



INFRASTRUCTURE PLANNING FOR NUNAVUT'S COMMUNITIES

INTERIM REPORT

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TABLE OF CONTENTS

1. INTRODUCTION	1
2. PURPOSE OF PROJECT	2
3. THE ROLE OF INFRASTRUCTURE IN WEALTH CREATION	3
4. HOW INFRASTRUCTURE SUPPORTS ECONOMIC, SOCIAL AND ENVIRONMENTAL PERFORMANCE	5
NUNAVUT'S ECONOMIC PERFORMANCE.....	5
NUNAVUT'S SOCIAL PERFORMANCE	8
NUNAVUT'S ENVIRONMENTAL PERFORMANCE	11
5. NUNAVUT'S INFRASTRUCTURE GAPS AND KEY ISSUES	13
6. SECURING FUNDING FOR NUNAVUT'S INFRASTRUCTURE	15
FUNDING OPTIONS	16
REDUCING DEMAND ON INFRASTRUCTURE.....	20
7. A PHYSICAL CAPITAL COMMUNITY PLANNING FRAMEWORK.....	21
WHY BENCHMARK?	21
TYPES OF BENCHMARKING	23
INPUTS	25
OUTPUTS.....	26
RESULTS.....	26
8. CONCLUDING REMARKS	27

1. INTRODUCTION

*Maintaining and developing infrastructure is fundamental to the long-term ability of rural and remote communities to adapt and grow.*¹

*In the built environment, factors related to housing, indoor air quality, and the design of communities and transportation systems can influence our physical and psychological well-being.*²

There is a growing concern in Nunavut that the existing state of municipal infrastructure, or physical capital, is preventing the Territory from growing to its full socio-economic potential. In its *2001 Nunavut Economic Outlook*—sponsored by the Government of Nunavut, Nunavut Tunngavik Inc. and Indian and Northern Affairs Canada—The Conference Board of Canada suggested that “the state of infrastructure in Nunavut is a serious problem that is affecting both the economic and social development of the Territory.”³

The lack of basic infrastructure can have several repercussions for socio-economic and environmental performance. An unsafe water supply, poor sewage treatment, or the absence of proper housing can have a significant impact on child development and residents’ health. Similarly, the lack of educational and training facilities can hinder the development of a skilled labour force that can participate in Nunavut’s growing economy. And the lack of transportation and communications infrastructure can prevent the creation of new business opportunities or reduce Nunavummiut’s participation in industrial opportunities across the Territory.

Together, the lack of adequate physical capital reduces communities’ ability to participate in or to develop economic opportunities. From a fiscal perspective, it maintains Nunavut’s dependence on financial assistance from the Government of Canada.

Some would argue that residents of northern or rural Canadian communities should not expect the same level of infrastructure and municipal services found in typical southern Canadian municipalities. While this is debatable, there are some fundamental infrastructure standards that can and should be met to support the healthy development of all Canadians regardless of residence.

¹ Canadian Rural Partnership, *Enhancing the Quality of Life for Rural Canadians*, Annual Report to Parliament, 2000-20001.

² Health Canada, “Population Health Approach – What Determines Health?” (www.hc-sc.gc.ca/hppb/phdd/determinants/determinants.html.)

³ The Conference Board of Canada, *Nunavut Economic Outlook: An Examination of the Nunavut Economy* (Ottawa: The Conference Board of Canada, 2001).

2. PURPOSE OF PROJECT

The Nunavut Association of Municipalities (NAM) requested The Conference Board of Canada demonstrate the contribution that investments in infrastructure can make in supporting the development of healthy communities in Nunavut. Specifically, the Conference Board was asked to:

1. Undertake a review of the socio-economic impact of incremental infrastructure investments on Nunavut communities and Canada.
2. Develop a benchmarking tool for Nunavut communities on the current state of physical capital with appropriate comparator communities.

Ultimately, the purpose of this project was to provide support to the Nunavut Association of Municipalities (NAM) and the Government of Nunavut (GN) in their effort to improve the standard of living for Nunavummiut.

The Conference Board of Canada staff undertook the following activities for this project:

- Discussions with experts and relevant organizations to introduce the project and to identify possible sources for data (e.g., Canada Mortgage and Housing Corporation, Federation of Canadian Municipalities, Government of Nunavut - Community Government and Transportation).
- A search and review of current and previous indicator initiatives and reports that may be relevant to the project (e.g., other municipal initiatives).
- A search for infrastructure reports from other northern or rural regions including Alaska, Greenland and Canadian provinces/territories.
- A search for relevant standards pertaining to physical infrastructure.
- Development of a physical capital planning framework.

Due to a lack of data, the second task involving a benchmarking analysis could not be completed. As a result, we have labeled this an “Interim Report” in the hopes that the benchmarking analysis can be completed once data become available. And a planning tool has been developed that can be used for benchmarking purposes when the community level data become available.

3. THE ROLE OF INFRASTRUCTURE IN WEALTH CREATION

The Conference Board of Canada's approach to looking at infrastructure builds on the model that we used in our *Nunavut Economic Outlook*⁴ that recognizes four forms of capital involved in wealth creation:

Physical capital: This includes the **physical infrastructure** or capital required for business and industrial purposes, such as investments, transportation infrastructure, power generation capacity, communications systems as well as housing, recreational facilities and hospitals.

Human capital: This includes a society's level of literacy, health and social wellbeing, education and skills status, and knowledge.

