NEW PARADIGM *for* ECONOMIC Growth

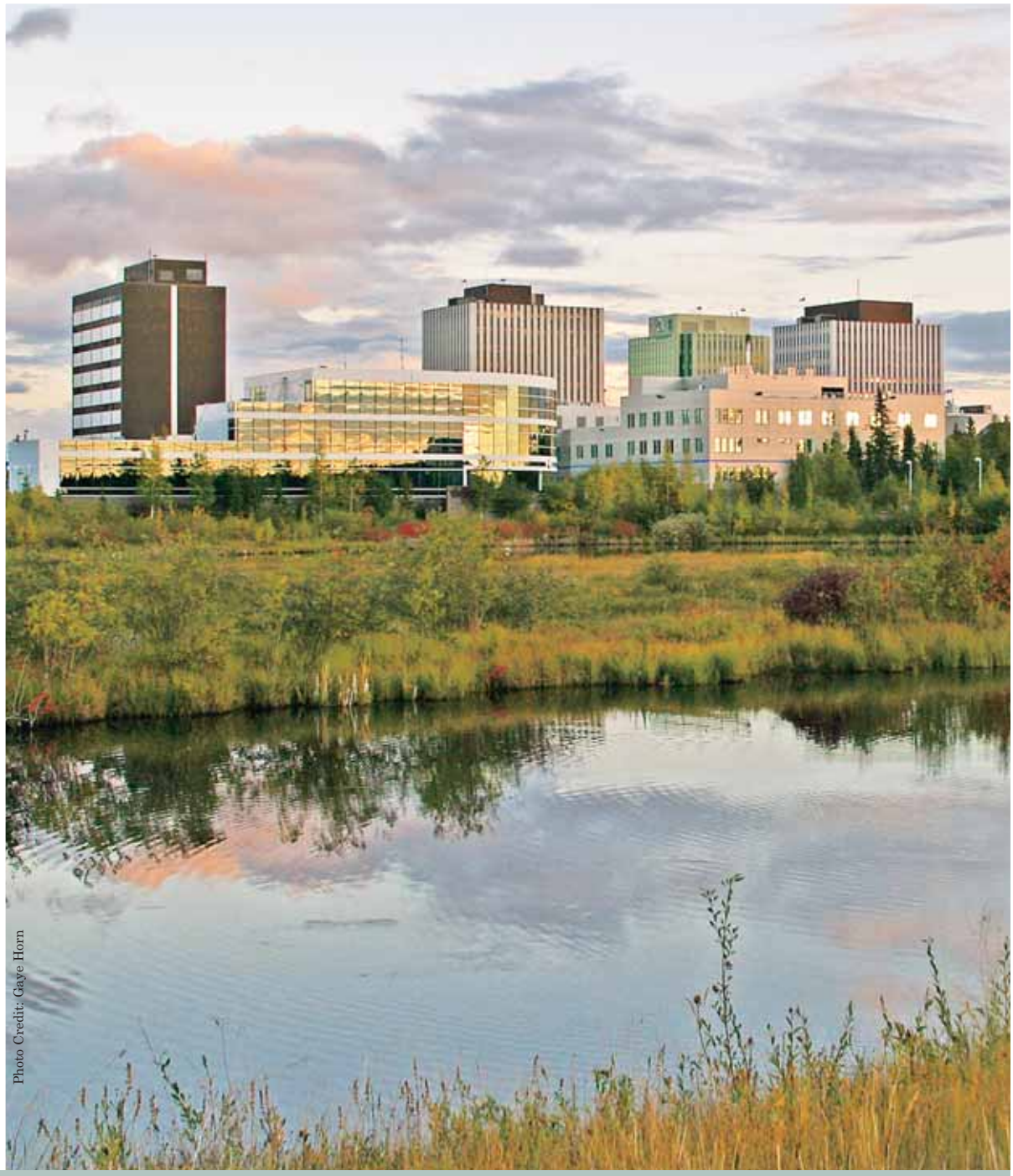

Photo Credit: Gaye Horn

Yellowknife
DIAMOND CAPITAL of NORTH AMERICA™

Prepared for the
City of Yellowknife,
Diamond Capital of
North America™
By the Nexus Group
2006

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PREFACE

The Canadian Investment Support (CIS) Program provides a unique opportunity for Canadian municipalities to attract new investment to add value to traditional industries, or to diversify their economies by adding a new or expanded range of goods and services for businesses, households or for export.

The composition of Yellowknife's labour force is and has always been dominated by employment in government and in the resource industry. High wages and the high cost of doing business pose critical barriers to counter cyclical investments aimed at creating new opportunities to lessen dependency on global commodity cycles.

Yellowknife's economy is operating at or near full capacity. The immediate and mid-term prospects for Yellowknife's economy are very positive. Over the next 10 years, the Mackenzie Valley pipeline, an agreement on revenue sharing, and, further mine developments in the Geological Slave Province will provide a stimulus for further growth in Yellowknife's economy. Yet, while the impacts of these investments are largely positive, in the long term they will further concentrate the economy, increasing reliance on industries controlled by outside forces.

The investment targets described in this report are intended to create high-value, knowledge-based jobs which are independent of the resource industry and government. Similar approaches have worked in many countries and regions with economic characteristics similar to Yellowknife.

Industry building is much more complex than business creation because of the need to establish positive conditions for the development of business networks and for sharing research, technology and knowledge. Unfortunately, in industry building, there is seldom a single investment that will unlock the potential of the industry. Investments must be strategic and integrative.

The City cannot by itself supply the capital needed to transform the economy but it can become an important catalyst for growth and diversity, by:

- Creating a common vision.
- Filling knowledge gaps.
- Building political will among the various levels of government.
- Bringing together the strategic partners needed to put a plan into action.

EXECUTIVE SUMMARY

Historically, Yellowknife's growth and prosperity have been largely influenced by its proximity to mineral resources. The growth of government since Yellowknife became the capital of the Northwest Territories in 1967 has created a more balanced economy. Still, in many ways, Yellowknife's economy continues to share the characteristics of many commodity-based economies.

Section 1 traces the history of the Yellowknife economy. Experience has demonstrated time and time again, the fragility of having an economy tied to resource cycles. While the diamond mines have a planned life of 20 years, without a plan to diversify the economy, the looming economic crisis of the early 2000s, when the gold mines closed could recur. With the help of the CIS Program, the City of Yellowknife has a unique opportunity to lessen the long-term risks associated with a dependency on the resource industry by laying the groundwork for a more sustainable and resilient economy.

Section 2 provides a detailed analysis of Yellowknife's strategic assets. Those include:

- Its proximity to natural resources – diamonds, gold and other minerals.
- A young, well-educated and diverse labour force.
- State-of-the-art transportation and communication networks.
- Extensive investment in public infrastructure.
- High household incomes.
- Extensive public service.
- Balanced housing market.

Risks to investment include:

- A limited pool of surplus labour.
- Remoteness from major markets.
- High cost of living.
- High cost of labour.
- The relative small size of the domestic market relative to other Canadian centres.

The challenge facing Yellowknife economic policy makers is to build on its strategic assets and select investment targets – high-value, capital-intensive industries that fit within the culture and quality of life valued by Yellowknife residents.

Section 3 profiles Yellowknife's industrial composition benchmarked against selected Canadian centres and for Canada as a whole. This analysis provides the rationale for isolating strategic targets in which investments could be used to:

Fill industrial gaps in the diamond industry – In many producing countries, co-dependent industry clusters have built around various aspects of the diamond industry. The Yellowknife-based diamond cutting and polishing companies were expected to provide the seeds for similar growth and diversification in the City's economy. Several market research studies on the potential for jewellery manufacturing and one pilot test (Laurelton) have not resulted in breakthrough developments that realize the value-added potential in the diamond industry. The absence of a history in jewellery manufacturing and the lack of a pool of skilled artisans in jewellery design and production are barriers to further development. While still in the early stages of development, efforts continue to be made to incorporate Northwest Territories manufactured cut and polished diamonds within other sectors, most notably tourism and the sale of loose diamonds by local jewellers to export markets.

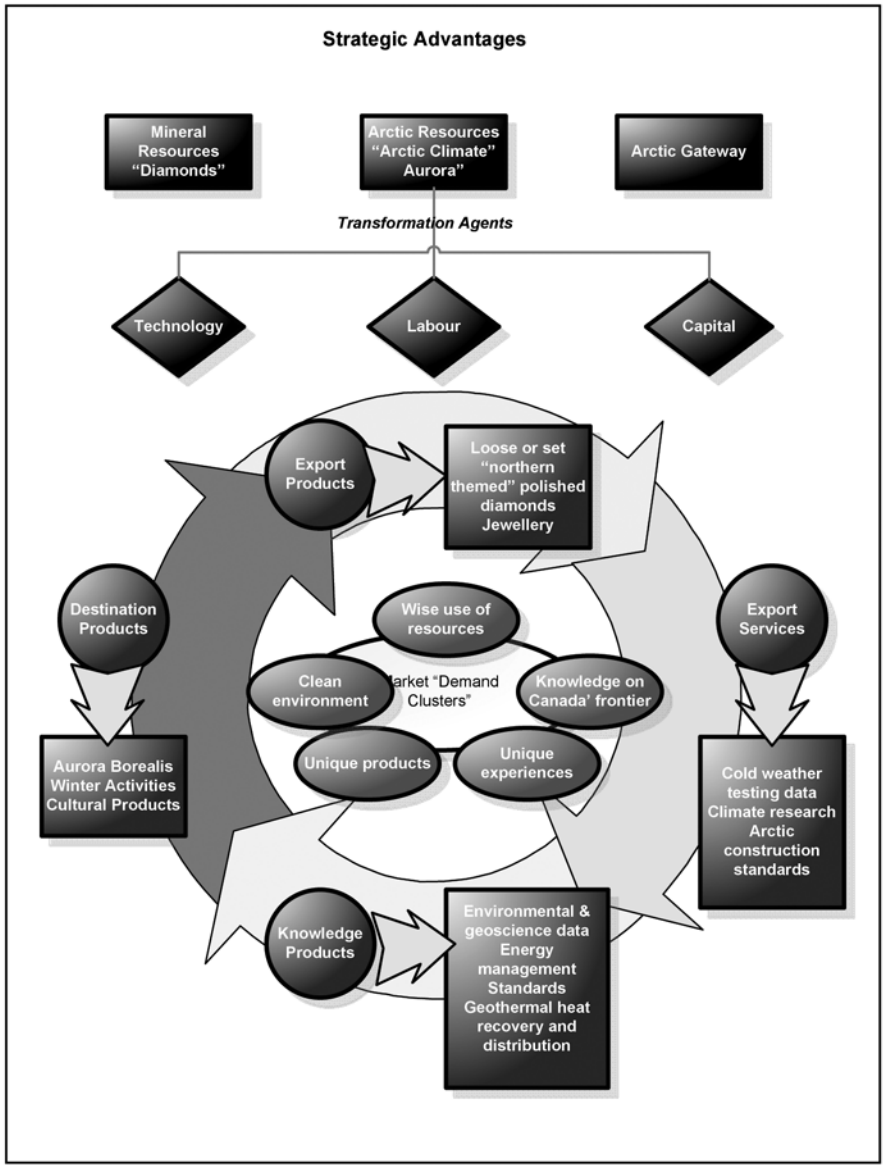
Diversify the economy – In contrast to other communities in Canada, the City's economy is significantly under-represented in manufacturing and in wholesale trade (approximately 10% of Yellowknife's labour force is employed in trade compared to almost 20% for the average large municipality in Canada).

Stimulate investment in growing global industries – Led by Sweden and Finland, revenues derived from cold weather testing in real and simulated conditions have been growing by 25% per year, globally. One region in Finland derives approximately 40 million euros per year in revenues from cold weather testing activities. Key to the region's development are strong government support, strategic business partnerships, private infrastructure to test products in both real-world and simulated conditions, and linkages between practical and academic research.

