

9 Recommendations: Addressing the Issues

9.1 Introduction

It is clear to anyone attempting to use new communication tools in all communities in the Arctic that there is a severe gap between what is needed today and what they can affordably purchase. The gap in the future will only increase if nothing is done.

This chapter details 10 specific recommendations toward closing that gap over the next five years.

This Assessment took a best guess for demand in the next 3-5 years (Chapter 7) based on what we know today. However, the communications industry is evolving rapidly, so this projection will need to be revisited annually as people increase their use of low-latency high-bandwidth applications such as video, telehealth, and use of 'self-service' centralized data. Coupled with an explosion of dependency on mobile devices, communications will play an increasingly important role in the future development of the Arctic.

There are already many extremely difficult challenges in the Arctic; an inadequate communications infrastructure cannot be allowed to cause more important things to fail, like emergency services, health, education, housing, industry, opportunity and sovereignty. It is comparatively easy to fix communications infrastructure.

The recommendations in this chapter are presented as possible solutions to the specific issues raised in Chapter 5. Taken together, they aim to meet the challenges of:

- Achieving service parity
- Meeting bandwidth needs & reducing costs to the end user
- Increasing reliability and quality of service
- Improving geographic coverage between communities
- Improving emergency response
- Keeping pace with technological change
- Increasing choice through innovation and competition (2 recommendations)
- Supporting human resource development

Each section in this chapter presents the overview of the issue, and provides a single recommendation to address each issue (with the exception of 'increasing choice', which has 2 recommendations).

The Arctic must have affordable, robust communication services for the benefit of the residents, and the benefit of all Canadians. These wide-ranging recommendations can help to close the gap in services today and tomorrow. Federal and territorial policy makers, service providers, regulators, procurement officers and NCIS-WG members will need to make a concerted effort to implement them.

9.2 Achieving service parity

As federal and territorial governments implement more and better services that rely on modern communication networks, the gap in access to services and opportunity between well-connected and poorly connected regions and communities will only widen.

Ensuring appropriate communication services may be one of the few truly affordable infrastructure efforts that will help to address some of the challenges facing northern residents, and the sustainability of communities in the long run. There are many strong arguments why fast, reliable, and secure Internet services are needed in the three territories, and not a single strong argument why they are not. Numerous studies in other countries indicate the positive effect broadband investments have on GDP and government costs over the long run.

The decision to ensure or not ensure service parity to all communities within each Territory has many implications to northern development. This decision may be one of the defining decisions in the future of many communities in the Arctic in the 21st century.

Access to modern networks will not necessarily result in increased opportunity in every facet of community life. However, lack of appropriate access will ensure that communities cannot take advantage of what better communications access can help to provide - including improved health care, education, business opportunities, governance, engagement in development, and the hope of a better future.

The consequences of inadequate wealth distribution from resource development are described in Section 8.4. In a comparable way, failure to provide service parity in Arctic communities will eventually put poorly serviced communities at a considerable disadvantage, leading to economic hardship for individuals and communities, and prolonged financial challenges and increased costs to northern governments.

Attempts to reach some level of service parity between the North and South are ongoing, as service providers and governments have worked to connect Whitehorse and Yellowknife to fiber and increase the capacity to the largest communities. But service parity does not stop with the connection of the two largest cities of the Arctic.

If Territorial and federal policy makers do commit to service parity among all Arctic communities, they will need to make decisions at the policy level on minimum connectivity standards for all communities that ensure a level of service parity within and across the North.

Chapter 4 of this Assessment documents the existing bandwidth available to communities. Chapter 7 has provided some community-wide bandwidth targets, based on input from key government departments. These targets form the start of the process required to define an Arctic minimum connectivity standard. It will be important to recognize that minimum standards must evolve as technical standards evolve, so the issue must constantly be revisited.

RECOMMENDATION 1:

To: Federal and territorial policy makers

Commit to service parity among Arctic communities, and set minimum connectivity standards for all Arctic communities that assure service parity to southern urban centres.