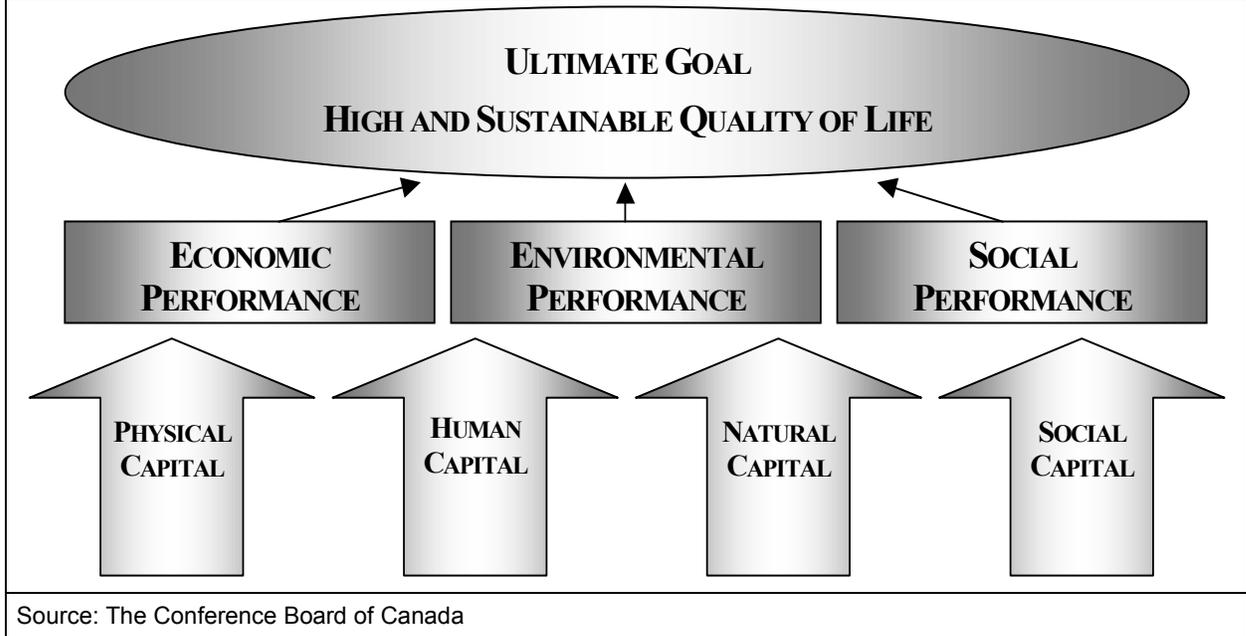
Natural capital: This includes the raw materials required for economic activity, such as land, wildlife, minerals, energy, as well as natural services provided by the environment, such as waste management.

Social/organizational capital: This encompasses the business and social environment within which economic activity takes place and explains how a society is organized to create wealth (e.g., system of governance, the regulatory system).

As seen in Exhibit 1, the ultimate goal of a high and sustainable quality of life is achieved through economic, social and environmental performance, which in turn comes about through investment in the four forms of capital. For example, a population with a high level of human capital in the form of knowledge (be it scientific or traditional knowledge) can expand the natural capital base by finding additional natural resources or using existing resources more efficiently through innovative techniques. Alternatively, attention to physical capital in the form of buildings, computer networks or community centres can support education and training for community members (human capital) or facilitate business networks (social/organizational capital).

Nunavut has a vast amount of natural capital. And over the past 30 years, Nunavut and its people have devoted considerable time to the matter of organizational capital, particularly acquiring political control through the 1993 *Nunavut Land Claims Agreement*, the *Nunavut Act*, and the Territory of Nunavut and its public government in 1999. However, as the Conference Board pointed out in its *Nunavut Economic Outlook*, there is a need for considerably more attention to Nunavut's physical infrastructure and human capital.

⁴ The Conference Board of Canada, *Nunavut Economic Outlook: An Examination of the Nunavut Economy* (Ottawa: The Conference Board of Canada, 2001).

Exhibit 1***A Framework for Understanding Economic Development***

This particular project focused on one of these four forms of capital, namely the current state of infrastructure (physical capital) and its role in supporting the economic, environmental and social performance of the Territory.

4. HOW INFRASTRUCTURE SUPPORTS ECONOMIC, SOCIAL AND ENVIRONMENTAL PERFORMANCE

Nunavut's social and economic conditions are ripe with potential. Opportunities exist in mining, fishing, tourism and cultural industries, and the public sector. Nunavut's population is the youngest in Canada, and these youth will soon enter the labour force eager to find employment and improve their quality of life. However, without the necessary investments, these opportunities will be lost. At risk is not only the development of a mine or new jobs in the fishery, but also the future prosperity of Nunavut itself. With a median age of 22, Nunavut's labour force could be more than 50 per cent larger in only 20 years from today.⁵ If this economic potential has not been realized or the social conditions throughout the Territory have not improved by the time many of these youth reach adulthood, one could foresee a loss for Nunavut such as the emigration of young employable Nunavummiut to other areas of Canada.

We define a society's ultimate goal as a high and sustainable quality of life. This goal can be reached by moving Nunavut's performance closer to its potential. Performance is measured through indicators of economic, social and environmental progress that are outlined below.

NUNAVUT'S ECONOMIC PERFORMANCE

Economic performance is the most common reference used when judging the progress of a region. Indicators include such things as real GDP growth, unemployment rates and income per capita (See Table 1).

Based on these indicators, Nunavut's economy is progressing as expected since its beginnings in the spring of 1999. A fast expanding population and increased government activity have facilitated an annual average growth of 5.5 per cent in real Gross Domestic Product (GDP) from 1999 to 2002. At the same time, almost 2,500 jobs were created (an increase of 30 per cent over the past three years)—almost half of which were in the public service.

Nevertheless, the number of people unemployed remained high throughout this period due to the increase in the working age population and the poor starting point in 1999. In 2001, the unemployment rate was still 23.6 per cent according to the Nunavut Bureau of Statistics' *Household Survey*.

Over the next few years, the pace of economic growth will slow with the temporary shutdown of the Territory's mining sector. The first signs of this were seen at the end of 2002, when Polaris and Nanisivik closed, reducing mineral production by over 15 per cent for the year and stunting the overall economic growth at 1.5 per cent. The closing of Lupin during the summer of 2003 ensures that the economy will see its first decline.

⁵ This is Statistics Canada's medium growth rate population projection.

Table 1**Selected Economic Performance Indicators**

(Levels)

	1999	2000	2001	2002
Real GDP (\$1997, millions)	752.5	811	869.1	882
Employment (SEPH)	7,876*	8,565	9,722	10,354
Working Age Population	16,324	16,798	17,304	17,797
Personal Disposable Income per Person	21,481	23,778	24,036	24,862
Retail Sales (millions)	174	185	193	208
Mineral Production (\$millions)	349	385	319	269
Trade Surplus(Deficit) (\$millions)	(426)	(394)	(396)	(440)

Source: Statistics Canada

Despite these short-term set backs, there are opportunities within Nunavut for strong growth in the future. Fishing, mining, and tourism offer potential for direct employment and small business ventures as does further expansion of the public sector given an improved fiscal position. Standing in the way of this potential is a lack of wealth-creating capital. In the 2001 NEO, The Conference Board of Canada projected strong growth within the Territory if a number of critical capital investments were made. Put another way, economic performance will suffer if these capital requirements are ignored. The current capital budget of \$75 million per year will not be sufficient to meet these requirements.⁶ At this rate, the Territory will incur an infrastructure investment shortfall of \$40 million to \$50 million annually for the next five years.⁷

For example, for Nunavut to capture the broader benefits from commercial fishing, it requires marine infrastructure such as harbour facilities that would enable ships to dock, unload their catch, and receive regular maintenance.

