Chibougamau, Matagami, Chapais and Lebel-sur-Quevillon)

[2] The study by the ADGA group evaluated the technical feasibility of the project and confirmed the network's capacity to meet current and future broadband needs in the region. The study indicated that there were no technical risks associated with the project and that the proposed technology (fibre optics) will be adequate to current and future broadband demand. The study also cited the need for a remote area like James Bay to have access to the same technological standards as main urban centres so that communities can reap significant social and economic rewards.

[3] The member organizations of the Eeyou Communications Network are: Grand Council of the Crees of Eeyou Istchee / Cree Regional Authority (CRA) www.gcc.ca; James Bay Cree Health and Social Services Council www.creehealth.org; Cree School Board www.cscree.qc.ca; James Bay Cree Communications Corporation www.creeradio.com; James Bay Regional Conference of Elected Officials www.crebj.ca; James Bay School Board www.csbj.qc.ca, and James Bay Regional Health and Social Services Centre: www.crsssbaiejames.gouv.qc.ca

[4] The economic development index was developed by CED to determine the level of economic development of 104 communities in Quebec so that their needs could be better met. This index measures progress on economic variables (participation rate, entrepreneurship and exporting operations, value of building permits, productivity, etc).

[5] Ranked 99th among MRCs on CED's economic development index, Eeyou Istchee's economy is heavily dependent on government transfers. Ranked 83rd among MRCs on CED's economic development index, the economy of James Bay relies heavily on natural resource extraction. Distance from key markets, a shrinking and ageing population and low rate of entrepreneurship make economic diversification difficult. This information is based on the 2011 census.

Given the distances and costs involved in connecting to the fibre-optic trunk, the project was divided into two phases. The first, partly funded by CED, aimed to connect 11 of the 14 Nord-du-Québec communities. The Departmentof Indian and Northern Affairs Canada (INAC), now the Department of Aboriginal Affairs and Northern Development (AANDC), supported the Agency in obtaining funding from the envelope earmarked for Aboriginal priorities in the 2006 budget to finance the project. AANDC has identified broadband as an essential component in enabling the region's Cree community to increase its socio-economic development opportunities.

The three remaining Cree communities – Waskaganish, Whapmagoostui (Poste de la Baleine) and Eastmain – should continue to be served by existing microwave links until the second phase of the project, development of which is ongoing at the time of writing this report.

Technical considerations

Originally, the Nord-du-Québec region was served by microwave infrastructure installed for telephone service. In opting for fibre optics, the communities were looking for a technological solution enabling them to offer quality service and permanently end the region's isolation. This network would act as a bandwidth highway connecting to points of presence (PoPs). These PoPs would in turn serve as gateways to neighbouring villages.

- A distinction has to be drawn between the technology (fibre optics) and the equipment (transponders) used to carry the technology. ECN needed to ensure that the capacity of the equipment selected by call for tenders is adequate for the evolving performace requirements of regional users.
- A redundancy or a "loop" in a circuit or network allows data to circulate over two pathways and arrive at the same point, thus making the network more robust in the event of a fibre-optic cable break and preventing failure or loss of data.

1.2 Project funding

Total project costs amounted to some $28.8M.[6] The project was financed in equal shares by the communities (both Cree and Jamesian), the Government of Quebec and the Government of Canada. When the project was approved, installation of the network was supposed to start no later than August 1, 2009 and wrap up by March 31, 2011. The federal portion paid by CED consisted of a non-repayable contribution of $9.6M over three years: $2M in 2008-2009, $6M in 2009-2010 and $1.6M in 2010-2011. The weighted rate of assistance was 44.3% for the construction and commissioning of the network (see breakdown of cost estimates in Annex 1). In the project's embryonic stage, several federal departments provided support[7], chiefly in the form of technical advice and consulting. For instance, Industry Canada's Spectrum, Information Technology and Telecommunications sector provided guidance to ensure that the specifications in the call for tenders matched federal government requirements for telecommunications projects.

In addition to CED's contribution, ECN also received non-repayable financial assistance from the Quebec Department of Education, Recreation and Sport (MELS) and the Quebec Department of Municipal Affairs, Regions and Land Occupancy (MAMROT) through the *Villes et villages branchés* program. This program opened the way for municipal funding from the James Bay

[6] A description of the associated types of cost is shown in Annex 1 - Table A. Estimate of Eeyou Communications Network project costs.

[7] Aboriginal Affairs and Northern Development Canada (AANDC), Public Works and Government Services Canada (PWGSC) and Industry Canada (IC)

Regional Conference of Elected Officials (CREBJ) and the James Bay School Board (CSBJ). The final portion of the funding came from the Cree Regional Authority (CRA). Table 1 displays the funding structure:

Table 1. ECN project funding structure

Source	**Amount**
Public funds	
Canada Economic Development Agency for the Regions of Quebec	**$9,600,692**
MELS (Quebec Department of Education, Recreation and Sport) / MAMROT (Quebec Department of Municipal Affairs, Regions and Land Occupancy)	**$9,600,000**
Other sources	
Cree Regional Authority (CRA)	**$7,930,700**
CREBJ (James Bay Regional Conference of Elected Officials)	**$1,200,000**
CSBJ (James Bay School Board)	**$500,000**
Total	**$28,831,392**

Apart from the Nord-du-Québec project, CED has funded four other broadband projects elsewhere in Quebec since 2006 to the tune of approximately $3.4M. The purpose of these projects was to:

- improve the communication system to make broadband services accessible to SMEs in the communities of the Saguenay Fjord and the Upper North Shore not yet served because of the low user density;
- wrap up deployment of a high-speed Internet network in the Pontiac and Vallée-de-la-Gatineau MRCs;
- provide SMEs and the self-employed in the Gaspé region with high-speed Internet service in areas where it was not offered because of low user density; and
- install the telecommunications infrastructure needed to provide the community of Portneuf with broadband service.

1.3 Anticipated results of initiatives

The project was approved under the *Community Diversification* Program, "Attractive Assets" sub-heading. The aim of this provision is to see that communities have the shared facilities needed to increase or consolidate their economic development.

The intermediate outcome sought under this heading is to have communities recognized for their distinctive character, their brand image or their outreach (see logic model in Annex 2).

The indicators and performance targets included in the agreement between ECN and CED are detailed in Table 2.