9.3 Meeting Bandwidth Needs & Reducing Costs to the End User

Chapter 8 outlines some of the initiatives other countries have taken to meet the challenges of building out a network infrastructure that can provide affordable access to end users. Only after minimum standards have been established can regulators begin to assess the best approach to bringing these services to the market. All the players must understand the unique nature of the market in which the services will operate.

Successful efforts to connect disparate regions in other countries have relied on developing a communication infrastructure and broadband strategy to achieve certain minimum standards, as defined in each jurisdiction. The Arctic will require a similar strategy.

As explained in Section 5.3, delivering affordable bandwidth to Arctic communities is an expensive business, that cannot be borne either by the purchasers of service alone, or by private sector providers that require a return on their investment to stay in business.

The initiatives to date (itemized in Section 5.4) to electronically connect the public and government in the three territories are very important, and have provided minimum levels of connectivity to many communities today. However, today's needs for connectivity are expanding at a much faster rate than what networks are able to provide with the funding models available, and where infrastructure is in place to offer the needed connectivity, the cost is often too prohibitive for users to afford.

Lack of sustained, consistent funds for government initiatives and public access, combined with the need for constant network upgrades to meet expanding demand, make it difficult for service providers or buyers to invest enough to meet future needs for both government and the general public.

In the Arctic, a realistic communication infrastructure and broadband strategy will have a number of important elements.

First, such a strategy will include a requirement for significant public investment. How that investment is made will be based on consistent decisions, and shared values. Currently, there is no cohesive approach across the three territories.

Furthermore, as argued in Chapter 8, the strategy must also set out the rules to deal with market disruption caused by government's contradictory roles in the marketplace as concurrent owners, regulators, and purchasers of Internet services. Unraveling this problem requires a deep understanding of the market and the development of a strategy that fully recognizes the market realities of the Arctic.

Another consideration in developing a strategy for developing Arctic communications infrastructure is in recognizing the impact of cross-subsidization by service providers (as required by regulators) - a process that belonged to another era when large markets subsidized small markets in return for monopoly status in phone service delivery. With convergence, deregulation, and the pace of technological change, cross-subsidization is no longer an effective tool to achieve ubiquitous services.

RECOMMENDATION 2:

To: Infrastructure investors, the CRTC, federal and territorial policy makers

Develop an Arctic-specific strategy with clearly defined rules, that articulates a sustained, multi-year funding commitment for communications network development to meet connectivity standards set by policy makers.

9.4 Increasing Reliability and Quality of Service

As people become more reliant on communications networks to live their daily lives, those networks must become increasingly reliable. Government planners must also have faith that communications networks will work when needed, in order to implement new services enabled by advanced communications networks.

Reliability has become a huge issue in the Arctic, particularly in the regions where investments in new technologies have actually increased dependency on communications for everything from health care delivery and education, to the basics of supporting the economy and providing emergency services. As this dependency increases, so do the negative consequences of system failures. Examples of the inherent fragility of the Arctic networks in all regions are provided in Section 5.5.

The single most important requirement to ensure services are not knocked out in a single communications event, such as fiber cuts, microwave tower and satellite earth station

damage, or even satellite failure, will be to build redundancy into the backbone connectivity. Every satellite-served community will require connectivity to two different satellites. Terrestrially served communities will require a second point of entry - either with a second terrestrial line, or satellite back up that could be brought online immediately as a fail over service.

It is simply not good enough to have a single point of failure when economies, public safety and ultimately lives are at stake. Redundancy should extend beyond the consumer level service and include ground equipment and satellite use.

RECOMMENDATION 3

To: Policy makers, service providers, and NCIS-WG members

Ensure there is a redundant connection into every Arctic community to avoid gaps in the provision of essential communication services.

9.5 Improving Geographic Coverage Between Communities

As governments assess the need for better geographical coverage, lessons can be learned from one agency to another.