The tourism industry needs infrastructure if it is to reach its potential. Interestingly, much of these needs would also serve to improve community social and environmental well being. Local arts and cultural facilities, clean water, waste and sewage systems, hotel and conference space, park access and transportation infrastructure would all support the promotion of tourism and aid in the health of communities.

⁶ This year saw an increase in capital spending specifically for health-care facilities that brought the fiscal year's capital budget to \$143 million. Expectations are for the budget to return to \$75 million per year in 2004-05.

⁷ The shortfall is based on Community Government and Transportation's projected infrastructure needs equaling \$640 million of the next five years.

In the mining industry, it is becoming more and more common that operators are expected to provide for their own infrastructure needs whether it's a road or airstrip, a port or marine facility, or communications systems. As we are seeing in Nunavut, the lack of infrastructure has led to a concentration of exploration activities on or near coastal waters, while inland resources are left stranded.

Infrastructure needs are often not associated with the growth of the public service, however in Nunavut's case this is very much the case. A lack of affordable housing impedes labour mobility that may affect industrial growth in the future. Even today, it is resulting in unfilled positions throughout the GN, especially in decentralized communities. While the government is trying to limit the number of jobs that come with public housing in an attempt to alleviate problems of rising housing costs and market interference, this may have the effect of limiting its ability to grow.

Not all the aforementioned infrastructure needs are or should be the responsibility of the territorial government. As will be discussed later, Nunavut cannot prosper with its economic agents working independently. The common goals established in the Nunavut Economic Development Strategy require shared financial responsibilities between the public, private and social sectors of Nunavut society.

Regardless of responsibility, the pervasive lack of infrastructure and other forms of physical capital are endangering the future economic success of the Territory. This lends itself to potential social and environmental shortcomings, pushing the need for capital investments to the top of the Territory's priority list.

And recently the *IMD World Competitiveness Yearbook 2003* noted that attention to infrastructure is one of two key areas required for states to remain competitive:

*Nations should concentrate once again on sound infrastructure: for economic purposes such as Communication, Administration, and Sciences, and for social purposes, such as Education, Health, and Security. Governments cannot escape this ultimate responsibility, even if implementation is sometimes delegated to the private sector.*⁸

But investments should be made in infrastructure for social and environmental objectives as well. These matters are discussed next.

⁸ *IMD World Competitiveness Yearbook 2003* (Lausanne, Switzerland: IMD, 2003), p. 37.

NUNAVUT'S SOCIAL PERFORMANCE

Social performance refers to indicators that touch on the social conditions of the people. This includes population growth, education and literacy levels, health status, levels of crime and family violence. A society where everyone is employed but lives in unsafe neighborhoods, and are of poor health and low education cannot be said to have achieved a high quality of life.

While conditions are improving, there remain tremendous shortcomings in terms of social performance in Nunavut, and equally important, there exist some social trends that will put additional strain on the capacity of the Territory's infrastructure.

Population

A significant pressure on Nunavut's infrastructure is the growth of the Territory's population. As shown in Table 2, Nunavut's population has several unique characteristics that distinguish it from most other regions in the country:

- Approximately 85 per cent of Nunavut's population (29,000) is Inuit—by far the highest share of Aboriginal population of any province or territory in Canada.
- Unlike most other parts of Canada, the far majority of residents in Nunavut (67.5 per cent) live in rural communities compared to the national rate of 20 per cent.
- Nunavut has the youngest population in the country with the median age of 22 years compared to the median age of 37.6 for Canada.⁹ Almost 55 per cent of its entire population is below 25 years of age compared to 32 per cent nationally. Further, 37 per cent of Nunavummiut are below the age of 15 years, almost double the national average.
- Nunavut had the second fastest growing population in the country (8.1 per cent) between 1996 and 2001. While Nunavut's birthrate is decreasing, its population is still expected to grow rapidly reaching almost 44,000 by 2020 (a 58 per cent increase).

There are several implications for these demographic trends. First, given the research findings showing that the early years of life have long-term implications for the health and learning of people, it will be important that human conditions support child development. Second, infrastructure in Nunavut will need to accommodate a growing school age and youth population as well as economic opportunities for a substantial number of young people who will be ready to enter the workforce.

⁹ The median age refers to the age in which half of the population is over this age and the other half falls below.

Education

While improving at a significant rate, education levels in Nunavut remain low compared to other Canadian jurisdictions. For instance, Nunavut has the largest percentage of population without a high school graduation certificate (38.2 per cent) compared to the national average of 22.7 per cent. However, there has been a 73 per cent increase in the number of high school graduates in the last ten years.¹⁰ Further, there has been a 105 per cent increase in the number of Nunavut students with a college diploma and a 60 per cent increase in the number of residents with a university degree. No doubt, there will be increased demand for post-secondary educational and training opportunities as the number of youth rise.

Health

There are a number of health indicators that are affected by Nunavut's lack of infrastructure. For example, there is a high rate of TB and child respiratory illness in Nunavut--crowded housing conditions can be contributing to both. The rate of lung infections among Inuit infants is one of the highest in the world at 484 hospital admissions per 1,000 children. The high rate is attributable to several factors including high rates of smoking during pregnancy, overcrowding and poor air quality in homes.¹¹

Infant mortality and the rate of premature mortality due to unintentional injuries (potential years of life lost) can be reduced by improving infrastructure such as safer roads and markings, and proper fire fighting equipment (e.g., sprinklers, smoke detectors, etc.).

Social Conditions

Nunavut is also experiencing a number of social conditions that are made worse by poor infrastructure conditions. Family violence and other forms of assault are serious problems in Nunavut. Nunavut is the only jurisdiction in Canada to have a higher rate of violent crimes than property crimes. Overcrowding no doubt adds to the problems. In addition, there is a lack of institutions to handle offenders in Nunavut and to assist in their rehabilitation.

¹⁰ The ten-year period was 1991 to 2001.

¹¹ Anna Banerji et al., "Low Respiratory Tract Infections in Inuit Infants on Baffin Island," *CMAJ*, 2001, 164 (13), pp. 1847-1850.