Reduce costs of doing business – Yellowknife businesses must contend with higher input costs for labour and energy. Because of extreme temperatures and distances from major markets, Yellowknife can be characterized as a fossil-fuel based economy. Higher world prices of fuel directly impact on all Yellowknife businesses and households. The prospects for continuing higher costs of fossil-based fuels will eventually lead to new alternative or non-traditional approaches to energy generation that were previously not viable.

Section 4 provides an assessment of alternative investments.

The search for investment targets was focused around areas where Yellowknife may have a competitive advantage over other Canadian cities. The following chart illustrates the analytical model used to map the transformation of Yellowknife's strategic assets into unique products and services that meet the needs of Yellowknife residents.



Investment in Yellowknife's strategic assets could trigger the development of a number of products and services that will enhance Yellowknife's reputation as a destination attraction as well as increase the quality of life in the captial.

Perhaps, more importantly, in the longer term Yellowknife's location in the transition region between the taiga (northern forests) and the tundra, may

provide unique opportunities for research to fill knowledge gaps about the effects of global warming, and for testing technologies to move from a petroleum-based economy.

Investment opportunities related to these assets are discussed in more detail below.

Mineral resources – The full extent of the vast mineral resources in the Northwest Territories may not yet be fully known. The discovery of diamonds at Point Lake, Northwest Territories, in 1991, has created the impetus for establishing a transportation and supply corridor that could drastically change the economics for bringing new discoveries into production.

The mining industry has also provided the impetus for many new non-mining jobs in diamond manufacturing, security, monitoring and enforcement of federal and territorial environmental regulations, transportation, planning and logistics. While the extent and scope of direct investment in mining is beyond that which could be considered under the CIS Program, mining provides a foundation – infrastructure and awareness – that could kick-start other industries not directly related to mining. Particular examples include: the hospitality industry, cold weather construction in remote sites, design and construction of ice roads, energy supply and management, communications, etc.

Arctic resources – Cold weather, permafrost, aurora borealis, the taiga, the tundra, ice roads, and arctic animals – caribou, free-range wood bison herds – could potentially become major assets in Yellowknife's efforts to become better known. Interest in climate change, North America's first diamond mines, the history and culture of the Dene, and the mystic of the aurora borealis may one day redefine what southerners think of the north. These assets only strengthen Yellowknife's potential as Canada's premiere northern city. Areas where these assets can be exploited to diversify Yellowknife's economy are discussed below:

Cold weather testing – Correspondence between City officials and companies in Europe and in North America demonstrates some interest in Yellowknife as a testing centre. As yet, these discussions have not led to formal commitments.

Scandinavian communities in Sweden and Finland that have succeeded in establishing cold weather testing capabilities generally offer more than extreme weather conditions; they offer a full range of services including both simulated and real-world testing facilities for an array of applications including aircraft turbines, automobiles, tires, wind turbines, other manufactured products, etc.

In some respects, North America lags behind other circumpolar regions in cold weather testing. Some of the better known sites are discussed below.

Ladd Field in Fort Wainwright, Alaska, has served as a testing facility for aircraft since 1940. A $7.3-million, state-of-the-art cold weather test centre has been proposed for Koochiching County, Minnesota.

In Canada, the City of Thompson, Manitoba, has converted an abandoned hangar into a permanent testing facility.

In Kapuskasing, Ontario, an all weather testing centre has been established to provide testing for automobiles and other manufactured products.

The Government of Canada's National Research Council - Centre for Surface Transportation Technology (CSTT), Climatic Engineering Division tests the performance of vehicles and equipment under an exceptionally wide variety of climatic conditions, and provides problem-solving support for vehicles and on-board systems including HVAC, cold-starting, defrosting, de-icing, anti-icing, fuel, condensation, humidity management, snow ingestion, snow and ice accumulation, and a host of other climate-related problems.

For Yellowknife to move forward as a cold weather testing centre, more research is required on the market and the services required to become a world-class centre. It will also be necessary to conduct due diligence in respect to identifying potential strategic partners prior to entering into any long-term arrangements. Once a strong business case has been developed, the City would need to develop a prospectus targeted at potential strategic partners who may be interested in investing in cold weather testing infrastructure.

The growing interest in the climatic impacts of global warming may become a further catalyst for developing test facilities in the City and may offer synergies for sharing facilities and research costs. The research should also examine possible links between academic and practical research.

Several northern region research projects are being undertaken by southern universities.

Geothermic energy development – The Con Mine ceased production in 2003, and all water pumps shut off to allow the mine to naturally fill with water. Abandoned mine sites have become an important source of geothermic energy in North America and Europe. The town of Springhill in Nova Scotia uses geothermic energy from its abandoned coal mine to provide district heating for their industrial park, generating savings of up to 60% for industrial customers. Mory Ghomshei, Manager for the Centre for Environmental Research in Minerals, Metals at the University of British Columbia, has visited the Con Mine site and is interested in participating in research on establishing the potential of this resource on behalf of the university.

Still, many questions remain. Prior to seeking foreign investment, it will be necessary to undertake more extensive technical and economic feasibility studies.

Diamond value-added products and services – Cut and polished diamonds manufactured in Yellowknife and branded with strong northern images – the polar bear, aurora, etc. – are being sold worldwide. While demand remains strong for these "northern branded" diamonds, they are primarily channeled through southern wholesale distribution networks. Only a small percentage of these diamonds are being exported through local jewellers.

Efforts to tie polished diamonds to other industries are in their infancy. Luxury Tour Operator, Horizon & Co., is marketing a "high end" trip to Yellowknife and the Northwest Territories that includes viewing the northern lights, a trip to a remote lodge, visiting a diamond cutting and polishing facility.

Laurelton Diamonds, a subsidiary of Tiffany & Co. has test marketed a line of jewellery through their "Little Switzerland" product line that was designed by Dene and Inuit aboriginal artists. Although the jewellery was manufactured in the United States, the success of ventures like those cited above could eventually open the way for small-scale jewellery manufacturing in Yellowknife.

However, the results of market research and pilot tests have not been encouraging for large-scale production of jewellery in Yellowknife. Small- scale, family-owned and operated design and production studios may be feasible for manufacturing limited-edition, mid-priced jewellery for sale locally, to tourists and on the internet.

Value-added diamond and diamond jewellery production will be dependant upon the viability of the Yellowknife-based cutting and polishing industry. The shortage of local artisans skilled in design and casting production could be addressed by attracting immigrant families who have operated successful jewellery manufacturing businesses in other countries to move their production to Yellowknife.

In the longer term, increased demand for "northern themed" jewellery will open doors to northern artists. To be successful, it will also be important that they have access to Canadian mined diamonds in the low- to mid-price range and other semi-precious stones. It will also be important that they be able to brand diamond jewellery as Canadian made.

As more North Americans, Europeans and Asians learn about the Northwest Territories and Yellowknife as a diamond centre, it can be expected that interest in other aspects of the north will also grow. This heightened interest will inevitably lead to a convergence of the diamond and jewellery manufacturing and the hospitality industries.

Yellowknife as a gateway city – Yellowknife has been the primary gateway for northern goods and services coming to and leaving Yellowknife for destinations throughout the Northwest Territories and Nunavut for many years. Improvements in the road system to Yellowknife and in air services, in combination with increased community incomes due to resource jobs, will open up new opportunities for expansion and growth of services offered by Yellowknife-based business.

From the research undertaken for this study it is clear that employment in businesses related to trade lags other Canadian centres of similar size. Specific opportunities in respect to expansion of trade are not explored in detail for this study since they tend to be dependant on the growth of other primary and secondary industries – mining and manufacturing.

Summary

If any of the projects listed in the previous pages are successful, they will generate new revenue for Canada and for the Northwest Territories. They also have the benefit of being transformational in that they will force the economy in new directions and focus discussion on new industries that will dampen risks associated with an economy heavily concentrated on mining and government.

Success in establishing Yellowknife as a cold weather centre and research on the geothermic energy to reduce dependence on petroleum–based fuels would be beneficial to governments' efforts in setting policy on dealing with the effects of climate change and reducing carbon emissions.

Furthermore, success will solidify Yellowknife's reputation in Canada and abroad as a sound environmental manager, and it will help to showcase its ability to develop and apply innovative solutions to unique northern problems.

Section 5 provides a work plan for implementing the following projects.

Cold weather testing – To become a successful centre for cold weather testing, Yellowknife must envision itself beyond providing a simple venue for testing vehicles under extreme weather conditions. Lessons learned from successful centres highlight the importance of developing a cluster or network of service providers that can provide testing services under real and simulated circumstances.

Yellowknife has the advantage of extreme conditions, accessibility, and state-of-the-art communications. However, it has neither the research and testing facilities, nor the academic or private sector support needed to compete with established centres in Scandinavia and Japan. As a first step, it will be useful to identify the key players in the industry that may serve as an anchor for further development. A good starting point would be to follow up with the National Research Council on their interest in establishing a northern facility in partnership with MDS Aerospace Corporation to test turbine engines.

Simultaneously, the City should:

- Undertake a needs assessment to identify infrastructure requirements to establish a centre in Yellowknife.
- Complete an inventory of the City's resources and undertake a gap analysis of services required for Yellowknife to become a full service cold weather centre.
- In collaboration with a university or research institute, undertake a pilot project using Yellowknife as a cold weather centre. The pilot project should include a detailed competitor analysis, market research, identification of key stakeholders, etc.

- Develop a high-quality prospectus on Yellowknife as a northern testing centre targeted at lead companies with experience and knowledge in cold weather testing.
- Organize familiarization tours for potential investors or users.

Geothermic energy generation – While the technology is proven, each application brings a unique set of problems. Research is required to establish the heating capacity of the reservoir, identify potential applications, and estimate the distribution infrastructure required, etc. A three-phased approach is proposed.

- Complete a study of the technical feasibility of using the Con Mine reservoir as an energy source.
- Complete an economic feasibility study.
- Develop the business case.

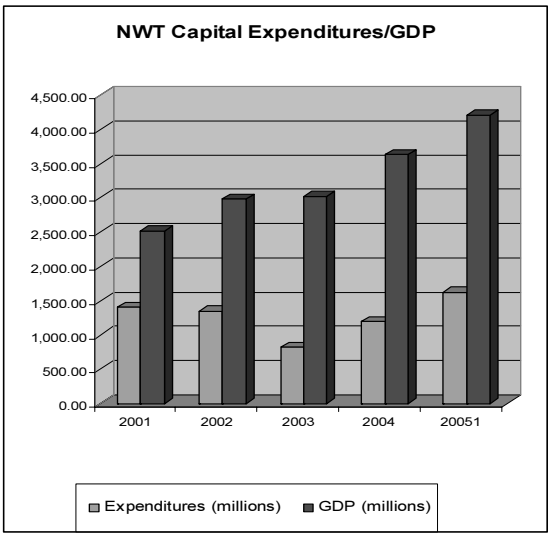
MAIN Report

Photo Credit: Stephen Cumming

INTRODUCTION

Foreign direct investment has been the driving force behind Yellowknife's economic growth since the first European settlers arrived in1934. Yellowknife began as a single resource community, and for outsiders that is a common perception that is held by many, even today. Much has changed since Yellowknife began as a gold mining town. In fact, the last gold mine closed in 2004.

Figure 1: Contribution to GDP



Source: NWT Bureau of Statistics

Between 1934 and today, Yellowknife's economy has gone through many ups and downs. As recently as 1999, the City was facing a major recession because of the closure of the gold mines.

In the last 10 years, the economy has been affected by a number of external factors. Some of the most noteworthy are described below.

Division of the Northwest Territories – Since 1967, Yellowknife has been the administrative and logistical capital of the "old" Northwest Territories. In 1999, when the Northwest Territories divided and Nunavut was created, Yellowknife lost many government jobs as well as private sector jobs – engineers, accountants, health professionals, etc. – that had previously served the needs of Nunavut residents.