For example, Yukon's MRS system is the newest mobile radio system in the Arctic. The service provider (NWTel), together with Yukon government officials responsible for using the system may be able to offer the NWT, the military and Nunavut some insights into how they deployed the new digital system, made use of repeater station technology in cold weather, and challenges in protocol linking non-military users of mobile radio services.

Emergency responders are experimenting with a wide range of satellite-connected systems as described in the Section 5.6. These systems may be applicable across a wide range of users.

Federally sponsored research by Communications Research Centre (example in Section 3.3) needs to be connected with commercial service providers in the Arctic so they can help develop and commoditize successful services that can then be made available to others across the North.

RECOMMENDATION 4

To: NCIS-WG members and service providers

Create an inventory of Arctic communications technology projects and services that aim to connect people from remote locations outside of communities in order to share experiences, best practices, and lessons learned.

9.6 Emergency Response Improvements

The ability to communicate effectively and efficiently in order to respond to an emergency in the Arctic is, in essence, a question of sovereignty. In extreme emergency scenarios, the existence of adequate communication networks is a question of survival.

Emergency responders arriving in any community in Canada often rely on publicly accessible networks for connectivity - particularly for Internet and mobile device connections. The process of emergency response is outlined in Section 5.7.

The failure of local communication services in an Arctic community during an emergency response exercise in 2009 kick-started this Assessment process. From a southern vantage point, it can be tempting to look at Arctic emergency response in isolation, imagining responders flying into a remote Arctic site with all the communications gear they might need to respond stuffed into their suitcase.

But in reality, if outside responders are required to deal with an emergency, they usually fly into established Arctic communities first, before heading out to the field (in the event of an emergency on the land). Over-all response capability is deeply intertwined with the response capability of the community closest to the emergency - whether the emergency is local, regional, or national in scope. Responders need to initially rely on local communication networks they can access, and they need those networks to be reliable.

It is entirely possible for Arctic service providers to be prepared for emergency events, if in advance, protocols and procedures could be developed that are agreed to by service providers and emergency responders in advance of a wide range of possible emergencies. Issues to be covered include:

- definitive, up-to-date list of what services are actually available, by community; (current list as of February 2011, in Section 4.6).

- a rapid, defined procedure to request surge capacity from the service provider by emergency responders;
- security requirements;
- a system for prioritizing use for first responders, to avoid overloading local networks.

As publicly accessible northern networks improve, emergency access will also improve.

The military typically deploys its own communication sites for its own purposes. But in emergency response, military participants of the Assessment have indicated a willingness to collaborate with civilian agencies in finding communication solutions that help the military and civilian responders as well as community residents with improved communication capacity. Challenges in security are always an issue to be examined, but with planning and foresight certain types of communication services can be shared.

RECOMMENDATION 5

To: NCIS-WG members and service providers

Identify communication services that will be required in a variety of emergency settings, developing protocols with service providers for surge capacity requests and prioritization of public communications networks for emergency responders within communities. Maintain an inventory of what is commercially available in communities.

9.7 Keeping Pace with Technological Change

The rapid pace of technological evolution combined with rising consumer expectations across the Arctic has left network operators without the necessary resources to meet the needs of both government and the public. Examples of ever-increasing efforts by government to use new communications tools to reach consumers are provided in Section 5.8.

The program-based one-off nature of the investment in new networks (Section 5.4) to date has not enabled service providers to adequately to keep pace with technological change.

Because of the North's small population and large geography, consumers don't drive competition and evolution of service in the same way as southern urban centres. Growth

is therefore at least partially dependant on subsidy frameworks, and regulatory initiatives aimed at ensuring affordable access to consumers.

The CRTC is currently conducting three different hearings, all of which are at different stages. These hearings are dealing with different aspects of the technological pace of change, and how they may affect the ability of networks to respond to, and meet the challenges of the future. They are described in Section 5.8.