Table 2***Selected Health and Social Indicators***

Indicator	Nunavut	Canada
Population (Statistics Canada)	29,094	30,859,000
Births per 1,000 women aged 15-19 years (1992-1996)	149	25
Percentage of population below age of 25 years	54.5	32.4
Percentage of population below age of 15 years	37.1	19.1
Rural population, 2001 (per cent)	67.5	20.3
Urban population (per cent) 2001 (Statistics Canada, 2001 Census) Urban is defined as having a minimum population of 1,000 and a population density of 400 people per square km.	32.5	79.7
Life Expectancy (Statistics Canada, 1997-99)	68.6 years	78.8 years
Life Expectancy at Age 64 (Statistics Canada, 1997-99)	14.4	18.3
Infant Mortality Rate 1999 (Statistics Canada) birth weight 500g or more)	15	4.4
Self-Reported Health Status (Canadian Community Health Survey, Statistics Canada)	16 per cent reporting fair or poor health	12 per cent of Canadians reporting fair or poor health
Self-Reported Health Status (Canadian Community Health Survey, Statistics Canada) 2000-2001	53.2 per cent of those 12 years and older reported health as very good or excellent (lowest in Canada)	61.4 per cent was Canadian average with a high of 66.2 in Newfoundland and Labrador
Potential Years of Life Lost due to Unintentional Injuries 1999 (per 100,000 population age 0-74 years) Statistics Canada	2827.8 (highest in Canada)	706.6
Crime Rate (rate per 100,000) 2001 (violent crimes) Statistics Canada	6,573	4,047
Property crimes	5,501	994
Patient Satisfaction with overall health care (Canadian Community Health Survey, 2000)	70.8 (lowest in Canada)	84.4
Tuberculosis incidence rates 1999 (GN Department of Health and Social Services, Report on Comparable Health Indicators for Nunavut and Canada, September 2002)	101 per 100,000	6 per 100,000

Source: The Conference Board of Canada

NUNAVUT'S ENVIRONMENTAL PERFORMANCE

Nunavut has abundant natural capital. For centuries, Nunavummiut have depended on it to survive, and to this day it remains central in importance to the local population. Both components of Nunavut's mixed economy are highly dependent on a healthy and sustainable stock of natural capital.

Unfortunately, there is insufficient public data in which to provide a comprehensive report on Nunavut's environmental performance. Like other areas, Nunavut must not only be concerned with its own environmental performance but the performance of other jurisdictions as well. Many of the threats to Nunavut's environment—global warming and contaminants—originate from other areas but hit the Nunavut eco-system hard.¹²

According to the latest report from the Northern Contaminants Program, mercury levels appear to be increasing in lake sediments in Nunavut south of 80 degrees North and levels of mercury and other heavy metals are expected to increase in the Canadian Arctic Ocean through climate change.¹³ Levels of persistent organic pollutants (POPs) on the other hand appear to be declining in some locations across the Canadian Arctic.

The northern environment is particularly vulnerable to certain contaminants as it takes much longer for them to dissipate than in southern regions. Further, the contaminants can get into the food chain at more concentrated levels and ultimately be consumed by Nunavummiut who rely on country food as a primary staple in their diet. In both the Baffin and Kivalliq regions, more than one quarter of the population is taking in levels of mercury through country food that are above that level known to be safe.¹⁴ Studies have found high levels of PCB concentrations in Inuit women including those living in Nunavut.¹⁵ Similar situations exist in other Arctic jurisdictions such as Greenland.

Poor environmental practices can harm Nunavut's economic performance with respect to its land-based or subsistence economy and its commercial food and tourism industries. This has certainly been the case elsewhere. For example, nearly 36 per cent of waters on the Atlantic coast suitable for direct harvesting of shellfish were closed in 1995 due to pollution from municipal sewage treatment plants, agricultural runoff, and private residences.¹⁶ And there was an example in Iqaluit where an adventure-tourism operator decided to have customers bypass

¹² David Leonard Downie and Terry Fenge Eds., *Northern Lights Against POPs: Combating Toxic Threats in the Arctic* (Montreal: McGill-Queen's University Press, 2003).

¹³ Northern Contaminants Program, *Canadian Arctic Contaminants Assessment Report II. Highlights* (Ottawa: Indian and Northern Affairs Canada, 2003).

¹⁴ *Ibid.*, p. ix.

¹⁵ David Leonard Downie and Terry Fenge Eds., *Northern Lights Against POPs: Combating Toxic Threats in the Arctic*, p. 12.

¹⁶ Environment Canada, *The State of Municipal Wastewater Effluents in Canada* (Ottawa: Minister of Public Works and Government Services Canada, 2001), p. 36.

Iqaluit due to garbage in the streets and burning at the nearby dump.¹⁷

There will be increased threats to Nunavut's environmental performance in the future such as population growth and a subsequent rise in demand for water consumption, water treatment and solid waste management. In addition, any new industrial activity will require infrastructure be in place to minimize the impact on the surrounding environment.

¹⁷ Miriam Hill, "Trash prompts tourism boycott," *Nunatsiaq News*, August 17, 2001.

5. NUNAVUT'S INFRASTRUCTURE GAPS AND KEY ISSUES

One of the conclusions reached in the *2001 Nunavut Economic Outlook* was that the prospects for Nunavut's economy were high, but only if a *long list of economic and social adjustments* were introduced into the Territory. Two years later, it is safe to say that this list is not any shorter. Economic opportunities that existed then still remain today, and while progress has been made, full realization of these opportunities is not eminent. As we have seen from the *Nunavut Economic Outlook* update in 2002, the social conditions of the Territory have improved but not at a rate that will see a significant change over the next five years.

The determination of community infrastructure gaps in Nunavut could not be undertaken due to a lack of data (discussed further in Section 7). Nevertheless, the *2001 Nunavut Economic Outlook* and other research have lead us to identify the following infrastructure gaps for Nunavut as a whole:

- the need for substantive marine infrastructure (e.g., inshore water craft, deep sea port);
- the need for transportation links to connect communities, labour and businesses in Nunavut to economic activities in the Territory (e.g., a road link to a mine or to another community; an air link to job sites);
- the need for housing to ameliorate social conditions as well as to support government decentralization and the movement of labour between communities; and
- the need for infrastructure to support public health and quality of life such as proper water treatment systems, waste water treatment systems and solid waste treatment.