Gold mine closures – Gold mining provided the early catalyst for Yellowknife's economic development and was the mainstay of the City's economy for over 50 years.

Diamond discoveries – The discovery of diamonds in 1991 provided a stimulus for a whole new industry and has more than replaced the jobs lost due to mine closures and the division of the Northwest Territories.

Future projects - The November 23, 2005 announcement that the Imperial Oil will file an Environmental Impact Statement to construct a Mackenzie Valley gas pipeline in the Northwest Territories ended much speculation about the future of the pipeline and provided a boost to flagging industry confidence that the project would go ahead. The pipeline is the largest of several multi-million dollar construction projects scheduled to take place in period between 2006 and 2011. Total capital expenditures in the period could exceed $10 billion.

Major projects on the planning horizon scheduled to be completed include:

- The Mackenzie Valley Gas Pipeline – $7 billion.
- The De Beers Gahcho Kue Diamond Mine - Also known as Kennady Lake, Gahcho Kue will become the fourth diamond mine in the Slave Geological Province, pending regulatory and environmental approvals. The project will cost approximately $600 million[1]. It is scheduled to start production in 2011.
- Two Hydro projects – the Bear River Hydro Project ($650 million) and the Talston River Hydro expansion ($250 million). If power supply agreements can be worked out these projects will be undertaken to supply energy to the compressor stations along the pipeline and the mines northeast of Yellowknife. Surplus power will be sold to communities along the Mackenzie Valley Pipeline route.
- Construction of the Deh Cho River Bridge – $80 – $100 million.
- Public housing – $200 million over five years.

While the scale of the northern projects relative to the economy will be transformational for the economy of the Northwest Territories, the effect of the projects on the capital and labour markets pale in relation to projects planned or underway in Northern Alberta around Fort McMurray. The impacts of the industrial projects on the territorial economy will be heightened because the Northwest Territories and Alberta draw from the same labour market. A summary of developmental impacts of these projects on the territorial economy is described below.

Labour force impacts – The net direct and indirect employment impacts of the pipeline alone will peak at just over 8000 person years (PYs)[2]. On a sustained basis, the number of jobs in the Northwest Territories is expected to increase by 2000 PYs after the completion of the pipeline and mines.

Population effects – Shortages of skilled oil field workers and miners in the Northwest Territories will mean that many of the new permanent jobs will be filled by persons who will immigrate to the territory to take the jobs. Also, experience with the diamond mines has demonstrated that a considerable number of persons now living in the outlying communities will move to Yellowknife to take advantage of better services and to be closer to their workplace.

The influx of new workers will put demand pressures on Yellowknife's public and private infrastructure and services.

[1] CNNMatthews, News Releases, www.cnnmatthews.com/news/releases

[2] NWT Bureau of Statistics, PowerPoint presentation, June 2005.

Income effects – In the north, the wages paid by the resource companies tend to be the highest of any industrial sector. Inevitably, labour shortages in one industry generally lead to a disproportionate growth in wages in that sector. This creates disequilibrium within the economy as other sectors must raise prices to meet wage demands. For business and government this means higher operational costs, shortages in key positions, higher turnover rates, etc. For homeowners and renters it could mean higher rent costs and higher prices for homes.

CIS Program – Investment in Yellowknife's Future

Investments in the order of tens of millions of dollars are required to develop a producing diamond mine. The diamond mines normally have planned life spans of 15 to 20 years.

By contrast, in the late 1980s and early 1990s, government and the private sector spent only tens of thousands of dollars to develop the Aurora Borealis viewing market that launched a new sustainable industry. Programs similar to the CIS Program have been important to the success of the Aurora Borealis program.

The City became interested in the CIS Program because of its potential for identifying other transformational investments that will create sustainable income and employment opportunities for City residents that will:

- Increase Yellowknife's competitiveness in retaining and attracting new workers.
- Broaden the economy and reduce dependence on the resource industry and government.
- Accelerate the adoption of new technology and innovation in making Yellowknife one of Canada's leading winter cities.

The CIS Program is funded by Industry Canada. Funding for this study was provided by the City of Yellowknife and Industry Canada.

The analysis of Yellowknife's strengths, weaknesses, opportunities and threats provides a first step in assessing alternative investments that may have a sustainable impact on the City's economy.

Yellowknife is uniquely positioned among Canadian cities to play a larger role in the economy of Canada. As one of three of Canada's truly northern cities, it reflects what the world thinks of Canada – cold, robust, hospitable and replete with natural resources.

Historically, Yellowknife has benefited greatly from Canada's immigration and foreign investment policies. In fact, the growth in the territorial economy due to the diamond mines has been largely fueled by foreign investment. In the years between 2000 and 2005, capital expenditures (estimated) ranged from between 33% and 56% of the Northwest Territories Gross Domestic Product (GDP) - see figure 1. For the same period, gross private and public capital

formation in Canada averaged only 17% of the Canada's GDP. The nature of investment in the Northwest Territories is different than it is for Canada on average in that almost all of Northwest Territories investment comes from foreign sources. The major mines are owned by companies that are headquartered in Australia, London and South Africa. Furthermore, foreign investment is largely concentrated in the resource industry. This makes the Yellowknife economy vulnerable to market and policy shifts.

The northern capitals – Yellowknife, Whitehorse and Iqaluit – are important symbols of Canadian identity both domestically and internationally. Yet, many Canadians are uninformed about events occurring north of sixty and view the Northwest Territories as a part of Canada's hinterland. Investments in knowledge-based industries will help to change public perceptions of the Northwest Territories and Yellowknife.

Up until 1967, Yellowknife was primarily a non-renewable resource based economy. Yet, its economic resilience has been demonstrated time and time again. During the City's 70 years of existence, it survived the closure of several gold mines. The closure of the Con Mine brought to an end an era of gold mining in the City.

As well, the City's economy had to cope with government layoffs that followed the division of the Northwest Territories in 1999.

Part of the City's resilience can be attributed to favourable immigration and investment policies that have enabled employers to attract outside investment dollars, as well as having a young, ethnically-diverse, educated and mobile workforce from across Canada and the rest of the world.

ORGANIZATION OF THE REPORT

OBJECTIVES:

The objectives of this report are:

- To provide an understanding of various economic activities that make up Yellowknife's economy and to describe investment opportunities and gaps or barriers that need to be filled or removed if Yellowknife's economy is to reach its potential.
- To define economic and demographic characteristics which differentiate Yellowknife from other urban centres within Canada and make it a good place to invest.
- To propose strategies for filling gaps or removing barriers to allow Yellowknife to reach its potential.

This report focuses on documenting Yellowknife's assets to provide a better understanding of the City's capacity for further growth and diversity and to identify potential gaps or barriers that may become sustainable investment opportunities.

The study will be organized in the following sections:

Section 1: Economic history of Yellowknife.

Section 2: Yellowknife's strategic assets.

Section 3: Yellowknife's industrial composition.

Section 4: Framework for investment.

Section 5: Next steps.

NOTES

Section 1

ECONOMIC HISTORY OF Yellowknife

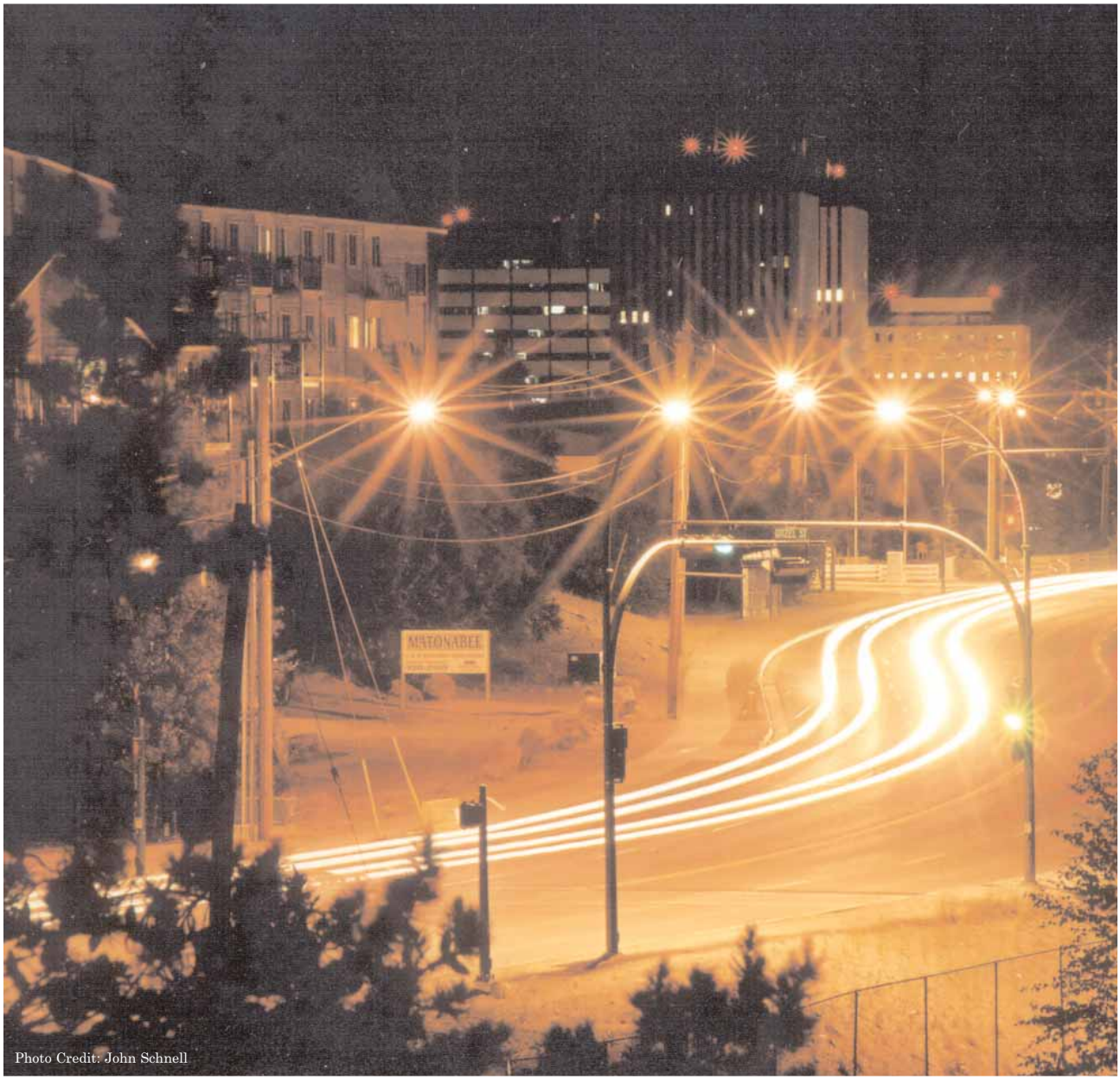
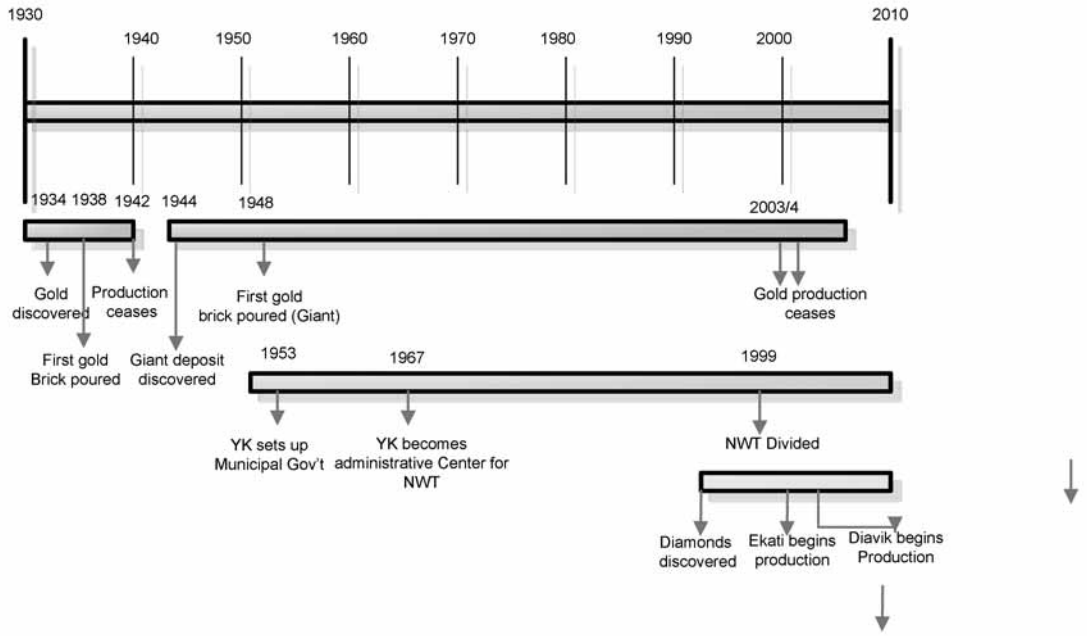


Photo Credit: John Schnell

The Dene lived and travelled throughout the North Slave Region for thousands of years prior to the first contact with Europeans. The first Europeans to arrive were the fur trappers, government surveyors, prospectors and bush pilots. The modern era of development began in 1933, when Johnny Baker and Herb Dixon discovered gold on the Yellowknife River. By 1935, enough gold had been discovered to prompt serious work. Con Mine became the Northwest Territories first gold producer when the first brick was poured on September 5, 1938.