Table 2. Project indicators and targets

Indicators	**Target value**	**Target value attainment date**
Number of private enterprises connected	155	March 31, 2011
Direct jobs created	28	March 31, 2011
Value of recurring annual sales	$2.3M	March 31, 2013

Completion of this project is expected to generate significant benefits for the communities of Nord-du-Québec:

- Access to broadband services will help maximize the development potential of local enterprises by opening up business opportunities that would otherwise be beyond their reach, and
- The network should help to improve the quality of life and promote social development by improving delivery, by electronic means, of public services such as government services, on-line health care and education.

Operation of the network was expected to create 28 new full-time (permanent) jobs, including 24 specialist positions (technicians) and 4 in network management.

2. Methodology used in conducting the study

This section presents the issues and questions for the case study, the methodology used and the timetable.

2.1 Scope

CED has made a commitment to Treasury Board to conduct a study to measure the economic spin-off from this major project.

This study documents project implementation, namely:

- the usefulness of the project as a development tool for the communities to which it applies;
- implementation success factors, in particular collaboration between the two communities;
- attainment of direct project results in terms of job creation in ECN, and
- estimates of the potential spin-off for organizations and enterprises connected (or about to be connected) to the broadband network.

Since the project had not achieved the maturity needed to measure socio-economic spin-off at the time of writing this case study (2014), this will be documented by a study of the economic benefits in 2017.

Though CED's funding applied only to the construction and commissioning of the network, the results sought through the funding reflected the project in its entirety. The findings and detailed lines of thinking in this case study therefore refer to the broadband network implementation project as a whole.

2.2 Issues and questions

2.2.1 Effectiveness of implementation

Five questions document implementation of the project. Specifically, they serve to identify success factors, determine to what extent it reaches the intended beneficiaries, shed light on the lessons learned and assess how well CED's roles and responsibilities have been harmonized with those of the communities and the Government of Quebec.

Table 3. Questions on implementation

Questions	**Data collection methods**
To what extent has the Eeyou Network implemented the project as planned? Are there particular factors that have either simplified or complicated project implementation? If so, what are they? Have changes been made? If so, what are they?	- Viewpoints of those involved (financial partners, promoters, local interests) on compliance with initial planning (timetable/budget), project monitoring and adequacy of the resources applied relative to expected outcomes

How were project risks managed? How did CED contribute to completion of the project?	- Viewpoints of those involved (financial partners, promoters, local interests) on factors and problems with an impact on implementation
Did the project reach the targeted communities and beneficiaries?	- Viewpoints of those involved (financial partners, promoters, local interests, clients and local suppliers) on factors and problems with an impact on implementation - Analysis of project performance measurement data
What are the best practices and lessons learned with regard to the design, execution and monitoring of the broadband project?	- Literature review for comparison with implementation of similar projects - Viewpoints of those involved (financial partners, promoters, local interests, clients and local suppliers) on best practices and lessons learned in the design, execution and monitoring of the project
How were governance and communication among those involved managed (including First Nations)?	- Literature review for comparison with implementation of similar projects - Viewpoints of those involved on relations among the various players

2.2.2 Usefulness

Two questions document the issue of the project's usefulness. The first sounds the project's adequacy to the region's development needs, and the second details the development opportunities created for enterprises and organizations in the region.

Table 4. Questions on the project's usefulness

Questions	**Data collection methods**
To what extent does the project constitute an asset/lever for economic development in the targeted communities in the prevailing economic context?	- Viewpoints of those involved (financial partners, promoters, local interests, clients and local suppliers) on the usefulness/contribution of the project in the economic development of Nord-du-Québec
To what extent do enterprises and organizations consider that the project constitutes a development opportunity, specifically with regard to their	- Literature review of documents identifying the economic spin-off of

positioning in the context of development activities in the North?	similar projects - Viewpoints of those involved (financial partners, promoters, local interests, clients and local suppliers) on development opportunities created by broadband

2.2.3 Outcomes

Three questions address attainment of immediate outcomes.

Table 5. Questions on expected project outcomes

Questions	Data collection methods
To what extent has the project generated the immediate output and outcomes anticipated?	- Analysis of project performance measurement data
To what extent has the project contributed to building collaborative links or partnerships (cultural and/or financial) among levels of government (federal/provincial), Aboriginal groups and communities? (Other unforeseen effects)	- Viewpoints of those involved (financial partners, promoters, local interests, clients and local suppliers) on relations among the various players
Could the same outcomes have been achieved in a different way?	- Literature review on other programs or similar cases

2.3 Study governance

In the spirit of the *Evaluation Standards for the Government of Canada*, a monitoring committee was established to steer the study. The committee's mandate included commenting on the various deliverables (evaluation framework, interview guides, list of interviewees and final report), facilitating access to project data, and providing advice and guidance at every stage of the study to maximize its usefulness for CED.

This committee was directed by the Planning and Evaluation Directorate and included representatives of the Agency's Operations sector and Policy and Communications sector.

2.3.1 Data collection methods

The sources of data used for the study sometimes made it possible to cross-check the data gathered. Methods were chosen with due regard for deadlines, resources and the data available.

The following three methods were used:

- analysis of project performance data;
- literature review, and

- qualitative interviews.

The administrative data used and the data from the financial information management system and CED's Hermes program (Hermes system) consisted chiefly of project tracking data provided previously by the Abitibi-Témiscaminque business office, by the Nord-du-Québec business office and by the proponent (ECN). These administrative data included: project progress (installation of network infrastructure, obstacles encountered, progress of discussions with potential clients), project performance measurement relative to the targets set in the contribution agreement, and any other relevant project-related information.

The literature review focused on documents setting out government priorities (budget speech, press review), comparative studies of broadband implementation and references to needs associated with this type of infrastructure in Quebec, Canada and abroad.

Semi-directed interviews were conducted by CED's evaluation team with a total of 29 people in January and February 2014. Respondent groups were: 8 representing financial partners (3 CED representatives, 4 from ECN's board of directors and 1 from MELS), 4 people engaged directly or indirectly in implementing the project, 1 local Internet service provider, 6 local concerns and 10 actual or potential users. The average interview duration was 40 minutes. The interviews yielded qualitative data on the relevance, efficiency and economic impact of the project. The interviews were conducted face-to-face and by telephone using pre-established interview guides.**2.3.2 Study limits**

Since the project was only recently carried out, the study focused on immediate outcomes and lessons learned in the process. Data collection methods were limited to a literature review, analysis of performance data and qualitative interviews. The study's findings are based chiefly on qualitative information.