An important issue is whether the lack of infrastructure is preventing viable economic opportunities from proceeding for the Territory. Indeed, there are "stranded" resources in Nunavut; that is, economic opportunities that cannot be accessed without the proper capital investments be it physical, human or organizational capital. Minerals in the Kitikmeot and Kivalliq regions that are not on or close to the coastline require road access if any benefits are realized. Meanwhile, fishing interests may negotiate greater access to the turbot and shrimp quotas, but without an adequate fleet of trawlers and appropriate marine and processing facilities, the benefits from this activity will remain limited, including the overall number of jobs.

In undertaking our work to date, several issues have been identified that make this project all that more important:

- **Demands on Nunavut's infrastructure will increase:** Nunavut has one of the fastest growing populations in the country. This population increase has and will continue to place enormous strain on Nunavut's infrastructure and ultimately the health and wellbeing of residents. *The impact of population growth on Nunavut's infrastructure is a key issue.*

- **Nunavut's infrastructure is aging:** Some communities may appear to have the required infrastructure. However, the more important issue is that the infrastructure has a decreasing lifespan and will need to be replaced.
- **The impact of climate change:** Climate change can have significant repercussions not only for Nunavut's natural capital but for its physical capital as well. For example, rising water tides may threaten some homes. In many instances, the Arctic ecosystem experiences the first signs of environmental change before other Canadian communities. Some Alaskan communities are already considering relocating due to rising water levels.
- **Meeting changing lifestyles, expectations and national standards:** Like other Canadians, many Nunavummiut are changing their lifestyles and tastes. This is leading to higher expectations in the quality of services provided that will add further pressure on Nunavut's infrastructure. At the same time, Nunavut will be increasingly expected to meet national standards across the range of municipal services provided.
- **Nunavut's infrastructure needs are competing with those of other Canadians communities:** While Nunavut's communities face many unique infrastructure challenges, other communities across Canada are changing and face several infrastructure challenges as well. The population shift from rural to urban areas has placed stress on urban infrastructure throughout the country.

6. SECURING FUNDING FOR NUNAVUT'S INFRASTRUCTURE

The current approach in Nunavut is to peck away at the capital (infrastructure) needs through government investment. This is due in large part to the confines of the Government of Nunavut's (GN) budget. At its current rate, the population will grow too fast for the GN's investments to help enough people. In particular, too many youth will leave school without the necessary skills and too little of the economic potential will be available.

One challenge facing Nunavut is raising the necessary funds to invest in what are often referred to as mega-projects. Some of the more prominent mega-projects include the Bathurst Inlet Port and Road (BIPR), the road link between Manitoba and the Kivalliq region, and the Kimmirut Port and Road. All three infrastructure projects have been shown uneconomic in terms of the cost-benefit analysis given current world mineral prices and the fact that virtually no infrastructure is in place from which to build. However, there are other "non-economic" factors to consider. Infrastructure projects are known and accepted job creators, providing labour with job opportunities, skills and training, not to mention intangibles like hope and personal pride. The issue of Canadian sovereignty in the North has not received the national attention that it deserves, but if and when it does, a deep-sea port along the Northwest Passage will be a legitimate option in addressing the issue.

An equally important consideration is the opportunity costs associated with these major infrastructure projects. With so many capital needs in Nunavut, there are other priorities competing for public money such as those related to human capital (e.g., investing in the education system).

Nunavut must find more capital if its future is to be secure. However, attracting the attention and interest of southern Canada has remained difficult. Critics believe the federal government already spends enough money in Nunavut. Making a strong case for further investment is therefore in Nunavut's best interest as well as demonstrating that the moneys will be spent wisely.

For instance, Nunavut's real GDP per capita is currently on par with the rest of Canada. The fact that its income levels are low is a function of demographics and a lack of education and training, not a lack of economic opportunities or natural wealth (the opportunities in mining, fishing, and tourism have already been discussed).

Nunavut should not need to convince Canadians that their economic contribution to the country warrants greater support. There are just as many intangible (or unquantifiable) contributions that stand on their own as justifiable reasons. It is hard to place a value on a national identity that is linked to the Arctic and the Inuit people. For example, how many foreigners vacation in Canada because of our image that includes Inuit people and their art and culture? What is the value of maintaining sovereignty in the Arctic through the existence of Nunavut and the many communities inhabiting the region? This latter issue is certain to intensify in the next 20 years as global warming opens the Northwest Passage for shipping.

But perhaps the most compelling argument for increased funding are the current inequities that exist in terms of standard of living, health and education compared to the south, and the growing concern surrounding the emergence of the North's baby boom into the workforce. The equalization payments made in southern Canada do not result in the same level of health care for everyone regardless of where they live, but it does provide enough for the operation of existing services that by and large meet Canadians' health care needs. In Nunavut, this is not currently the case, primarily because many services and facilities are not yet established. Preventative spending and support for individuals to help themselves is the best way for public money to be spent. And on these counts, this is what is required in Nunavut and is why Canadian taxpayer dollars should be spent there. How much and by what means is yet to be determined.

FUNDING OPTIONS

*One of the major challenges (facing) the Government of Nunavut is to find revenues to finance the wealth-creating investments needed to ensure the future prosperity of Nunavut's whole economy. While a reassessment of spending priorities may be required, the Conference Board believes it is unlikely this will provide sufficient funding for these investments. Therefore, consideration should be given to securing additional revenues over the short to medium term. ... failure to address the physical and human capital needs of the Territory poses a tremendous risk to the future of Nunavut and this economic outlook.*¹⁸

The Conference Board of Canada was asked previously to consider funding options to assist Nunavut in raising the necessary investments required for its infrastructure priorities.¹⁹ This section provides a summary of that analysis.

The analysis looked at several options including own-source revenues, reallocation, and federal funding. In terms of own-source revenues, the analysis concluded that raising taxes in Nunavut is a difficult proposition because of the already high cost of living and low income per capita of residents. The only potential source of revenues that exist would be that of resource royalties if the Territory's base and precious metal deposits were developed in the future. However, under the current Territorial Formula Financing agreement, these revenues would be clawed back, meaning they would not result in an increase in the Territory's revenues.

The second option considered was reallocation. It is conceivable that the Government of Nunavut could afford to redirect some of its finances to capital deficient areas and there are certainly areas of duplication of programs and areas that could benefit from stronger financial management. But after a review, it is not obvious that there would be enough to go around. And some concern

¹⁸ The Conference Board of Canada, *Nunavut Economic Outlook: An Examination of the Nunavut Economy* (Ottawa: The Conference Board of Canada, 2001), p. V.