Yellowknife's timeline is illustrated below:



Since 1933, there were three identifiable settlement periods.

- The gold rushes of 1933–38 and 1944-48.
- The movement of the government north -1967.
- The beginning of diamond production -1998.

Gold rushes of 1934-38/1944-48 – Between 1934 and 2004, Yellowknife experienced two gold rushes. As stated earlier, the first followed Johnny Baker's discovery of gold in 1934. The second occurred after new gold deposits were discovered on the "Giant" property in 1944. Production from the Giant Mine began in 1948.

Gold production in Yellowknife continued until 2004. This marked the end of the gold era in Yellowknife (at least for the time being). Between 1938 and 2003, Yellowknife-based mines produced and exported gold valued at over $8.2 billion (at today's prices).

Transfer of northern administration – 1967 to the present – Yellowknife became a municipal district in 1953, and in 1967 it became the administrative headquarters for the Northwest Territories. Yellowknife was made capital of the Northwest Territories in the same year. On January 1, 1970, Yellowknife was incorporated as a City.

Except for a few periods when government cutbacks were made to align expenditures with fiscal realities, the government sector experienced continuous growth until 1999, when the Northwest Territories divided and jobs were transferred to the Nunavut Territory. Most of the lost public service jobs have since been recovered.

Diamond period – 1991 to the present – The discovery of diamonds in 1991, and the completion of the Ekati mine (1998) marked the beginning of the third settlement period. A second diamond mine went into production in 2003, and a third is scheduled to begin production in 2007. A fourth diamond mine is entering the regulatory phase and, if it is successful in obtaining the necessary approvals, production is scheduled to begin in 2011.

By 2001, Yellowknife was no longer the remote frontier town that it was when the government moved north in 1967. Today's mining companies are environmentally responsible and must adhere to strict legislation and policies that ensure that the environment is preserved and that remediation occurs after the natural resources have been depleted.

In 2004, a Statistics Canada's survey of employers identified 1,068 mine employees living in Yellowknife with total direct and indirect mine employment[3] estimated at close to 1,600 persons. The NWT Bureau of Statistics[4] has estimated the multiplier for diamond mines at .81 which would make total employment

[3] NWT Bureau of Statistics, data prepared for the Nexus Group taken from the Statistics Canada, Employer Survey.

[4] NWT Bureau of Statistics, Economic Multipliers, March 2004.

attributed to the diamond mines at approximately 25% of the total employment in the City.

The value of mineral shipments from the Northwest Territories has increased from $42.2 million in 1999 to $2.15 billion in 2004.

Growth of the City between 1938 and 2006

In contrast to other Canadian capital cities, Yellowknife is a relatively young City. In 1940, it had only 1,000 residents. In 1961, prior to the movement of the government administration to Yellowknife, the population had grown to 3,141 persons. By 1971, the population was 5,867. In 2004, the NWT Bureau of Statistics estimated that the population of Yellowknife was 19,056[5].

In the past, when mine companies considered setting up a town site near the mine, their investments in public infrastructure and housing tended to be short term in nature, based on the expected life of the mine. It was only after Yellowknife became the capital and administrative centre of the Northwest Territories that the economy began to put down roots and a sustainable economy started to form.

Despite the growth of the service economy, the economy remains resource dependant. With at least 20 years remaining in the planned life of the diamond mines, Yellowknife has a 20-year window to re-engineer its economy to become one of Canada's premiere winter cities.

Resource dependant economies are inherently unstable. However, while volatility raises risks for investors it also contributes to an environment that is vibrant, dynamic and entrepreneurial. In older economies it might take a generation to completely adjust to the loss of a major industry or the start up of new one. Yellowknife, as a high-cost economy with a relatively young, well-educated, transient workforce, can adjust quickly to changing economic fortunes.

The City's leaders are committed to developmental values that recognize the connection between economic growth and quality of life that incorporates many of the values adopted by "smart growth" advocates.

[5] NWT Bureau of Statistics, Statistics Quarterly, Population Estimates, Community Populations 1999-2004.

The City is committed to the following values in regulating its growth:

Comprehensive – investments in developing new industries must be comprehensive, supporting the development of interdependent industry clusters and adding value throughout the supply chain.

Market driven – growth must be driven by an identified market demand.

Add value to existing businesses – growth should fill gaps by providing goods or services not now available.

Create net benefits for the City – growth must create new jobs, incomes, added services, and lead to improvements in the quality of life.

Economic growth must be consistent with "smart growth" principles[6] – growth must preserve and enhance the City's character and quality of life.

Sustainable – new businesses should be sustainable, recognizing natural industry cycles. Each industry has a natural life cycle – planning, construction, production and decline. Business needs change throughout the cycle. It is important that the City's businesses recognize these cycles and are prepared to adapt to changes in customers' needs throughout the lifecycle.

[6] Smart Growth Network, www.smartgrowth.org

Section 2

YELLOWKNIFE'S Strategic Assets

Photo Credit: Fran Hurcomb

Yellowknife's strategic location in respect to internal (Northwest Territories) and regional markets and natural resources – diamonds, gold, water, aurora borealis, etc. – has been fundamental to the City's economic growth and its emergence as the service centre for the Northwest Territories.

Yet, location by itself is not sufficient for sustainable growth. Equally important are the acquired or constructed assets that provide the foundation for the economy. These are discussed under three headings below;

Human capital – The first precondition to growth is having access to a skilled and knowledgeable labour force. Human capital in this context is defined as the characteristics or qualities possessed by the Yellowknife labour force that sustain economic life. Labour force qualities such as knowledge and skills, mobility, age, and diversity are important determinants in attracting potential investors.

Physical capital or infrastructure – The second precondition to economic growth is having the physical assets or infrastructure that allows an efficient market to operate – free movement of people, products, capital and technology. Also important are public and private infrastructure in place to care for health and personal growth and safety of its residents. The physical assets include:

- Public investment in infrastructure – roads, communications networks, schools, hospitals, etc.
- The availability of adequate and affordable housing and commercial accommodation.
- Banking and financial institutions to provide capital and to enable efficient transactions.

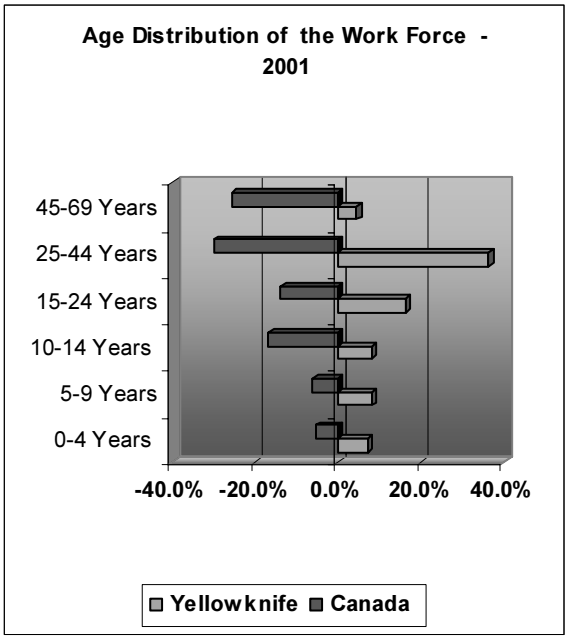
Social capital – Social capital is defined as the formal and informal community-based networks that are formed to improve or sustain the quality of life. These are information and knowledge networks that enable markets and individuals to associate with one another, to benefit the community and to create a sense of belonging.

HUMAN CAPITAL

Four characteristics or qualities are offered that differentiate the Yellowknife labour market from others in terms of its capacity for growth.

- Positive demographics – young, well-educated and experienced workforce.
- High participation rates.
- Ethnic diversity.
- Mobility.

Figure 2: Canada-Yellowknife: Labour Force Age Profile

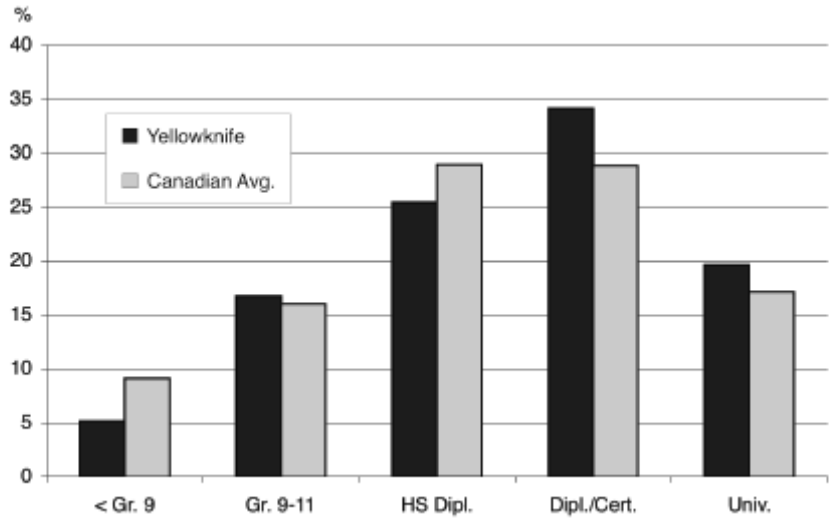


Source: Statistics Canada: 2001 Census

Demographics – Yellowknife's workforce is among the youngest of any Canadian capital city with more than 72% of the labour force being 44 years of age or younger. By comparison, in Canada 62% of the population is 44 years of age or younger (See figure 2). Also important to growth is the concentration of the population in the 25-44 age groups – 36% of the labour force falls into this group, compared to 30% for Canada.

Education – Information collected during Statistics Canada's 2001 census showed that for the adult population the highest grade achieved on average was higher for the Yellowknife labour force than for Canada as a whole. Two areas in particular stand out: Individuals with a trades certificate - 5.3% more or (34.1% for Yellowknife versus 28.8% for Canada); and those with a university degree (19.6% for Yellowknife versus 17.2% for Canada). The difference in education levels between Yellowknife and Canada is shown below.