3. Findings on project implementation

To what extent has the Eeyou Network implemented the project as planned? Has the project reached the targeted beneficiaries and communities?

- The Eeyou Network has implemented the communications network project in accordance with the planned budgets.
- The network is operational, as confirmed by 83% (24/29) of interviewees.
- Operationalization of the network suffered delays because the supplier had to replace equipment.
- There were no cost overruns. The targeted communities have been served by the project.
- The ECN signal has reached the targeted communities, but connections have been concentrated among larger users (eg: municipal administrations, school boards, health authorities, Crown corporations and large enterprises).
- The shortage of local Internet distributors limits access for beneficiaries (residents and small businesses) within the communities.

Are there factors which either simplify or complicate project implementation? If so, what are they? Have changes been made? If so, what are they?

How were project risks managed? How did CED contribute to project implementation?

- The answer to both questions is the same, since most factors in implementation were also considered risk factors.
- Siting, choice of equipment and certain administrative arrangements such as compliance with deadlines and annual expenditures raised difficulties during project implementation.
- Geographically, the Nord-du-Québec region is thinly populated with a northern climate, creating obstacles to the development of infrastructure and industries, and consequently retarding socio-economic development.
- Replacement of obsolete equipment delayed project implementation.
- According to the proponent, the time taken by both governments to approve the funding and grant permits exerted further pressure on the work undertaken, but the flexibility allowed by CED and the funding conditions eased this constraint. The processing deadline was three months.
- Partners in the Cree community are counting on self-determination in developing the network, with acquisition and development of expertise and service delivery as factors in the project's success.
- Network capacity needs to be developed, with specialized personnel to support the service.

What are the best practices and lessons learned regarding the design, execution and

monitoring of the broadband project?

The best practices identified explain how the factors and risks noted in section 3.2 were mitigated. They include:

- In terms of best practices:
    - rigorous planning;
    - contractual provisions with the supplier (eg: legal warranty in case of failure);
    - buried fibre-optic cables rather than overhead lines;
    - presence of technical expertise, and
    - concerted efforts in negotiating flexible funding conditions.
- In terms of lessons learned, provision needs to be made for:
    - checking equipment before installation;
    - more precise technical specifications in the contract;
    - consideration of the HR component right from the design phase of the broadband project, and
    - the literature suggests that funding models for this type of project must be geared more to sustained than to one-time investment as a way of ensuring development of human capital.

How were governance and communication among the parties involved (including First Nations) managed?

- Governance among ECN project participants has been managed effectively.
- The governance model has been cited as a factor contributing to the smooth operation of ECN and the project by all financial partners (n=8), the proponents (n=2) and others involved (n=4).
- This project has built collaborative links between the Cree and the Jamesians and between the levels of government. They are considered a key factor in its success (n=15/21).
- All parties involved must continue to be encouraged to buy into project objectives through efforts to promote the economic benefits of broadband for the development of Nord-du-Québec (n=25/29).

3.1 To what extent has the Eeyou Network implemented the project as planned? Has the project reached the targeted beneficiaries and communities?

Construction of the network, ie: installation of poles and fibre-optic cables, was completed in June 2011. However, the network was not fully operational because it quickly became saturated. ECN ran a check of the network and found that electronic equipment such as transponders was obsolete, and corrections needed to be made. There were therefore delays in connecting clients as the technology was replaced, finishing in late 2012. In May 2013, ECN reported no new challenges with equipment; migration of new clients was ongoing in March 2014.

According to data provided by the proponent and available from the Hermès system, the last instalment was released on March 22, 2012. Though operating revenues were lower because of the delay in deployment, the proponent revised its budgetary planning to be able to meet commitments. For its part, the Agency ensured that costs were kept in line by monitoring the project and through frequent contacts with the client, random financial reports and project progress reports. Apart from a few adjustments, the work proceeded as planned in the comprehensive timetable presented in the contribution agreement.

ECN focuses on connecting public institutions such as the city halls of Chapais, Chibougamau and Matagami, school boards and the Cree health authorities in Chisasibi, Mistissini and Wemindji, as well as a few large enterprises and Crown corporations (Air Inuit, Valpiro, Alstom, Hydro-Québec, etc). The network is now up and running and serving most of the targeted communities, as was confirmed by some 83% of interviewees. Even though it is operational, however, most communities are faced with a shortage of local Internet distributors.[8] This lack of distributors limits access for small businesses and residents and delays connection for certain clients.

3.2 Are there particular factors that either simplify or complicate project implementation? If so, what are they? Were changes made? If so, what are they? How were project risks managed? How did CED contribute to the project's completion?

The answer to the questions in section 3.2 is the same, since most factors in implementation were also considered risk factors.

The region's characteristics are major factors in implementing the project and managing the network and its costs. The vast area of Nord-du-Québec and its low population density are impediments to development of infrastructure and industries, thus limiting socio-economic development. Communities are remote from each other, and resupply points are few and far between. Moreover, this arid wooded region is exposed each year to forest fires and to a northern climate (several months of extreme cold, with rocky or frozen soil).[9]

To mitigate these factors, the preferred method is to bury the fibre-optic cables. Though this method is costlier and carries certain risks (possible damage to cables in areas under development (nurseries), lack of roads/access, additional permits for trenching, etc), it remains the most viable and sustainable option over the long term.

Further, equipment capacity may vary depending on the area to be served to ensure quality service. To minimize costs and risks of service interruption, ECN has acquired monitoring systems to anticipate and locate equipment failures, thus reducing travel and optimizing maintenance.

According to the project's proponents, the main unforeseen factor was replacement of obsolete equipment by the supplier, leading to a delay in deploying the full network. This problem was

[8] Only the communities of Chisasibi and Wemindji have suppliers.

[9] The network lies in the heart of a territory of 839,000 KM^2 covering 55% of Quebec's total area, with few roads, and thus faces the geographical challenge of a lack of continuity between service points.

detected because surplus capacity was very low, suggesting that the transponders were not strong enough to carry the needed bandwidth and uncovering fusion problems at some points.