¹⁹ The Conference Board of Canada, "Capital Funding Considerations For Nunavut: An Analysis of Options to Address Nunavut's Capital Investment Needs." Prepared for the Nunavut Economic Forum, December 2002.

must exist that reallocation from one department to another may only serve to create new problems where they didn't exist before. Furthermore, the magnitude of some of the investments needed requires more than just minor adjustments.

Increasing federal funding is another option considered. This funding may come from mechanisms other than the Territorial Formula Financing agreement. For instance, the federal government has played a more highly visible role in the area of infrastructure since 2000 when Infrastructure Canada was established to oversee several related funding initiatives announced in subsequent federal budgets. These federal funding programs have been targeted to both cities and rural areas and are guided by several objectives including limiting climate change, improving water quality, enhancing urban life, and stimulating innovation. Many of these programs are cost-shared meaning that the federal government only provides one-third of the capital funding while the provincial and territorial governments and other levels such as municipalities are required to provide the remaining funds.

Federal programs in recent years have usually involved a per capita funding component and are based on the assumption that funding is to be used primarily for upgrading existing services. Such an approach does not match Nunavut's needs where little infrastructure is in place. However, the situation is improving as some of the federal government's infrastructure funding programs now include a base allocation before the per capita component kicks in (see Table 3). There is also greater flexibility on project eligibility.

A final option that was raised in the analysis calls for a more proactive approach—a Nunavut Capital Fund—focused on developing Nunavut's four forms of capital including human capital and infrastructure. Each Nunavut partner could contribute to the fund that could then be used to leverage external funding sources including the federal government and private investors. While the amount of funding would no doubt be limited, it would offer many benefits. Most importantly, it would be a Nunavut owned fund whereby Nunavummiut would set the rules and could ensure that the funding supported their priorities identified in their economic strategy as opposed to trying to fit their needs with external funders. It would also promote a move away from the more narrowly defined "economic development" language that has been used in the past.

Table 3: Summary of Federal Funding Programs Related to Infrastructure

Program	Purpose	Federal Amount	Nunavut's Share	Announced Projects
Canada Infrastructure Fund	To enhance municipal infrastructure in urban and rural communities and to improve Canada's quality of life through investments that protect the environment and support long term economic growth.	2 Billion	Nunavut received \$2 million under the first installment of funding.	Four projects related to water or sewage in Cambridge Bay, Gjoa Haven, Pangnirtung, and Kugluktuk
Municipal Rural Infrastructure Fund (MRIF)	To respond to the specific needs of Canada's municipalities and rural and remote areas. The focus is on improving water quality, wastewater treatment, municipal energy improvements, solid waste treatment, public transit and local roads, and recreation.	\$ 1 Billion	<p>Each jurisdiction will receive a base allocation of \$15 million with the remaining funds allocated on a per capita basis. 80 per cent of the fund will go to communities with a population of less than 250,000.</p> <p>Approximately 50 per cent of the funding will be directed to green infrastructure that provide essential health benefits to Canadians and improve the quality of the environment.</p> <p>The Federal Government provides one-third of the funding while the Province/First Nations/Municipality are to provide the remaining two thirds. For the territories, the Federal Government can provide a greater share such as through INAC funding. Project selection will be determined by a joint federal/territorial management committee and municipal associations.</p>	<p>August 20, 2003, Allan Rock, Minister responsible for Infrastructure announced that Nunavut would receive over \$15 million from federal share. Projects are to be negotiated</p>
Canada Strategic Infrastructure Fund (CSIF)	Focused on large-scale strategic infrastructure in Canada's largest cities.	<p>First installment was \$2 Billion.</p> <p>A second installment of \$2 Billion was added</p>	Nunavut is to receive one per cent of funding	\$20 million from 2001 Budget for sewage treatment systems in Cape Dorset, Kugluktuk

<p>National Satellite Initiative (Broadband Internet Access)</p>	<p>To lower the cost of broadband for communities in the Mid to Far North.</p>	<p>to the fund in the 2003 Budget \$155 million over the next 10-15 years through CSIF and the Canadian Space Agency</p>	<p>FCM and NAM are lobbying for one per cent for Nunavut (\$20 million) for the second installment.</p>	<p>and Rankin Inlet \$20 million for public housing through CMHC-Nunavut Social Housing Agreement for construction of approximately 160 homes</p>
<p>Environment Canada's Partnership Fund and Climate Change Fund</p>	<p>The 2003 Federal Budget committed \$3 Billion over the next 10 years to address environmental issues.</p>	<p>\$3 Billion over 10 years</p>	<p>It remains unclear as to how Nunavut will benefit directly from this funding source.</p>	
<p>Parks Canada</p>	<p>The 2003 Budget included the announcement of two new parks in Nunavut (Ukkusiksalik and Bathurst Island)</p>			
<p>CMHC Social Housing Agreement</p>	<p>Social Housing Agreement provides funding to support operation of social housing units</p>		<p>\$58 million in 2001-2002</p>	

Source: Nunavut Association of Municipalities; The Conference Board of Canada

REDUCING DEMAND ON INFRASTRUCTURE

Given Nunavut's scarce financial resources, Nunavummiut must ask themselves whether there are practices that they can adopt, that would not negatively affect their quality of life, but would lessen the demand on infrastructure.

For example, energy saving campaigns in other jurisdictions have led to reductions in the demand for energy and utilities. Such programs in Greenland led to a 50 per cent reduction in water use. Further savings were obtained by instituting energy conservation incentives to its fishing industry by subsidizing any energy used below a set level. Greater attention to maintenance of infrastructure such as water and heat leaks can also result in substantial savings. With respect to housing, the question could be asked as to whether all residents require or desire to live in single dwelling units. Living units that share common heating and water systems can reduce energy and water consumption and lower costs.

Greater use of combined heat and power (CHP), that is making use of residual heat that is normally lost in the generation of energy, can also lower utility costs. Approximately one-third of the energy provided by diesel fuel is converted into light and electricity, while the remainder is wasted in the form of heat. Technology that utilizes this otherwise lost heat is in use in Denmark and the Netherlands. In Denmark, 86.8 per cent of gross electricity generation comes from CHP systems as a result of strong government support (i.e., tax incentives and subsidies).²⁰ Examples of CHP systems on a small scale already exist in Nunavut including Cambridge Bay, Taloyoak, Kugluktuk and Kugaaruk.