Figure 3: Canada-Yellowknife - Educational Profile



Source: Statistics Canada: 2001 Census

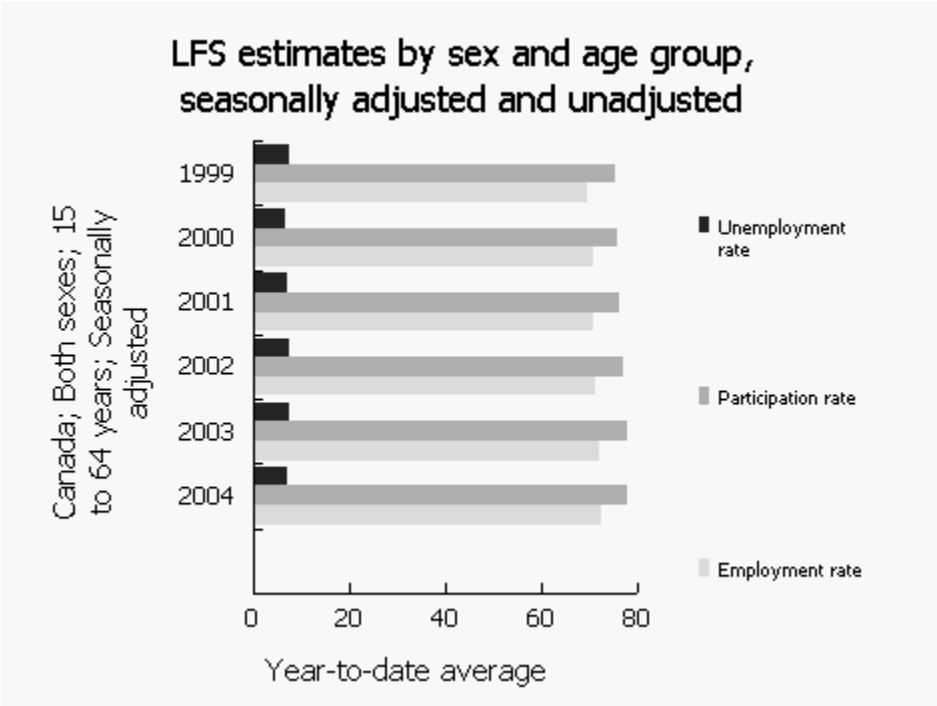
Other highlights are shown below:

- In the 20-34 age group, 34% have a trade certificate or a university degree compared to 31% for Canada as a whole.
- In the 35-45 age group, 37% have a trade certificate or university degree.
- In the 45-64 age group, 34% have a trade certificate or a university degree compared to 27% for Canada.

Participation in the economy – High participation[7] rates are typical for economies operating at or near peak capacity. The City's employment rate in 2004 was 80%. This compares to Canada's employment rate of 64%. Yellowknife unemployment (5%)/employment (80%)[8] rates are typical of an economy operating near full capacity.

Full employment occurs when the economy is producing at its maximum sustainable capacity, using labour, technology, land, capital and other factors of production to their fullest potential. The Organization for Economic Cooperation and Development (OECD) considers an economy at full employment when the unemployment rate is between 4% and 6.4 %.

Figure 4: Key Labour Force Indicators – For Canada



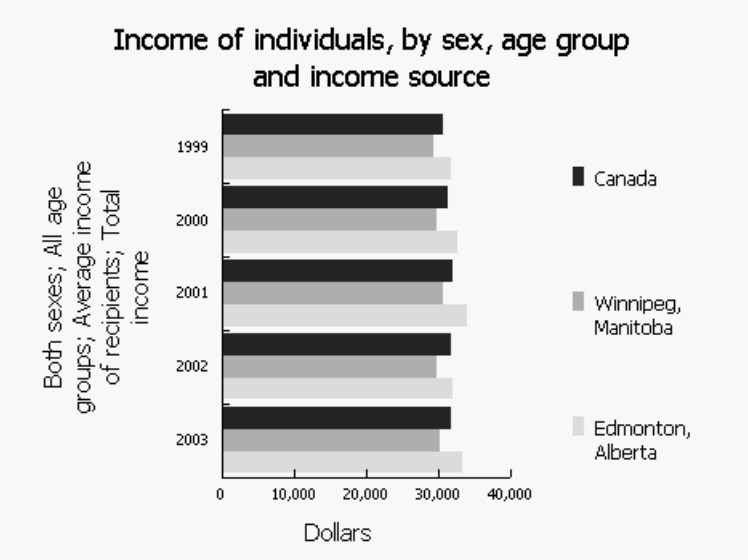
Source: Statistics Canada

[7] Definition: Participation rate is defined as the percentage of the labour force that is either seeking work or are working.

[8] The employment rate is defined as the number of working age persons between 15 and 64 who are working to the total number of persons between 15 and 64 years of age.

In 2003, the average annual income of a Yellowknife tax filer was $50,345. This is among the highest in the country and almost 30% higher than the average Canadian income ($38,340). The average income of individual wage earners is higher than Edmonton or Winnipeg. Figure 5 shows the average incomes for Edmonton and Winnipeg. These two cities were chosen because they are supply points for goods and labour moving to Yellowknife.

Figure 5: Income Profiles of Selected Communities



Source: Statistics Canada

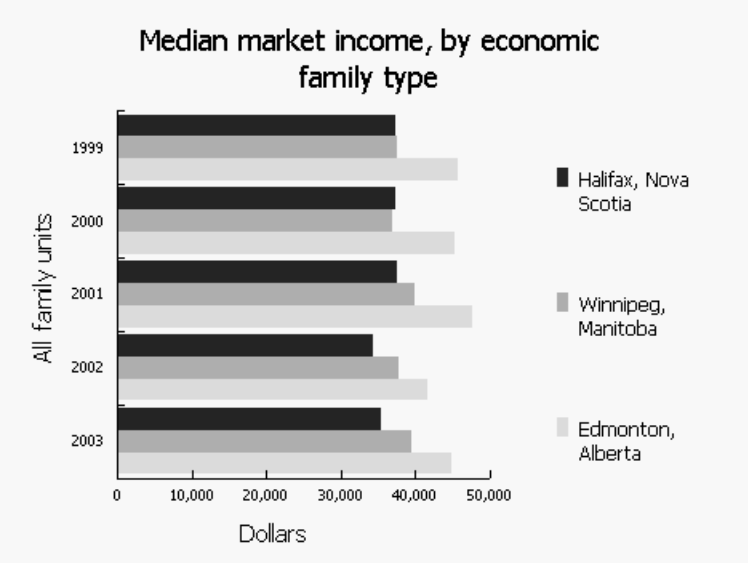
The probabilities of getting a job and expectations of higher earnings (relative to other centres) are important factors in attracting and retaining workers. However, the prospect of higher earnings is offset by the higher cost of living. The proportion of income spent on essentials – food, shelter and household operation – for residents of Yellowknife, Winnipeg and Edmonton is relatively the same (the range is between 35.2% – 35.5%) as for other Canadian cities.

However, the relatively high cost of living in Yellowknife generally offsets higher incomes as Yellowknife has to compete with Edmonton and other lower cost centres to accommodate rotational diamond mine workers. Yellowknife is at a competitive disadvantage as a host community if its income advantage is the only measure of comparison in deciding where to live.

The average family or household income for Yellowknife households in 2003 was $107,534. This compares to $44,800 for Edmonton, $39,500 for Winnipeg and $35,400 for Halifax.

Two factors that contribute to higher household incomes (relative to the comparative communities) are higher average wages and the higher participation rates. Most Yellowknife households have two or more income earners.

Figure 6: Medium Family Income – Comparative Communities

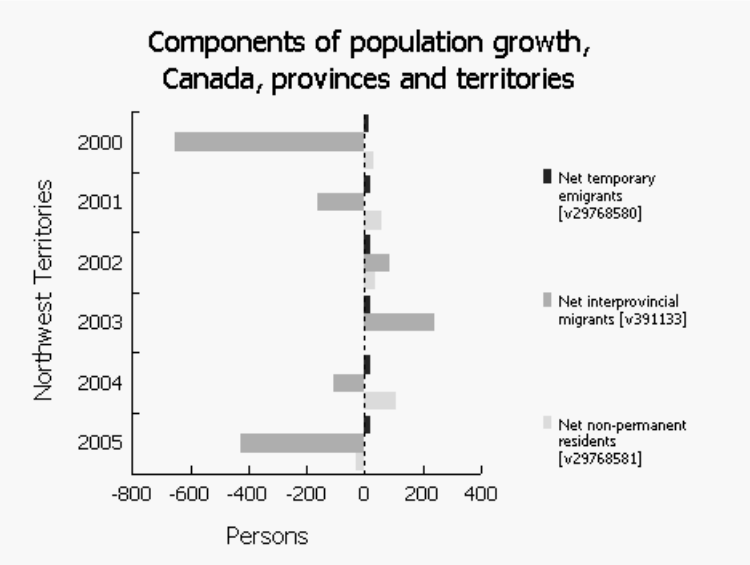


Source: Statistics Canada

Mobility – One key factor in the economic growth of a city is its ability to attract new workers and to retain existing workers. According to a 2001 Citizen Survey conducted by the City of Yellowknife, 44% of citizens reported that they lived in Yellowknife for less than10 years and 24% less than 5 years. This measure by itself would suggest a highly transient population. However, this must be considered in the light of the changes in the population due to economic restructuring caused by government transfers and the gold mine layoffs.

While statistics were not available for Yellowknife only, figure 7 illustrates that Canadians made up the majority of new citizens coming to the Northwest Territories between 2000 and 2005.

Figure 7: In-migration/Out-migration to the Northwest Territories



Source: Statistics Canada

Figure 7 also provides an illustration of the capacity of the City's labour force to react to demands in the economy. Many of the persons moving out of the Northwest Territories in 2000 and 2001 were construction workers associated with the Diavik Diamond Mine (completed in 2002) or workers laid off after the closure of the Giant and Con gold mines. The labour force growth in 2002 and 2003 can be attributed to the start up of Diavik Diamond Mine.

This pattern is typical of resource-based economies. The fact that people leave rather than wait for a new job relieves the community of the social costs of transitional programs in dealing with unemployed workers. Consequently, the lead-lag times required for the economy to adjust to new economic circumstances are minimized.

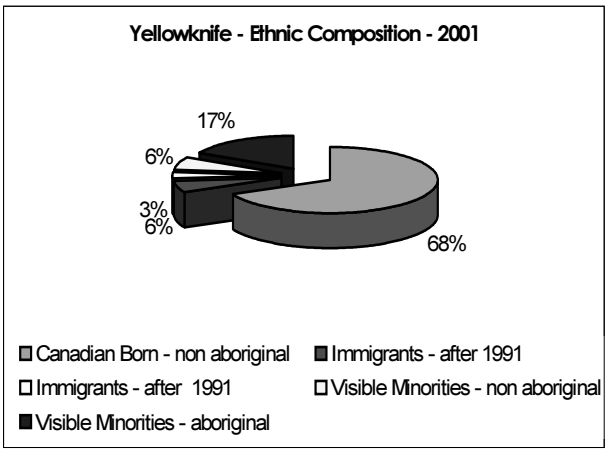
Ethnic diversity – The final dimension of Yellowknife's labour force discussed is its ethnic, linguistic and cultural diversity. The relationship between linguistic and cultural diversity and economic growth and productivity is complex. Studies have shown that diversity can have a positive impact on economic growth. After undertaking research to test the relationship between diversity and productivity, Lu Hong and Scott Page[9] concluded "that culturally diverse problems solvers can find optimal solutions to difficult problems; and second,

[9] Lu Hong and Scott Page, "Diversity Trumps Ability" (with Lu Hong in *Proceedings of the National Academy of Sciences.*

under certain conditions more diverse groups of people with limited abilities can outperform a more homogeneous group of high ability problem solvers".

In the 2001 census, Statistics Canada reported that visible minorities make up about 9% of Yellowknife's population (aboriginal persons are not counted as visible minorities).

Figure 8: Yellowknife's Ethnic Composition



Growth in most industrialized countries tends to concentrate in major urban centres, like Toronto. Yellowknife has benefited from the Canadian policy of welcoming persons of all nationalities and cultures. Figure 8 shows ethnic make up of the City's population.