Thanks to a contract clause, ECN was able to get the product replaced at the supplier's expense, thus reducing risk in choice of equipment. It has been recognized by experts interviewed that certain specifications should have been better defined and detailed in the call for tenders. Because of the challenges posed by geography and the tight deadlines, ECN had little room for trial and error once the network was set up. It had to work right from the start.

In spite of the correction made by the supplier using superior quality equipment at no additional cost to ECN, certain clients identified as representing a major share of anticipated revenues (eg: health council clients) were connected two years later than planned. Expected revenues channeled to the operating budget were therefore held up, which limited the operating budget and the size of the ECN team. This cap on the size of the team servicing the network was a significant factor in implementation, since this was the team providing technical support and thus ensuring reliable service. The problem surfaced when there was a physical failure, since the ECN team had only two full-time employees and a handful of part-time staff (equivalent to six full-time) to cover the region.

According to the promoter and the financial partners, the exercise of balancing risks, benefits and costs while keeping the project viable was a key priority for ECN. The proponent also mentioned that the time taken to approve financing and obtain permits increased the pressure on the timetable for the work. Work was started pending these approvals so as not to hold it up, given the challenges posed by winter (constraints on excavation and travel). According to CED and ENC representatives, both organizations worked closely together to ensure that financing arrangements and contractual constraints did not increase administrative pressures on the project. For example, the planned project completion date was put back, and certain costs as planned at the outset were revised to allow the project to proceed. A broadband project case study for the Washaho Cree Nation in Fort Severn confirms CED's approach to managing its agreement with ENC. "(…) the community needs support for long-term planning, supported by its strategic partners, for sustainable ... connectivity."[10] Comparable to CED's project approval deadlines, the project was approved within three months of filing the final application.

As stated in the agreement between CED and the proponent, the latter sought to create 28 direct jobs in the management and maintenance of the network. The partners in the Cree community and ECN both insisted that the network, services and expertise be developed at the local level. This was a firm condition and a factor in the project's success. The Fort Severn case study states: "Broadband networks and new technology coming into a community have little added value unless they benefit the unique needs of the community as a whole."[11] However, developing a specialized workforce in this remote region is a challenge. The communities affected by the project are only in the first stages of appropriating current technology.

Lastly, according to the financial partners (n=8), proponents (n=3) and other parties (n=3), the ability to influence, the credibility and the solidity of the network as well as sound relations are all necessary conditions for the successful implementation of a project like this.

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[10] O'Donnell, S., Kakekaspan, M., Beaton, B., Walmark, B., Gibson, K. (2011) "How the Washaho Cree Nation at Fort Severn is Using a "First Mile Approach" to Deliver Community Services", Presentation at the *Telecommunications Policy Research Conference*, Arlington, Virginia, USA, September, p. 15. http://ssrn.com/abstract=1985750.

[11] *Idem*, p.15.

3.3 What are the best practices and lessons learned regarding the design, execution and monitoring of the broadband project?

The project proponent's representatives have identified several best practices that have facilitated the project's design and implementation (n=3):

- Rigorous planning is called for before starting a project like this in a remote area – tight budgets and deadlines were met in spite of siting challenges, dilatory approvals and technological upgrading;
- Contract provisions (eg: legal warranties in case of failure) covered replacement of obsolete or defective equipment and helped avoid litigation;
- Experiences during deployment (eg: fires) led the proponent to opt for buried fibre-optic cables rather than overhead lines;
- In spite of the project's complexity, several of those involved (all the financial partners and/or potential users) (n=18) have stated that the proponent's technical expertise was well regarded by all concerned, thus enhancing the project's credibility, and
- Concerted efforts by ENC and CED in negotiating contract terms and flexible conditions were indispensable in reducing administrative pressures.

They also listed a few lessons learned:

- Check the engineering before equipment is installed to forestall costly replacements, the attendant delays and potential loss of revenues;
- Ask for more refined specifications with additional details when the next call for tenders on equipment and installation is issued, like those in the D&S, and
- Take into consideration development of the human capital needed to ensure both management (proponent) and use (users) over the long term, not just installation of the physical infrastructure and design of the broadband project.

In more general terms, the literature suggests, in the Fort Severn case study, that "funding models must evolve beyond the current practice of paying only for one-time capital without supporting the sustained training and capacity building required in communities."[12]

At the same time, the Fort Severn findings emphasize how user training is essential in broadband-type projects:

- The community needs greater local capacity to be able to support management and control of the information and services carried on its network. This presupposes a need within the community for the ongoing funding of professional development and training for the personnel delivering these services;
- Community members themselves need support to ensure that they can use the services available with broadband effectively, and

[12] *Idem*, p.16.

- The reporting and direct supervision needed for the smooth operation of the services available through broadband will always be a challenge as long as management and personnel continue to change.[13]

Given the implementation stage of the broadband network, it will not be possible to gauge the short or medium-term economic spin-off (jobs and enterprises created, market development, regional appeal, etc). The planned study of economic spin-off should not be contemplated for another three to five years.

[13] *Idem*, p.15-16.

3.4 How are governance and communication among those involved (including First Nations) managed?

According to the financial partners (n=8), some proponents (n=2) and others involved (n=4), the governance model contributes to the smooth functioning of ECN and the project. The majority of the financial partners, proponents, users and others who have commented on collaboration in the project (n=15/21) have cited it as being exemplary. The four members of ECN's board interviewed (two Cree and two from the Jamesian community) stated that there had been good collaboration, but that this had taken time to achieve. They specified that most conflicts were avoided because of the 75-50 voting formula.[14] The insistence of the federal and provincial governments that the project gather the communities in the region around a shared goal rather than having several separate initiatives was seen as a lever for building relations between communities, and federal and provincial support was essential, conducive and unifying.

According to the four board members interviewed, there were certain divergences of interest among the communities on ECN's business model and the definition of project needs. At the outset, the Jamesians just wanted a stable network that would reach as many people as possible at an affordable price, whereas the Cree sought to use the project as a lever for developing their region to create jobs through a locally managed network.

As the project was being designed, the various groups had to learn how the others operated, negotiate the needs to be included in the project and clarify each party's roles and responsibilities. The two communities acknowledged each other's complementary expertise, which helped to manage relations among the participants. For example, one group facilitated negotiations with Hydro-Québec, while the other completed the project's financial package by obtaining subsidies from the Government of Quebec.