²⁰ European Environment Agency, Indicator Fact Sheet Signals 2001 – Chapter Energy. 2001.

7. A PHYSICAL CAPITAL COMMUNITY PLANNING FRAMEWORK

Building the capacity of communities will strengthen Nunavut.

The Bathurst Mandate

Nunavummiut place high expectations on their communities to promote economic growth. They identify the community as the focal point for the Territory's economic development. This is proclaimed consistently in Nunavut documents such as the Bathurst Mandate. Any economic development approach in Nunavut must take this guiding value into account. This approach is also consistent with research looking into the factors involved in creating innovation:

The current period of growth is thus characterized by a paradoxical consequence of globalization in which the ever greater integration of national and regional economies into the global one accentuates, rather than minimizes, the significance of the local context for innovative activities. Analysts recognize that while the process of globalization poses new challenges for regions and localities, it simultaneously creates new opportunities which arise from their unique capacity to serve as centres of learning and innovation. Factors such as access to a highly skilled pool of local labour, unique support services for local industry, the establishment of trust relations among networks of suppliers and buyers, and the interactive learning effects that emerge in a regional or local setting all contribute to strengthening the importance of local agglomeration effects and untraded interdependencies.²¹

However, even if economic opportunities are limited at the local level, *communities can still contribute to high quality of life by providing the necessary conditions to support healthy learning and living.* Having the necessary infrastructure in place is a key ingredient. For example, safe water and adequate housing can positively affect one's health and ability to learn while proper waste disposal can affect the surrounding environment. The issue then is to identify the best mix of physical capital investments at the community level to maximize socio-economic and environmental performance.

A draft physical capital community planning framework has been prepared to assist in identifying gaps in physical capital contributing to socio-economic development. The planning framework is intended to assist communities to identify top priorities for investment in their physical capital. The framework would support the use of benchmarking to compare communities within Nunavut as well as with communities in other jurisdictions.

WHY BENCHMARK?

There is growing interest in assessing the capacity of countries, provinces/states and communities to produce and sustain a high quality of life for their citizens. Several

²¹ David A. Wolfe, Social Capital and Cluster Development in "Learning Regions. Forthcoming in Knowledge, Clusters and Learning Regions," ed. J. Adam Holbrook and David A. Wolfe (Kingston: School of Policy Studies, Queen's University).

organizations both in Canada and elsewhere have been active in promoting the use of social and economic benchmark indicators as a tool in such an assessment.²² Various provinces and states are also producing their own benchmark reports to track performance relative to other jurisdictions.²³

Benchmarking indicators, in this case, physical capital indicators, is one tool to help communities identify strengths and deficiencies, as well identify the tradeoffs between competing interests. The interactions and interdependencies within a socio-economic system are complex. Choices sometimes need to be made between the short and longer term; between competing interests; as well as between individual and collective wellbeing. Benchmarking can help policymakers and decision makers to focus their efforts on areas that need improvement.

But the real point of benchmarking with other jurisdictions is to see the kinds of outcomes that are possible, assess whether communities are living up to their potential, and taking the necessary steps to improve performance and ultimately outcomes. There is much to be learned from developments in other communities—better or worse performance can often be explained by the policies pursued. The role of benchmarking is not to promote the success of one community at the expense of another. Rather, comparing Nunavut communities with those in other jurisdictions allows one to see what is possible and choose the best of what other communities or jurisdictions are providing (See Box, “An Overview of Greenland’s Infrastructure”).

²² For example, The Conference Board of Canada in its annual *Performance and Potential* reports provides a report card on Canada’s performance relative to comparative countries on a range of ‘quality of life’ indicators (www.conferenceboard.ca). Relying on citizen input, The Canadian Policy Research Networks’ has produced *Canada’s Quality of Life in Canada. A Citizens’ Report Card* (www.cprn.ca).

²³ See for example: BC Progress Board, *BC Progress Board 2001 Report*; Government of Alberta, *Measuring Up, 2000-2001*; Oregon Progress Board, *Achieving the Oregon Shines Vision: The 2001 Benchmark Performance Report*; Minnesota Planning, *Minnesota Milestones, 1998*.

An Overview of Greenland's Infrastructure

Unlike Nunavut, Greenland's population is more concentrated in larger towns and in the same central geographic region. While there are no inter-community roads, the road system in towns are well developed (150 kilometers of roads of which 60 kms are paved). Helicopters have played a large role in transporting people and goods between communities. However, in recent years, Greenland has invested in upgrading its fixed wing transportation system with the construction of runways in more towns, resulting in a shift from helicopter to airplane as the preferred mode of transportation. Shipping is the principal source of freight. Harbour facilities are located in 16 towns, many of which also have container handling facilities and are used to support the country's only industry—fishing and fish processing. Some 60 smaller settlements also have limited facilities.

Greenland built a cultural centre in 1997 located in Nuuk.

The supply of electricity and heating in Greenland is a municipal responsibility and is largely powered by fossil fuels at the community level. There are no transmission lines between communities. However, as of 1993 hydro-electric power was introduced in the Nuuk area. This cleaner source of power is expected to reduce Greenland's diesel consumption by a third. Greenland also makes substantial use (over one third) of its power production facilities to supply residual heating. Additional hydro-electric projects are either being developed or are under consideration.

Water is supplied by a mix of sub-surface piping, above ground piping heating by electricity and by a truck and tank system. Surface water is the source for drinking water and is treated with chloride and chemical and bacteriological control.²⁴

There are more computers per capita in Greenland than in any other country in the world. Access to Internet is available in even the smallest and most outlying settlements.²⁵

One area in infrastructure that continues to plague Greenland is its housing shortages and overcrowding (although their levels remain lower than that of Nunavut). One report identified as many as 4,250 people who are waiting for housing.²⁶ In addition, much of the existing housing stock was built in the 1950s and 1960s and approximately two-thirds of rental housing lacked proper maintenance in the mid 1990s.²⁷ All land is public in Greenland. Housing subsidies, both for ownership and rental, are very high. And approximately 60 per cent of the homes built between 1988 and 1995 are owned by Greenland's Home Rule Government or by the municipalities. There is very little private housing development.