In order to keep pace with the rate of change, the reality of the northern marketplace combined with consumer and government needs must be understood by all players, and ongoing subsidy support and regulatory action must be taken in a timely fashion to ensure affordable services can be developed, evolved, and delivered.

RECOMMENDATION 6

To: CRTC, infrastructure investors, federal and territorial policy makers

Investment strategies for Arctic communication networks must include provisions for the increasing rate of change of technology, and the continuous introduction of new consumer services and devices.

9.8 Increasing Choice through Innovation and Competition

Compared to communications services, there is probably no other industry where competition is so vital in lowering price, adding innovation, and improving what has essentially become a public good. Accepting the role of competition does not translate into a singular, hands-off approach to regulation. Other jurisdictions in the world, as summarized in Section 8.6, attempt to introduce competition, even in markets where logic would dictate that only one provider can survive.

In some jurisdictions such as Sweden, governments own the backbone, and then private companies compete for last mile service delivery. In other jurisdictions, such as southern Canada, private sector companies own the backbone, and are forced through regulation to provide open access to competitors to compete to provide last mile services.

If vertical or complete competition cannot be achieved (from the infrastructure backbone all the way to the home), then competition should be made possible at different market segments. Examples include competition at the research and development stage, competition for the installation of infrastructure, and/or competition at the community level (or last mile) for household consumers.

RECOMMENDATION 7

To: Policy makers, CRTC, service providers

Investment models should allow for, and encourage competing services in as many market segments as possible, thereby promoting consumer and government choice, and innovation and improved services.

In southern markets, consumers drive innovation and choice through their buying power.

In the North, governments are expected to drive innovation through their buying power. But most government buyers are required to be risk-averse and make long term decisions that do not typically allow for rapid technological evolution of networks to meet their evolving needs. Section 5.9 looks at some of the challenges in innovation and competition in an Arctic context.

It is unrealistic to expect that government procurement will drive innovation and expansion of networks. However, procurement processes could help improve innovation with some steps, including:

- pan-Arctic efforts to share best-practices in procurement;
- focusing on outcomes-based RFPs that are technologically neutral;
- consider innovative procurement strategies such as Joint Solution Procurement;
- allow flexibility in federal procurement within the Arctic, recognizing the unique infrastructure challenges that are different than the South.

Public demand for more services fuel innovation faster than government buying. Real innovation will occur if financial incentives are put in place for delivering services to the public through competition for subsidies that lead to better, more ubiquitous services to the Arctic public. The public will benefit, and ultimately so will government procurement processes, as the existence of multiple providers may be made possible, leading to more competition and innovation to meet governments' needs in the long run.

RECOMMENDATION 8

To: Procurement officers, service providers

Government procurement officers are to encourage innovation through RFPs that focus on business outcomes requirements and technology neutral RFPs to stimulate innovative solutions from service providers.

9.9 Human Resource Development

Issues in human resources are summarized in Section 5.10. Communication networks hold the promise of being able to actually solve some human resource challenges in communities to improve training and education opportunities for local staff..

In addition, linking specialists from other communities or the South to provide expertise will continue to evolve, as governments invest more heavily in connectivity in order to solve some human resource challenges in smaller communities particularly in education and health.

When designing and building communication networks, it is important to recognize the existing capacity of the people who are already living in communities, and ensure systems can be maintained with local support.

Designing systems whereby local people can learn the basic maintenance and support roles will allow local people to grow into the jobs, and evolve their skill levels over time. Corresponding training for network support people in communities can be delivered as needed, even using communication tools for distance training.

RECOMMENDATION 9

To: NCIS-WG members, IT developers, all government departments

Recognize the reality of community capacity, and design applications and networks that will allow for effective remote service delivery.

RECOMMENDATION 10

To: NCIS-WG members, IT developers, all government departments

Take advantage of robust networks to deliver training to government workers using new communication tools.