Source: Statistics Canada: 2001 Census

Earlier in the report, reference was made to the fact that 44% of the City's population in 2001 had lived in the NWT for less than 10 years and 24% for less than 5 years. The turnover means the population is in a constant state of differentiation and transformation to reflect changes in the economy in general. Twenty-two percent of Yellowknife's population is aboriginal.

The benefits to Yellowknife of having a diverse population are many. For example, it has enabled the diamond cutting and polishing operators to become firmly established, and it has strengthened the aurora tourism industry. It also widens consumer choices and broadens perspectives in dealing with common issues. It also increases the potential for opening new export markets as immigrants with knowledge, experience and business contacts in their home countries establish a basis for trade.

Summary

The Yellowknife labour force is well-educated, young and mobile. It also has a good balance between trades, professional and service workers.

Five characteristics distinguish the City's labour pool from other Canadian municipalities:

- A higher proportion of the population is in the 15-44 age group.
- Employment rates are among the highest in Canada.
- Household incomes are twice the Canadian average.
- The workforce is highly trained and balanced - includes a good balance among unskilled labourers, tradespersons and professionals.
- The population is more ethnically and culturally diverse than most Canadian communities.

These are positive attributes for a person or company considering an investment in Yellowknife.

Less positive is the fact that the economy is operating at or near full capacity, meaning there is strong competition for skilled workers (particularly tradespersons). Most affected are businesses in the lower paying service sectors.

The lack of a surplus labour pool may be less of a problem with industries and businesses operating with high margins or high capital/labour ratios.

Other characteristics that make Yellowknife a good place to set up or expand a business include:

Growing internal and external markets (regional).

- High disposable incomes.
- Minimal disparities between the wealthy and the poor – fewer persons are on welfare (compared to the rest of the Northwest Territories) and those who are, remain so for shorter periods.

PHYSICAL CAPITAL OR INFRASTRUCTURE

Physical capital refers to the infrastructure needed to support economic production. These include: private, commercial and industrial accommodation, transportation infrastructure, communications systems, and other structures and equipment required for business and industry.

The report discusses Yellowknife's assets under the following categories:

– Public infrastructure.

– Private and Commercial infrastructures.

Public Infrastructure

The City of Yellowknife's 2004 Annual Financial Report lists the City's capital assets at approximately $206 million. A breakdown of those assets is provided below.

Table 1: Value of the City of Yellowknife's Assets

	2003 Actual	Additions	Deletions	2004 Actual
	$ (000)	$ (000)	$ (000)	$ (000)
Land and Buildings	$ 44,894	$ 3,732	$ (1,266)	$ 47,360
Infrastructure	$ 137,255	$ 6,512		$ 143,767
Vehicles and Equipment	$ 13,437	$ 2,330		$ 15,767
	$ 195,586.00	$ 12,574.00	$ (1,266.00)	$ 206,894.00

Source: City of Yellowknife

Among the assets owned and managed by the City are:

- Roads – 81.6 kilometres.
- Water and sewer systems – 68.5/52.8 kilometres.
- Extensive park and trail system.
- A municipal library.
- Extensive recreational facilities – A sports multiplex featuring two large ice surfaces, a gymnastics facility and a gym, a community arena, a curling rink and a swimming pool.

The City of Yellowknife is committed to open space

The City's 2004 General Plan - Bylaw 4315 articulates the principles of smart growth and sustainability. The City has published an "Integrated Parks, Trails and Open Space Development Study[10]" that sets out a vision to 2015 that will:

- Create a network of linked open spaces that will provide residents with alternate transportation and recreation routes and provide access to open spaces.
- Incorporate open space and trail connectivity as criteria in assessing development opportunities.
- Recognize the importance of water bodies.
- Provide an integrated hierarchical system of parks for recreational, sports and conservation purposes.

Parks and open space make up 46% of the area within the City limits. This compares favourably to Edmonton, AB (16%), Grande Prairie, AB (10%) and Kamloops, BC (22%).

Yellowknife is also a leader in Canada in its recognition and celebration of open spaces. The Yellowknife chapter of the Canadian Parks and Wilderness Society has published a green map of Yellowknife providing a guide to residents and visitors of sites and buildings that reflect the values of the society.

Figure 9: Yellowknife Green map

Source: Canadian Parks and Wilderness Society

Volunteers have worked tirelessly in making Yellowknife an eco-friendly place to live and raise families. The land around the Legislative Assembly has been designated as a capital area park. Administratively, Yellowknife serves as the northern region headquarters for the Department of National Defence, and the regional headquarters for the Department of Indian and Northern Affairs Canada.

[10] City of Yellowknife, Integrated Parks, Trails and Open Space Development Study, April, 2005.

The Government of the Northwest Territories and the Government of Canada have made significant investments in assets that serve residents of Yellowknife and the Northwest Territories.

Public assets owned by other levels of government and non-government organizations include:

- The Stanton Territorial Hospital.
- Aurora College Campus.
- Several schools managed by the two school boards.
- The Legislative Assembly building
- The court house.
- Adult and youth corrections facilities.
- Yellowknife airport serving the hub of the air travel for the Northwest Territories.

Private and Commercial Infrastructure

The total assessed value of residential and commercial land and improvements in the City in 2002 was estimated at greater than $1.5 billion. This was calculated based on 100% assessment of the property's value using a 2001 base year adjusted by a northern cost index.

Table 2: Assessed value of residential and commercial land and buildings

		Assessment		
Assessment Year	Taxation Year	Land ($)	Improvements ($)	Total ($)
1995	1996	507,205,400	904,322,000	1,411,527,400
1996	1997	519,232,310	932,789,090	1,452,021,400
1997	1998	521,890,840	946,185,840	1,468,076,680
1998	1999	481,620,540	954,664,370	1,436,284,910
1999	2000	483,079,560	961,271,250	1,444,350,810
2000	2001	484,023,780	974,438,260	1,458,462,040
2001	2002	485,754,600	987,351,010	1,473,105,610
2002	2003	467,249,870	1,094,553,160	1,561,803,030

Source: City of Yellowknife, Assessment and Taxation Records

In the 5 years between 2000 and 2004, construction permits (residential and commercial) were valued at approximately $284 million.

By comparison, the value of existing private and commercially owned residential accommodation is estimated at approximately $1.15 billion.

Table 3 summarizes the impact of new housing construction on the existing Yellowknife housing market.

Table 3: Selected housing statistics

	2001	2002	2003	2004
New construction (units)[11]	42	268	258	176
New construction (value ($millions))	12,3	38,6	38,0	29,3
Capital formation rate[1]	1.1%	3.3%	3.2%	2.4%
New persons housed based on (2.95 persons/unit)	124	791	761	519
Population growth[12] (persons)	343	446	604	248
Housing surplus/deficit (+/_) persons	-219	345	157	271
Housing surplus/deficit (+/-) households	-74.2	117	53.2	92

Note 1: The capital formation rate is the annual value of new permits/value of existing property.

After the division of the Northwest Territories (1999), the City's vacancy rate stood at 6%. From 1999 to 2002, the vacancy rate fell, reaching 0.2% in 2002. The turnaround began in 2003 when the vacancy rate increased to 1.6 %. In 2004, the vacancy rate stood at 2.7%,

Between 2001 and 2004, 744 new units were added to the existing housing stock. Assuming an average occupants/dwelling ratio of 2.95, sufficient housing would be provided for up to 2,195 persons. The population grew by 1,641 over the 2001-04 period. With no major industrial activity that would induce new employment, it is expected that the vacancy rate will continue to grow until the Snap Lake mine goes into production bringing new residents to the City.

[11] City of Yellowknife, Residential Growth Study, April 2005.

[12] NWT Bureau of Statistics, Yellowknife, Statistical Profile.

A table of the Yellowknife housing market in 2004 is provided below.[13]

Table 4: Average Monthly Rents (2004) -Yellowknife

				Average monthly rents ($)	
	Vacant	Total Number of units	Vacancy Rate	2003	2004
Bachelor	5	55	9%	821	816
1 bedroom	32	732	4%	1047	1060
2 bedroom	15	813	2%	1266	1282
3 bedroom	2	191	1%	1390	1370
	54	1791			

Source: Canadian Mortgage and Housing Corporation

The falling vacancy rate since 2001 has moderated the rate at which the price of rental units has increased. The average cost per unit in 2004 grew by less than 1% over 2003 rates. With a surplus (over the population increase) of new units being added in 2004 and 2005, it is expected that the cost of rental housing should remain steady as long as new construction keeps up with the growth in the population.

The higher cost of housing in Yellowknife may become a deterrent in attracting new workers to move to Yellowknife.

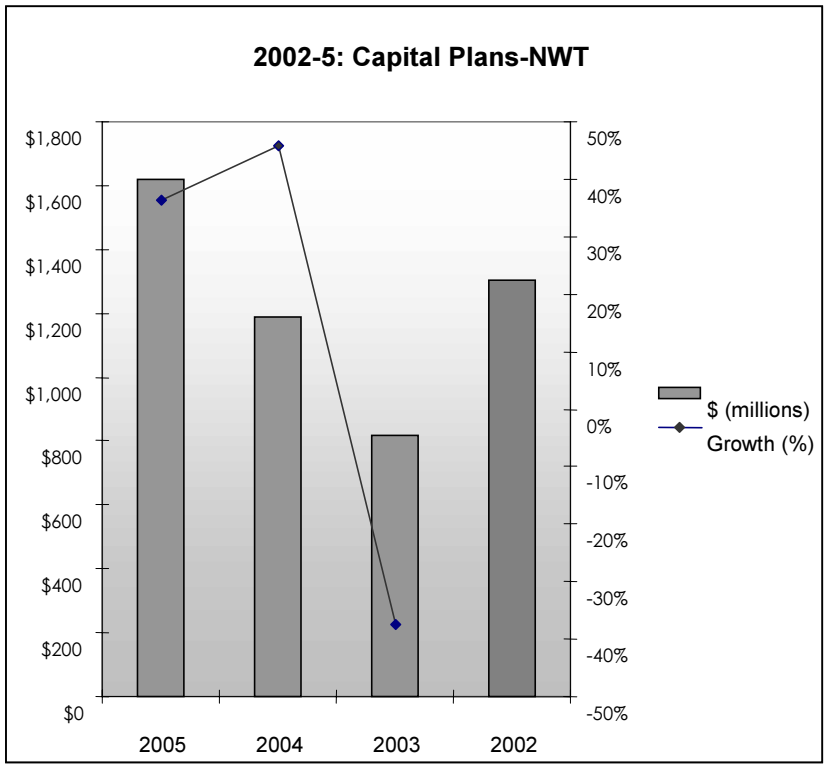
In 2004, the average two-bedroom apartment rent In Yellowknife was more than $1,282 per month. This compares with the highest average monthly rents for two-bedroom apartments in Toronto ($1,047); Vancouver ($954); and Ottawa ($930).

[13] Canadian Mortgage and Housing Corporation, 2004 Rental Market Report.

Commercial capital expenditures

The value of planned capital projects in the Northwest Territories is expected to reach $1.622 billion dollars in 2005. If realized, this would represent a growth of 36% over the previous year. Almost all of these expenditures are related to the construction of the De Beers' diamond mine at Snap Lake and expansions at the Diavik and Ekati diamond mines.

Figure 10: Planned Capital Expenditures



Source – Statistics Canada

Summary

Yellowknife's growth continues to be driven by investments made in developing the resources in the Slave Geological Province. Government policies and negotiated industrial benefit agreements have been important in ensuring that the Northwest Territories and the City benefit from these developments.

Yellowknife possesses a range of public and commercial services that are exceptional for a city its size.

In the next 10 years, the population of Yellowknife is expected to increase by 4,374 persons or 1,475 households[14]. This will directly impact on the requirements for housing, retail services etc. If there were no change in incomes, at current dollars this would translate into an additional $133 million in income earned by City residents.