According to the financial partners (n=8), proponents (n=3) and other parties (n=3), managing these expectations and maintaining this balance remain a challenge that can be overcome if the parties continue to talk openly, work together on project objectives and pursue sound resource management.

In practical terms, all financial partners, proponents, users and others concerned (n=25/29) share the view that ECN must continue to unite the various parties involved around project objectives through efforts to promote its economic and local development benefits. The hope is that the broadband network will help:

- attract new players (either local or Southern) offering new services;
- develop a critical mass of bandwidth demand for new markets and jobs (economies of scale), and
- strive for optimum land use in Nord-du-Québec and adjoining regions (social development).

[14] ECN's board of directors consists of Cree (eight) and Jamesian (three) representatives, chaired by a representative of the Cree Regional Authority. Their voting system is 75-50: 50% approval is required for routine expenditures, while 75%, including at least one Jamesian vote, is required for major changes.

4. Findings on the project's usefulness

To what extent is the project an asset/lever for economic development in the targeted communities?

- The literature on broadband and its presence in the regions studied suggests that it does leverage economic and social development.
- The Eeyou broadband network constitutes an asset and a lever for economic development, but certain conditions are required for success.
- 90% of respondents (n=26/29) consider that such a network allows local actors in Nord-du-Québec to exert greater influence over its development.
- There is a consensus among some 80% of respondents (n=20/25) that price/quality ratios have improved or will improve with the arrival of the network.
- There are indirect savings through the provision of new services thanks to video conferencing and IP telephony.
- All those interviewed feel that the Internet is now an essential service for developing the region, and the broadband network gives access to better-performing Internet service.
- Regional capacity (training and entrepreneurship) must be able to take on board the technology associated with broadband (86% of interviewees).

To what extent do enterprises and organizations consider the project to constitute an opportunity for development, specifically improving their positioning in the context of Northern development activities?

- The project should generate social development activities in the medium term and economic development over the long term.
- 65% of users are confident that the ECN project is the way to go to improve their business and institutional operations. 35% of respondents were unable to comment.
- The greater speed and capacity of the broadband network are becoming a boon to users, with potential benefits such as cloud computing,[15] more North-South transactions, messaging and IP telephony, video conferencing, data centralization, etc.

4.1 To what extent is the project an asset/lever for economic development in the targeted communities?

Access to a broadband network does provide leverage for economic development. According to all proponents, financial partners, local interests and most users (n=25/29), access to the broadband network (and to Internet services) will give the region greater accessibility, appeal and economic viability. Like ECN's board, where there are representatives from both communities in Nord-du-Québec (specifically the James Bay region), 90% of respondents (n=26/29) said that

[15] According to the definition of the *National Institute of Standards and Technology* (NIST), cloud computing is a model for enabling ubiquitous, convenient, on-demand network access (through a telecommunications network) to a shared pool of configurable computing resources.

development of a broadband network would give all those involved, including users, greater influence over development of their region. This is why the network's owners are from the region, local management being cited as one of the project's objectives, so that local interests receive better consideration.

Before the broadband project, there was no telecommunications infrastructure, and the capacity to optimize Internet use did not exist. Nord-du-Québec was served by microwave infrastructure (radio relay) set up for telephone service. This technological limitation compounded the isolation of an already inaccessible area. The fibre-optic technology used for the Nord-du-Québec project offers the high-capacity bandwidth needed for optimum use of the Internet in the region. The Internet in turn brings assets and levers of economic development, with interactive functions, data transfer and the possibility of real-time communication (IP telephony, e-mail, chats, etc).

The network provides an alternative for the targeted communities, which hitherto had only very costly, low-speed connections compared to what is available in southern Quebec. The network's proponent quotes the example of Chisasibi, where one megabit of data cost between $2,000 and $3,000 compared to $4 in Montreal. This improvement in the price/quality ratio with the arrival of broadband meets a consensus among the majority of interviewees. Indeed, 80% (n=20/25) of interviewees (excluding CED and MELS) stated that they now had access to superior data transfer capacity (citing variations of 10 to 100 times, depending on locality) for the same price.

This capacity provides for uses which were out of the question before the arrival of the network. The most compelling example is that of court appearances by video conference. In order to meet various requirements, a connection of at least 5MB was required for a video conference, a rate which did not exist before implementation of the broadband network. The reduction in the travel entailed represents savings for the justice system of several thousand dollars per defendant. This technology could also be applied to tele-medicine. One interviewee explained how this medium could help nurses in remote areas when they have to make major decisions on medical conditions.

Another potential application is IP telephony. For some localities in Nord-du-Québec now served by the broadband network, the only means of communication available is satellite telephone, entailing enormous costs. IP telephony would substantially reduce the costs of long-distance communications for both individuals and businesses.

In addition, an entrepreneur in a remote area capable of developing a technology or software would now be able to operate more easily where he is instead of having to move to an urban centre. Business people would be able to envisage settling in remote areas if they knew that they would have access to essential business services such as reliable, high-capacity telecommunications.

According to several representatives of financial partners (6/8), proponents (4/4), clients and other parties (8/17), the network may make it possible to use remote computer support (based in Montreal, for example), which would enable enterprises to develop their projects in Nord-du-Québec. According to an OECD study, expanded Internet connectivity opens up business opportunities, lowers barriers to entrepreneurship, changes the business environment, leads to

efficiencies within enterprises and nurtures the growth of links among entrepreneurs in ways that were not previously possible because of lack of time, resources or connections.[16]

The literature on broadband suggests, with examples in support, that this type of network does constitute a lever for economic development.

Industry Canada estimates that broadband access has become "a necessary infrastructure that Canadians rely on in order to participate in today's economy," and that the advantages of broadband services apply to all sectors.[17]

The Federation of Canadian Municipalities considers that "much of the economic growth that has taken place in recent years has resulted from the use of broadband networks to improve productivity, provide new products and services, support innovation in all sectors of the economy, and access new markets in Canada and abroad."[18]

The Public Policy Institute of California has found a positive correlation between expansion of broadband and economic growth, especially for industries that are more dependent on information technology and regions with a lower population density.[19]

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[16] OECD, Directorate for Science, Technology and Industry Committee for Information, Computer and Communications Policy, (2013), *Working Party on the Information Economy – The Internet Supporting SMEs and Entrepreneurship*, December, p. 3, DSTI/ICCP/IE(2013)11.