TYPES OF BENCHMARKING

The benchmarking of indicators can occur on several levels. At the highest level, benchmarking involves the identification and comparison of **outcome** indicators. Outcome indicators are intended to capture whether a society, community or organization is reaching its overall goal. Examples of outcome indicators may include health status, well-being, educational performance, and satisfaction rates. Many organizations and jurisdictions (i.e., countries, provinces, municipalities) are focusing their benchmarking work on outcome indicators.²⁸ Most of these initiatives originated at the municipal level given the recognition that of all of the levels of government, municipalities and the services they provide (e.g., water, sewage, recreation) can have

²⁴ Statistics Greenland, *Statistical Yearbook 1997*, Chapter 6.

²⁵ www.visitgreenland2000.gl/infrastructure.htm

²⁶ "Housing crisis growing in Greenland," *Nunatsiaq News*, January 25, 2002.

²⁷ Statistics Greenland, *Statistical Yearbook 1997*, Chapter 13.
<http://www.statgreen.gl/english/publ/yearbook/1997/chap13.pdf>

²⁸ Treasury Board of Canada Secretariat, *Canada's Performance 2002*.
(http://www.tbs-sct.gc.ca/rma/communic/docs_e.asp).

the biggest impact on citizens' quality of life.²⁹

The second level of benchmarking covers indicators designed to track **outputs** or performance. For example, what is the cost of providing potable water per household or how safe is the community's drinking water? While these types of indicators do not report on outcomes such as the rate of illnesses contracted from unsafe water, they nevertheless play an important role in measuring the effectiveness (i.e., quality and cost) of the service. There is a moderate amount of activity taking place related to developing and monitoring performance indicators (outputs) at the municipal level. The Government of Ontario has developed municipal performance indicators. The International City/County Management Association in the United States has been identifying municipal performance indicators for the past several years.³⁰

Finally, benchmarking can be undertaken to compare **input** indicators. Inputs refer to the resources or services in place. However, the existence of inputs does not speak to the issue of whether they are being provided in a cost-effective manner (outputs).

Our examination of current initiatives related to the benchmarking of community indicators has revealed that there is little activity related to the benchmarking of infrastructure inputs at the municipal level with comparator communities or to an accepted standard. In addition, there are very few reports that try and link all three types of indicators (i.e., inputs, outputs and outcomes). We may know that people in a community are generally healthy but we often know little about whether this is related to the state of municipal infrastructure and its performance.

²⁹ See for example, the Federation of Canadian Municipalities, *Quality of Life Reporting System*.
<http://www.fcm.ca/newfcm/Java/frame.htm>

³⁰ ICMA, *Performance Measures Report*. <http://www1.icma.org/login2.asp?tpid=18>

Different Levels of Benchmarking

Outcomes

(Are we meeting our ultimate goal?)

Examples include: improved health status, higher employment level,
improved quality of life

Outputs

(Are we providing the service well?)

Examples include: cost per unit produced, number of boiling water advisories issued per year,
emergency response times, customer satisfaction rate

Inputs

(What services are being provided?)

Examples include: type of water and sewage treatment systems available, percentage of homes
not requiring repairs, airport capability, existence of port facilities

This project focused on the benchmarking of Nunavut's physical capital at the input and output levels (where possible), as well as outlining their important link to socio-economic and environmental performance (outcomes).

INPUTS

Our first step was to identify the necessary physical capital requirements that need to be in place at the community level to support socio-economic and environmental performance.³¹ Nine key requirements (or inputs) for physical capital at the community level were identified. They refer to a community's ability to:

- support a clean environment (e.g., sewage treatment, solid waste management)
- provide healthy living and working conditions (e.g., quality housing and water supply)
- have an effective transportation infrastructure (e.g., airport, seaport)
- have an effective communications system (e.g., affordable phone rates, Internet access)
- provide a sustainable and affordable energy supply (e.g., power, fuel)
- ensure access to education and learning opportunities (e.g., child care, schools, training facilities)
- ensure access to health care services (e.g., medical care, dental care, access to specialists)
- provide a safe community (e.g., policing, fire fighting, emergency response team) and
- provide facilities for social, cultural, spiritual and recreational activities (e.g.,

³¹ It is recognized that the other forms of capital can equally impact socio-economic and environmental performance. For example, without the proper management skills, a community's infrastructure may not be used effectively.

community hall, sports facilities).³²

The next step was to determine whether these inputs are in place in each Nunavut community. This includes consideration of the life-cycle/aging of the inputs (assets) and their quality.

The third step was to identify what the above inputs should be compared to. There are two possible approaches. The first is to compare Nunavut's communities with communities elsewhere such as in southern Canada or in other northern regions in the world (e.g., Alaska). A second approach is to compare the inputs with acceptable standards for each. Such standards should be appropriate for Nunavut communities and their needs (e.g., water safety standards including standards for delivering trucked water).

OUTPUTS

Benchmarking the availability of the above inputs is helpful, particularly for planning purposes. But an equally important matter is assessing the effectiveness in providing these inputs. For example, it can cost up to one hundred times more to provide drinking water in Nunavut's communities than in the south, despite the abundance of water in the Territory.³³

Suitable performance indicators for each input (e.g., # of boiled water advisories per year, cost of maintaining roads per kilometer, # of medivacs per year) should be identified and if possible measured. These indicators must be meaningful to Nunavut and are intended to help measure the cost-effectiveness of the infrastructure and identify performance/management areas that can be improved.

RESULTS

The results of the work conducted to date are found in Appendix A. Unfortunately, there were insufficient data and resources to conduct a proper analysis of infrastructure at the community level. However, the template in Appendix A can be used as a planning tool for communities to consider for themselves as to whether they have the necessary infrastructure in place across the nine components that support high economic, social and environmental performance.

³² For the purposes of this analysis, we do not categorize the inputs by owner or funder (i.e., whether the input is community owned or owned by the GN).

³³ Canada Mortgage and Housing Corporation: *Northern Water and Sewer Infrastructure Cost Study*. Draft Report. 2003.

8. CONCLUDING REMARKS

Given Nunavut's inability to raise adequate funding to address all of its physical capital investment needs, it must develop sound arguments to support requests for additional external investments (e.g., federal government, private sector). The goal of this research has been to provide support through greater insight into the physical capital issues facing Nunavut's communities and how this impacts on their socio-economic development and ultimately the quality of life for its people. Investing in Nunavut's infrastructure will provide greater opportunity for Nunavummiut to participate in the economic prospects that lie ahead. It will also serve to improve the social and environmental performance of the Territory.

At the same time, investments in Nunavut's infrastructure alone will not be a sufficient condition for improving the Territory's economic, social and environmental performance. Nunavut will also need to take action to improve its human, natural and social/organizational capital.