As the administrative, transportation and communications hub of the territory, Yellowknife has become the business and financial centre for the Northwest Territories.

In spite of the pace and scale of economic growth that has occurred over the last 6 years, the Yellowknife business community has shown the capacity to respond quickly to meet the needs of the community for housing and services.

Prices are high but are relative to income.

While Yellowknife is the dominant market in the Northwest Territories, it should be considered as part of the Prairie region market and must compete directly with Edmonton, Winnipeg and other western cities for labour. Because Yellowknife cannot compete with other centres on cost, it must find other ways to differentiate itself.

SOCIAL CAPITAL

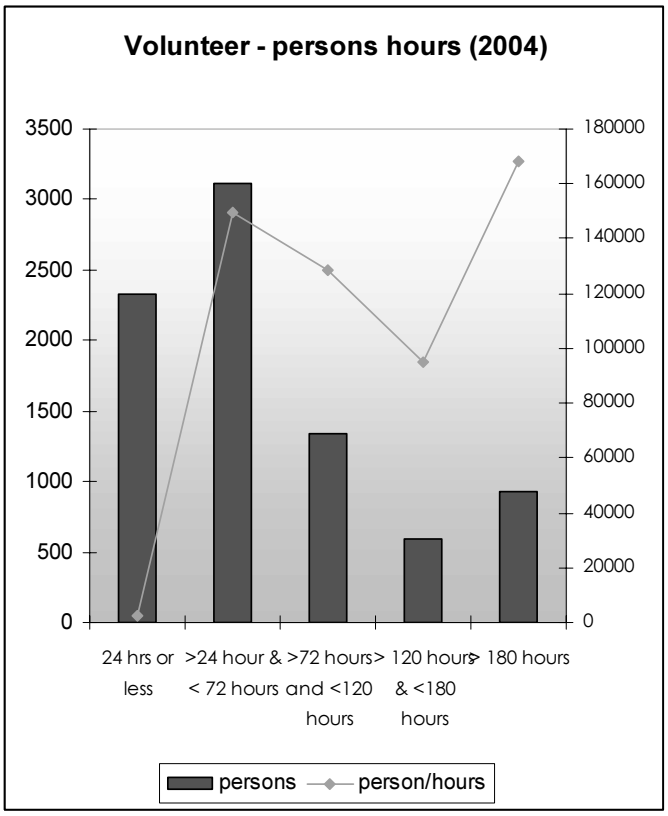
During its early swashbuckling mining days, everyone knew one another and Yellowknife had a reputation as an inclusive and caring community. As the population grew, many of these networks were formalized through the growth of service clubs and non-profit organizations that were set up to help those in need and to bring together people with shared interests.

These formal and informal networks are as important to the functioning of the community as are the commercial networks providing goods and services. Yellowknife residents are leaders in Canada in donating their time and money to worthy causes. A 2004 survey showed that almost 60% of Yellowknife residents volunteered during the year. This compares to 27% for Canada as a whole. In total, Yellowknife residents donated over 591,000 hours to volunteer activities.

[14] The number of households is calculated using the 2004 ratio of population/number of dwellings.

Figure 11 shows the distribution of volunteer hours per person in the Northwest Territories. On average, each resident in the territory donates 71 hours per year to worthy causes. If information were broken out for Yellowknife, it would probably show a much larger number because the incidence of volunteerism tends to be higher in the major centres.

Figure 11: Person hours devoted to helping others-NWT



Source: NWT Bureau of Statistics

Summary

Yellowknife is a modern winter city. It has many of the characteristics needed to become Canada's showcase for northern innovation. It has access to natural resources; a young, well-educated and culturally diverse workforce; an extensive array of public and private infrastructure; and active social networks that make northern living a unique and rewarding experience.

Yellowknife's demographics are moving towards the Canadian norm in terms of both gender balance and age distribution.

However, new business or industries must compete against high-priced resource jobs and a cost structure that mitigates against growth in industries requiring lower wage workers.

The City has invested heavily to expand its physical infrastructure to allow housing and industrial construction to keep pace with the growth in the economy. In fact, developers of residential housing have created a surplus of housing allowing vacancy rates to fall thereby stabilizing rental rates.

The Yellowknife business community possesses an entrepreneurial spirit that has enabled it to:

- Pioneer new techniques for constructing in a northern environment.
- Develop and operate an extensive transportation and communication system to supply the City and the mines efficiently and price competitively.
- Become the service and supply centre for the Northwest Territories.
- Put in place innovative work rotational schemes to support workers commuting to and from the diamond mines.
- Develop the capacity to react quickly to changes in the market place.

And finally, the residents of Yellowknife have worked together to develop a concerned and caring society capable of welcoming newcomers to the City and assisting those who are less fortunate or are in need.

Section 3

YELLOWKNIFE'S INDUSTRIAL Composition

Photo Credit: Larry O'Brien

The previous section provided a summary of the strategic assets that make Yellowknife a good place to do business. This section provides:

- A profile of employment in the various industries that make up Yellowknife's economy.
- Changes in employment by industry since 1999.
- An analysis of the City's industrial employment profile compared to other Canadian Cities.

The accompanying table shows the changes in employment by industry for 1999 and 2004.

Table 5: Changes in Yellowknife's Industrial Profile – 1999-2004

	Northwest Territories	Yellowknife 2004	Yellowknife 1999	% Change	Jobs Created
All Industries	**21,239**	**11,470**	**10,441**	**10%**	1,029
Goods Producing Sector		**1,789**	**1,516**	**18%**	**273**
Primary Activities – not mining	41	-			
Mining, Oil & Gas	1,728	1,068	884	21%	184
Utilities	242	77	28	175%	49
Construction	1,236	465	526	-12%	-61
Manufacturing	218	179	78	129%	101
Services Producing Sector		**9,199**	**8,782**	**5%**	417
Wholesale & Retail Trade	2,236	1,176	999	18%	177
Transportation & Warehousing	1,564	761	868	-12%	-107
Finance, Insurance & Real Estate	694	383	295	30%	88
Professional, Scientific & Technical Services	760	633	612	3%	21
Accommodation & Food Services	1,111	758	742	2%	16
Public Administration	5,551	3,008	2,722	11%	286
Educational Services	1,626	555	475	17%	80
Health Care & Social Services	1,675	825	793	4%	32
Other Services	1,667	1,100	1,276	-14%	-176
Not Stated	890	483	143		340

Source: Prepared for the Nexus Group by the NWT Bureau of Statistics

The major growth industries over the 1999-2004 period include:

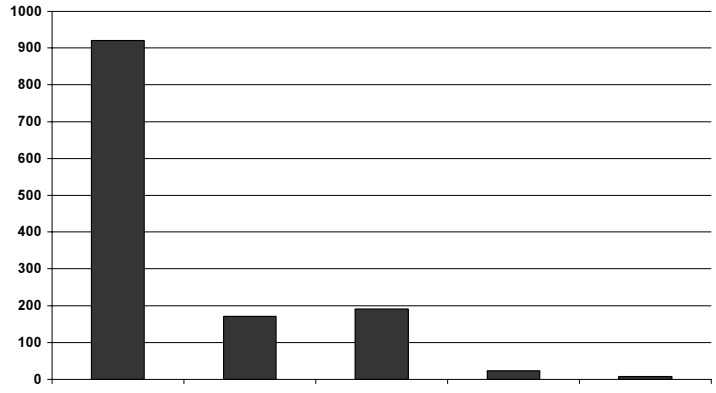
- **Diamond manufacturing** - The number of jobs increased by 129% – the increase is due primarily to the establishment of four diamond manufacturing plants.
- **Mining oil and gas** - Employment increased by 21%, demonstrating the combined effects of layoffs at Con and Giant Mines and the opening of the Diavik Diamond Mine.
- **Utilities** - Jobs increased by 175% but this is probably due to the inclusion of the power corporation jobs in Yellowknife.
- **Finance, insurance and real estate -** Jobs were up by 30%.
- **Wholesale and retail trade -** Jobs were up 18%.

Sectors which lost jobs relative to the overall economy include:

- **Construction -** Jobs were down by 12%. This is probably due the completion of the Ekati Diamond Mine in 1998.
- **Accommodation**, **food services, professional and technical services -** Jobs decreased from 3% to 2% of all jobs.

To a certain extent, the 1999-2004 industrial employment figures obscure the transformational impact of the replacement of mine jobs lost in gold mining by jobs created by the diamond mines. Figure 12 summarizes the job impact of the diamond mines on the North Slave Region.

Figure 12: Direct Employment Impact of the Diamond Mines

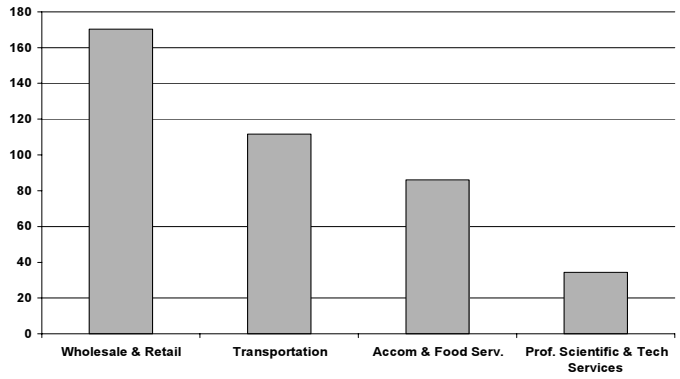


Source: NWT Bureau of Statistics

Figure 12 shows that Yellowknife is home to most of the 1,314 persons employed by the diamond mines. Additional jobs are created by Yellowknife serving the mine and retail and service businesses serving mine workers.

Figure 13 shows the distribution of indirect and induced jobs that were created because of the diamond mines. Most of these jobs were created in the retail or wholesale sectors. The majority of these expenditures are in Yellowknife. Not evident in these numbers are the impacts on secondary and service jobs in the tourism sector.

Figure 13: Diamond Industry Indirect and Induced Jobs

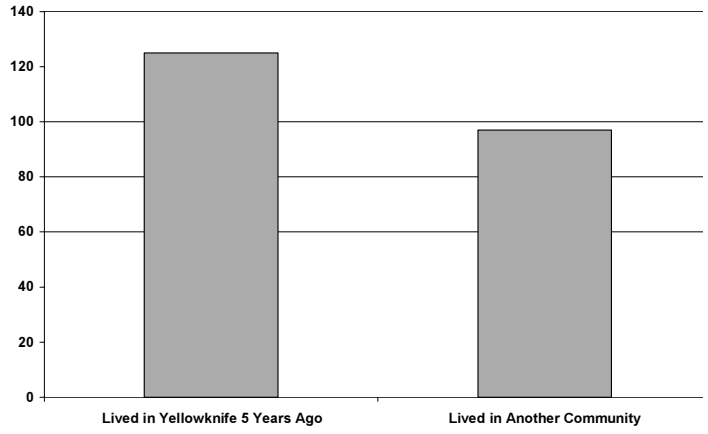


Source: NWT Bureau of Statistics

Another impact of the diamond mines is the number of aboriginal mine employees who have moved to Yellowknife from the surrounding communities.

Nearly half of the aboriginal persons working at the mines who lived in Yellowknife in 2004 have moved from a smaller community.

Figure 14: Migration of Aboriginal Employees to Yellowknife



Source: NWT Bureau of Statistics

The in-migration of aboriginal persons to Yellowknife accelerates the trend of persons moving from the smaller to the larger urban centres occurring throughout the NWT.

Figures 13 and 14 demonstrate the importance of the Yellowknife economy to the territory as a whole.

Fifty-four percent of all jobs in the Northwest Territories are in Yellowknife .