[17] Industry Canada (2006), *Formative Evaluation of the Broadband for Rural & Northern Development Pilot—Final Report*¸ p. vi, http://www.ic.gc.ca/eic/site/ae-ve.nsf/eng/02999.html.

[18] Federation of Canadian Municipalities (2013), *Policy Statement – Rural Communities*, March, p. 5, http://www.fcm.ca/Documents/corporate-resources/policy-statements/Rural_Communities_Policy_Statement_FR.pdf.

[19] KOLKO, Jed, (2010), *Does Broadband Boost Local Economic Development?* January, p. 28, http://www.ppic.org/content/pubs/report/R_110JKR.pdf.

Researcher Peter Stenberg, an economist with the US Department of Agriculture's Economic Research Service, found that broadband Internet access in these communities made employers more competitive than those without such access and boosted the appeal of these communities.[20]

Case studies by Lamie and Barkley of Clemson University and Markley of the University of Missouri have shown that SMEs in remote areas can extend their markets geographically through electronic commerce, and product development leads them to niche markets through transactions on interactive Web sites. Also, inventory management can be built into on-line database software, making for reduced sales costs, improved client service and a better quality of life for the entrepreneurs.[21]

A broadband study by Litan and Crandall of MIT showed that some 300,000 jobs had been created in the United States between 2003 and 2005, in particular in finance, education, health care and manufacturing.[22]

Morris and Lyndon of the University of New Hampshire have confirmed that broadband allows workers to work from a distance, so that the economy brings in jobs without enterprises having to relocate.[23] Indeed, some interviewees (financial partners, proponents and local partners) have pointed out that this may restrain an exodus of workers from Nord-du-Québec.

Although broadband is a lever of economic development, 86% of interviewees (n=25/29) are of the opinion that the presence of a network in the region is not enough to guarantee a fully operational and technically supported service and ensure that it is used. Respondents recognize that both users and suppliers must be ready (technically and culturally) to use this tool (including high-speed Internet applications). In fact, the usefulness of the lever is intimately bound up with the training and capacity of a local specialized workforce that can support service delivery.

An assessment by Industry Canada lists the considerations for broadband projects in remote areas:

- "Although it is too early to tell if innovation performance has improved in the Broadband Pilot Program communities, the Program is one of a series of complementary programs designed to improve Canada's innovation performance."[24]
- "Market forces alone will not extend the benefits of broadband access to some communities."
- "These communities (in rural, northern and remote regions of Canada) risk falling behind their urban counterparts in their ability to harness the potential of broadband, and in doing so, take full advantage of the economic and social opportunities these powerful networks have to offer."[25]

[20] *Idem*, p. 62
[21] Broadband Properties staff Report (2008), *The Research Files: Broadband and Economic Development*, December, p. 63, http://www.bbcmag.com/2008issues/dec08/BBP_Dec08.pdf
[22] *Idem*, p.63.
[23] *Idem*, p. 64.
[24] Industry Canada (2006), *Formative Evaluation of the Broadband for Rural & Northern Development Pilot—Final Report*, p. vii, http://www.ic.gc.ca/eic/site/ae-ve.nsf/eng/02999.html.
[25] *Idem*, p. 1

4.2 To what extent do enterprises and organizations feel that the project constitutes an opportunity for development, particularly by improving their positioning in the context of Northern development activities?

All connected and potential users interviewed expressed their desire for a reliable and affordable network so that they can position their activities better in the region. Excluding ECN and its financial partners, about 65% (n=11/17) of actual and potential users are confident that the ECN project is the best channel for improving their business and institutional operations. They take the view that the higher speed and greater network capacity will be able to support development in Nord-du-Québec. The remaining 35% of interviewees, not being connected, preferred to wait and see what the benefits would be or were unable to comment on its potential.

Examples of opportunities cited by proponents and some other local parties and potential clients include satellite offices as service points or outlets. In their view, this would save on costs and travel time by making tools accessible remotely without having to be ordered. Other potential benefits identified by respondents can be categorized as follows:

- Cloud computing, which is an innovative way for businesses to meet their IT needs without having a team on hand to manage their servers;
- In an emergency (eg: fire) or when operating in remote areas (eg: long-haul transportation companies), the network is an additional means of communication;
- Tools such as messaging and IP telephony substantially reduce communication costs relative to satellite telephony, and
- Broadband provides structure for the region, since it expands business opportunities and the pool of potential enterprises (mining companies, commercial operations and specialized firms seeking closer ties with the region, etc) that may establish themselves there.

Video conferencing can:

- Facilitate training of the specialized and technical personnel needed;
- Be used in the fields of justice, tele-medicine (diagnosis, monitoring and nursing care) and to support businesses;
- help citizens through counselling and/or psychological services, language training and support and reintegration programs;
- lead to greater retention of personnel and/or experts in the region, and
- spawn new initiatives and exchanges between communities.

Centralization of data and of the network will lead to better regional service because broadband will link all of an institution's sites (eg: the Cree Health Authority and James Bay Social Services) in order to:

- share data;
- provide greater data security (avoid losses);
- allow the tracking of information processing operations, with continuous access to data (eg: patients' files and histories), and

- avoid duplication in data production and the risk of error in transmission.

The broadband network may eventually yield a wider choice of services, such as conclusion of agreements covering the whole territory for video/telephone/Internet. This would require more local Internet and cable service providers and regional negotiations to assemble a critical mass of users capable of generating a better price/quality ratio.

5. Findings on project outcomes

To what extent has the broadband project contributed to attainment of the immediate outcomes?

- The project has not yet yielded all the immediate anticipated outcomes.
- Of the 28 direct jobs planned, only two people were working full time for ECN. However, nine technicians may be engaged part time, and it is expected that ten new employees will be hired full time by September 2014. ECN is still counting on the joint training program with Cree Human Resources Development, which aims to develop a local workforce.
- Recurrent sales were $1.6M, whereas the proponent was counting on projections of $2.3M by March 31, 2013. Forecast revenues for 2014-2015 were $2.9M.
- 141 sites out of 155 were connected by ECN, amounting to roughly 91% of the anticipated outcome.

To what extent has the project contributed to establishing collaborative links or partnerships (cultural and/or financial) among levels of government (federal/provincial), Aboriginal groups and communities? (Other unplanned effects)

- The project has fostered development of collaboration among communities and with government agencies.
- An agreement has been concluded between ECN and Cree Human Resources Development to train technicians.
- Good collaboration has evolved between ECN and the Department of Health. More advanced collaboration with other government departments (Justice, Public Safety, Education, etc) will bring greater benefits to the network by promoting access to improved service delivery across the region.
- According to 87% of interviewees (n=25/29), the broadband network will open up opportunities to influence development and government action on the ground.

Could the same results have been achieved by different means?

- Over a third of respondents (n=11/29) identified alternatives for meeting the project's anticipated outcomes.
- According to a literature review, government programs, including those targeting regional economic development, are necessary to support remote areas in structurally important projects such as broadband, and respondents stressed that patience is called for in awaiting results.
- Though certain proposals do not fit well with CED's mandate, interviewees have suggested coordination among the parties involved, consideration of the HR component throughout the project, planning for access to capital, flexible regional programs, and coordination of decision-making processes and government efforts.

The following elements may provide food for thought on success factors for a broadband project and CED's role in such projects:

- necessary conditions drawn from CED's other similar broadband projects throughout

Quebec;

- ways of ensuring a link between the intermediate outcomes of the logic model and establishment of essential conditions in the context of Nord-du-Québec;
- the effects of monopoly situations in remote areas in the field of infrastructure and telecommunications, and
- identification of potential avenues of interdepartmental collaboration.

5.1 To what extent has the broadband project contributed to attainment of immediate outcomes?

5.1.1 Direct job creation

The funding agreement between CED and ECN provided for creation of 28 direct jobs on completion of the project on March 31, 2011: 24 technicians for the network and 4 management and administrative positions in the office. This objective was not met. According to data provided by the proponent and findings in the field, only 2 people were employed full time by ECN, and 6 technicians (field repairs) might be employed part time (about one hour a week); 2 or 3 local technicians were recruited for casual work. Several impediments explain the difficulty in hitting this target, the chief one being the delay in connecting certain clients, which limited operating revenues. However, thanks to recovery of projected revenues (agreement reached with a major client in December 2013), 10 new employees should be hired full time between June and September 2014.

The challenge of training personnel is another obstacle to hiring. In fact, two training projects were offered, one in telecommunications and networks – IP protocol – and one on managing and repairing fibre-optics. However, attendance and motivation were very low because the training was seen as being too theoretical, with little relation to actual practice and hands-on learning. Though the training did not lead to the hiring of new resources, ECN was able to develop a training program with HRDC and Service Canada. This program, running for three years, aims to develop a local workforce.

5.1.2 Value of annual sales and number of connections made

ECN has partly met its target for recurrent annual sales. When the project began, the target was set at $2.3M for March 31, 2013. According to the latest data from ECN, the target appears to have been 70% met ($1.6M). Commercialization of the service was still ongoing to increase the number of users. The proponent's revenue forecast for 2014-2015 is $2.9M.

As of March 21, 2014, the project had not reached its target of 155 private enterprises connected. On that date, ECN had connected 141 sites (public bodies, institutions and private enterprises combined). Of this number, ECN has connected seven enterprises, including two Internet service distributors. These two distributors have respectively 33 (Wemindji) and 35 (Chisasibi) private-sector enterprise connections. The delay attributable to the number of connections is explained by the fact that some users who were supposed to receive service were not ready. According to ECN, the target should be reached and even exceeded during 2014-2015.

The change in technology that delayed implementation of the network is expected to ensure greater reliability and improved network capacity, which should entail greater client satisfaction and ultimately more clients. Financial partners, proponents and other parties concerned

acknowledge that commercialization operations have not reached the stage of marketing to SMEs, leaving it to local Internet service distributors to provide residential and commercial service. Once agreements are concluded, network revenues should continue to grow.

5.2 To what extent has the project contributed to establishing collaborative links or partnerships (cultural and/or financial) among levels of government (federal/provincial), Aboriginal groups and communities? (Other unplanned effects)

In order to meet ECN's technical training needs, collaboration was established with Cree Human Resources Development. This organization is part of the Cree Regional Authority (a financial partner in the project) and receives financial support from Services Canada and Aboriginal Affairs and Northern Development Canada. ECN seeks to take advantage of the development program for telecommunications technicians run by Cree Human Resources Development to train the future technicians who will deliver the service. However, a performance assessment and interviews with proponents showed that the number of graduates has not yet reached the desired level and that supplying this pool will take longer than planned.

Another example of collaboration is the association between ECN and James Bay Cree Health and Social Services Council (CCSSSBJ) and the James Bay Regional Health and Social Services Centre (CRSSSBJ) for delivery of broadband telecommunications infrastructure. With the consent of the Quebec Department of Health and Social Services (MSSS) and the Quebec Shared Services Centre (CSPQ), ECN will be authorized to connect to the Integrated Multimedia Telecommunications Network (RITM). The mission of this provincial health network, whose *raison d'être* is to link health and social services agencies in Quebec, is to improve the speed and security of information traffic on a network that reaches sites in practically all institutions.[26]

Access to RITM can also spark further collaboration with other provincial departments (Justice, Public Safety, Education, etc):

- more effective delivery of services in the region;
- a greater government contribution to the needs of the population;
- a drop in the shared costs for the entire network and its clients, and
- a gain in efficiency for the government in delivering its services to the public.

According to 87% of interviewees (n=25/29), the broadband network provides an opportunity to influence local development and government action on the ground. With this end in mind, local actors seek to continue a constructive dialogue in order to set shared objectives for various programs and hope to find support through coordination among departments and between governments. A comprehensive approach, more flexible parameters, clear policies, updated legislation and stable partners within each department should be pursued to foster this

[26] Laurent Fey, Patrick Blanchet and Patrick Dufour (2013) *Information sur les services d'accès au RITM pour les fournisseurs Version : 1.36 Numéro du mandat : T0454-01G*, Direction des infrastructures technologiques DGTI-MSSS, 2013-09-24, p. 5.

collaboration and this venture. The value of this approach is highlighted in a study by Simon Fraser University on First Nations.[27]

In interviews, a federal collaboration model was suggested based on the roles and responsibilities of government agencies. Accordingly, Industry Canada might be mandated to support broadband implementation projects nationwide while remaining sensitive to the needs of each region. At the same time, the CRTC may monitor the market to minimize the risk for the public of a costly monopoly. Lastly, Industry Canada wouldonce again be in a good position to measure the economic spin-off once the network is up and running.

5.3 Could the same outcomes have been achieved differently?

The conclusions drawn from the salient findings of this study are that government programs, including those targeting regional economic development, are necessary for supporting remote regions in structure-building projects such as broadband and that patience is called for pending results. More than a third of respondents (n=11/29) proposed solutions for helping to obtain the desired outcomes in projects of this type. Special concern is given to choice of technology, the importance of HR, availability of capital and relations with governments.

Firstly, changes of equipment at the outset of the project could have been minimized by more precise criteria in the call for tenders, and a rigorous check of the engineering should have been conducted before implementation. However, project proponents pointed out that coordination and collaboration were good and that the required corrections were made.

Secondly, human resources issues should have been taken into consideration from the beginning of the project, allowing faster recruitment and the earliest possible delivery of reliable service. Section 3.2 details the challenges associated with technical support and a region's capacity to optimize Internet use through broadband. The European Commission's *DG Information Society and Media* (2008) confirms the importance of human capital and recommends a policy of heavy reliance on long-term education to develop a knowledge society, spreading IT skills among the population to foster self-reliance in learning by developing on-line access to educational and technical resources.[28] Though this study is based on possible impacts in a European context and in rural communities (development characteristics in this type of structural project in the European and North American continents may be difficult to compare), the fact remains that the proposed ideal and the long-term objective have to be considered.

The foregoing recommendation introduces and reflects the concern of some parties (n=4) to the project regarding the way governments may intervene in broadband-type projects.

Furthermore, government intervention also requires effective coordination of decision-making processes and government efforts and enhanced attention to public policy to reflect the reality on

[27] MCMAHON, R., O'DONNELL, S., SMITH, R., WOODMAN SIMMONDS, J., WALMARK, B. (2010) *Putting the 'last-mile' first: Re-framing broadband development in First Nations and Inuit communities*. Vancouver: Centre for Policy Research on Science and Technology (CPROST), Simon Fraser University, December. p. 3. URL: http://fnbc.info/sites/default/files/resource-files/Putting-the-Last-Mile-First-Dec-1-2010.pdf

[28] Dr. FORNEFELD, Martin, DELAUNAY, Gilles, ELIXMANN, Dieter, (2008), *The Impact of Broadband on Growth and Productivity - A study on behalf of the European Commission (DG Information Society and Media)*, MICUS Management Consulting GmbH, p. 7, http://breitbandinitiative.de/wp/wp-content/uploads/2009/04/2008_micus-studie-broadbandeu_long.pdf.

the ground. At the same time, the CRTC had the following recommendations for Industry Canada:

- extend broadband service to communities not yet served, since it would be commercially impossible to provide broadband service to rural and remote communities without government assistance;
- establish a Commission to coordinate all broadband initiatives;
- establish and adopt a horizontal governance role to coordinate all initiatives, federal, provincial and private-sector, to avoid duplication of efforts, and
- ensure that more Canadian communities have access to affordable and reliable broadband services.[29]

The case study looked at the output and immediate outcomes of the broadband network implementation project. Though the desired short-term results are on their way to being achieved, it is hard to predict attainment of intermediate outcomes any time soon (see project logic model in Annex 2), given the type of intervention carried out so far. CED could consider taking its thinking further in future on this type of project. Such thinking might focus on:

- necessary conditions for success, inspired by similar projects like, for example, the other four broadband projects funded by CED in Quebec;
- means for attaining the intermediate outcomes of the logic model in the Nord-du-Québec context;

Complemented by special attention to:

- the effects (control, regulation, lessons to be considered, etc) and implications associated with creation of a single telecommunications network (monopoly) in a remote area, and
- potential avenues for interdepartmental collaboration.

[29] Industry Canada (2006), *Formative Evaluation of the Broadband for Rural & Northern Development Pilot—Final Report*, pp. 70-71, http://www.ic.gc.ca/eic/site/ae-ve.nsf/eng/02999.html.

Annex 1. Cost estimate of the Eeyou Communications Network (weighted authorized rate of assistance is 44.26%)

		Eligible costs	
		Non-authorized	Authorized
Purchase of fibre-optics from Hydro-Québec		$7.1M	$0
Engineering and connections to ECN network		$0	$630K
Alcatel bid:	Opto-electonic transmission	$0	$4M
	Access and distribution	$0	$1.8M
	Hut; room and board	$0	$1.3M
	Outdoor network facilities	$0	$12.5M
	Fit-up of rooms for network operations centres	$0	$290K
	Fit-up of training centre and laboratory	$0	$160K
	Comprehensive tests and tools	$0	$210K
Field set-up and site preparation (trunk stations and points of presence (PoPs))		$0	$450K
Cost of hooking up Whapmagoostui, Waskaganish and Eastmain using links provided by Bell Alliant		$0	$76K
Servicing equipment		$0	$264K
Administrative offices, supplies and furniture		$0	$32K
Video surveillance of trunk stations		$0	$110K
Total		$7.1M	$21.7M

Annex 2. Logic model of broadband implementation project

<table>
<tr><td>End results</td><td colspan="2">Communities have appeal; they attract and retain actual tourists or qualified individuals (workers who are qualified or graduate from creative classes), generating economic spin-off within communities</td></tr>
<tr><td>Intermediate outcomes</td><td colspan="2">Communities are recognized for their distinctiveness, their brand image or their outreach

Number of enterprises created, developed or maintained within the range of the common equipment project

Development of new markets and attraction of new clients</td></tr>
<tr><td>Immediate outcomes</td><td colspan="2">Communities have common equipment to enhance or consolidate their economic development.

Direct job creation</td></tr>
<tr><td>Outputs</td><td>Number of private enterprises connected

Value ($) of recurrent annual sales</td><td>Applications:

Tele-medicine, distance teaching, high-speed Internet, residential and business traffic, high-volume data traffic, community networks, video conferencing and local land-line or wireless service providers.</td></tr>
<tr><td>Activities</td><td colspan="2">Planning and management of network construction

Recruitment and training of personnel

Network implementation</td></tr>
<tr><td>Inputs*</td><td colspan="2">CED’s financial contribution: $9.6M / Total project cost: $28.8M</td></tr>
</table>