Sectors in which the City's economy is over-represented relative to the Northwest Territories as a whole include:

- 83 % of all professional, scientific and technical employees live in Yellowknife.
- 68% of all public service employees live in Yellowknife.
- 49% of all Health and Social Services professionals are located in Yellowknife.
- 82% of all manufacturing jobs are located in Yellowknife.

The City's economy is underrepresented compared to Canada's economy (more than 5% difference) in the following sectors:

- **Trade** - Nineteen percent of Canadians work in activities related to wholesale or retail trade. By comparison 10% of employed Yellowknifers work in this sector.
- **Manufacturing** – Fourteen percent of Canadians work in manufacturing. The manufacturing sector contributes only 1.5% of all jobs in Yellowknife in the work force.

Sectors in which Yellowknife's labour force is higher compared with the whole of Canada include:

- **Natural resources** – Forestry, fishing, mining and oil and gas – less than 2% of Canadians work in primary extraction or harvesting activities. Ten percent of Yellowknife's labour force work in extraction or harvesting activities.
- **Public services** – Approximately 24% of employed Canadians work in public sector activities i.e. educational services, health and social assistance and public administration. Forty percent of Yellowknifers work in public sector related activities. Public sector jobs include NGOs. Table 6 compares Yellowknife's industrial composition to Edmonton (AB), St. John's (NFLD), and Sudbury (ON).

Table 6: Yellowknife Industrial Composition: Comparison with selected cities

	Yellowknife		Edmonton		St. John's		Sudbury	
Sectors								
Goods Producing	**1,789**		**102,570**		**11,840**		**15,180**	
		%		%		%		%
Natural Resources[1]	1,068	**9.7%**	11,630	**2.3%**	2,335	**2.8%**	5,385	**6.1%**
Utilities	77	**0.7%**	4,630	**0.9%**	865	**1.0%**	510	**0.6%**
Construction	179	**1.6%**	40,435	**7.9%**	4,540	**5.4%**	4,415	**5.0%**
Manufacturing	465	**4.2%**	45,875	**9.0%**	4,100	**4.9%**	4,870	**5.6%**
Service producing industries	**9,199**		**409,055**		**72,650**		**72,445**	
		%		%		%		%
Wholesale & Retail Trade	1,176	**10.7%**	86,160	**16.8%**	14,465	**17.1%**	12,600	**14.4%**
Public Services[2]	4,388	**39.9%**	124,815	**24.4%**	29,585	**35.0%**	20,835	**23.8%**
Professional, Scientific & Technical Services[3]	1,016	**9.2%**	55,160	**10.8%**	7,905	**9.4%**	4,425	**5.0%**
Hospitality Services	758	**6.9%**	38,520	**7.5%**	5,790	**6.9%**	12,715	**14.5%**
Transportation	761	**6.9%**	27,760	**5.4%**	4,005	**4.7%**	3,850	**4.4%**
Other Services[4]	1,100	**10.0%**	76,640	**15.0%**	10,900	**12.9%**	18,020	**20.6%**
Total Employment	**10,988**		**511,625**				**84,490**	**87,625**

Notes

1. Natural Resources sector includes oil and gas, mining and agriculture activities.
2. Professional Services includes financial, insurance and real estate service activities.
3. Public Services include public administration, health and education service activities.
4. Other Services include information, culture & recreation, building and support service activities.

Source: Statistics Canada

A number of factors contribute to differences in the Yellowknife industrial make-up and those of comparative cities, including:

- **Productivity differences** – Relatively higher wage costs in the Northwest Territories may contribute to higher capital/labour ratios in Yellowknife.
- **Reporting differences** – the survey includes only persons between 15 and 64 years of age. Yellowknife retail stores are heavily dependent on workers under 15 years of age that are not considered to be in the labour force.

Table 7 shows expenditures on private and public capital by sector between 2001 and 2005.

Table 7: Northwest Territories Capital Expenditures

	2001	2002	2003	2004	2005
Mining & Oil and Gas	1,100	935	444	758	1,622
Utilities	11	11	20	18	21
Construction	4.6	4	2.2	3.1	4
Trade	21.5	11.9	30.8	23.8	23.5
Transportation & warehousing	41.8	54.4	37.4	43.3	59.8
Finance & Insurance	5.2	3.7	6.2	1.6	1.9
Real Estate and rental leasing	5.9	10.4	8.9	10.7	15.5
Professional, scientific and technical services	3.9	2.1	4.2	3.8	3.4
Arts, Entertainment and Recreation	0.1	0.3	0.6	1	0.7
Hospitality	5.6	6.4	3.4	4.2	4.3
Other Services	2.8	1.7	3	1.9	1.7
Public administration	77.8	142.2	103.9	126.1	111.8
Housing	52.7	101	102.4	133.1	138

Source: Statistics Canada

Table 7 shows that between 2001 and 2005, capital expenditures by the mining industry made up almost 75% of the $6.5 billion spent on public and private capital. This imbalance will continue at least until 2011.

Furthermore, capital expenditures in other sectors are also driven by the mining industry. These sectors include:

- Retail and wholesale trade.
- New housing construction.
- General construction.
- Transportation and warehousing.

INDUSTRIAL DEVELOPMENT TARGETS

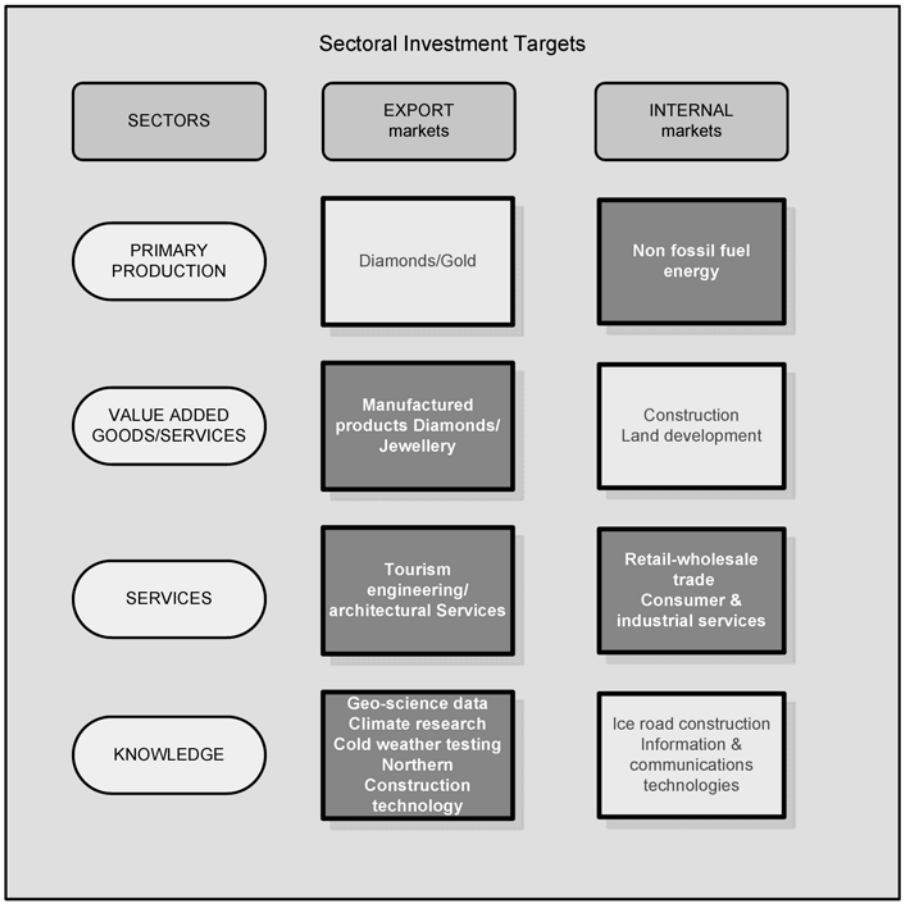
The foregoing analysis provided an overview of the industrial composition of the City's economy. It demonstrated the continuing impact of resource-based investments as the major driver for economic growth. It also shows that there is a trickle-down effect of investments in the resource industry to other industries. There is little evidence that jobs are being created by industries not impacted by the resource industry or government.

In fact, the economic fortunes of the City are increasingly being tied to its role as a bedroom community and service centre for resource-based activities. For rotational mine workers, the high cost of living in Yellowknife, relative to other bedroom communities, and the shortage of skilled workers, will limit mine driven future population growth.

Over the next 5 years it is expected that investments in mining and oil and gas sectors will dwarf investments in other sectors. Therefore, in selecting investment targets under the CIS Program it is important that the investments being sought are strategic and provide for long term economic stability through diversity. The objectives to be met by the City through the investment program are to:

- Increase the City's competitiveness by reducing north-south cost differences.
- Lever investments to further value-added opportunities in the diamond industry.
- Improve the quality of life for Yellowknife residents.
- Enhance the City's image globally. The industry targets in figure 15 were derived by examining opportunities in domestic and export markets in light of the above objectives. Opportunities were further segmented into the following sectors.
- **Primary production** – Extraction and energy production.
- **Value added services** – Secondary processing, manufacturing, hospitality, etc.
- **Retail and wholesale trade and services** – Resale of imported products and wholesale and retail exports.
- **Knowledge-based services** – Research, data collection, and services that rely on information and communication technology.

Figure 15: Industry Targets



The strategic investment opportunities within the targeted industries are discussed in greater detail below:

Primary production (internal markets) – Yellowknife and the north in general is hugely dependant on imported fuel. The rising cost of petroleum products has a greater effect on the north than in the south on costs in general. Higher prices of fuel will further erode its competitive position relative to the south. Investments that will reduce north-south cost differences include:

Energy conservation – Investments in technology and research to manage energy use and incorporate proven technologies for saving energy will improve Yellowknife's competitiveness. Scanning the world for new technologies and testing them under real arctic conditions provides a great opportunity to demonstrate operating savings and advance construction standards in the Northwest Territories and elsewhere.

Alternate energy generation – Worldwide research and development in the application of geo-thermal heat, solar, and wind production has been accelerated because of rising energy costs. Yellowknife has the potential for demonstrating similar applications.

Waste management – An important standard of a community's development is how it handles its waste products. The development of a saving ethic in respect to recycling and extending the useful life of products opens up new worlds of conversions where technologies meet. A German company GEKO/DIHAG Group had expressed an interest in investing in facilities that would extract energy from Yellowknife waste products.

Manufacturing (export) – Jewellery making – The availability of cut and polished diamonds provides a natural outlet for further value-added production. Most of Yellowknife jewellers have sufficient skills and equipment to handle small-scale custom production for local markets. Still, Yellowknife is a net importer of finished jewellery. They also have developed wholesale markets for cut and polished loose diamonds. Larger scale production has not occurred in Yellowknife largely because Yellowknife does not have a sufficient pool of skilled workers in jewellery manufacturing. This problem could be overcome by:

- Providing opportunities for City residents interested in jewellery manufacturing to attend courses and/or be sponsored to take internships in the industry.
- Recruiting individuals experienced in the jewellery trade to move to Yellowknife.
- Promoting partnership agreements with larger, southern-based manufacturers.

Services – Tourism (exports) – Market studies have concluded that there is some potential for adding value to existing tourism products by including diamond related activities (events) or products.

Wholesale-retail trade (internal) – Yellowknife lags behind other cities in the total investment and employment in trade-related activities. The gap is most significant in the wholesale trade sector. Yellowknife and the Northwest Territories are often included in the districts assigned to southern based companies.

Knowledge-based industries (exports) – Yellowknife has world-class architectural and engineering firms that were heavily involved in the innovation and testing necessary to establish the diamond mines. Tougher environmental legislation has created new opportunities for northern firms to develop the technology and skills needed to assess future impacts.

Research applications include:

- **Product testing** – Extreme conditions provide an excellent opportunity to test the limits of a product's endurance. Particular opportunities may be provided for energy management products and services.
- **Climate research** – Global warming has provided a major stimulus for research and products.
- **Mining extraction** technologies.
- **Geo-science research** and analysis, bulk sampling, etc.
- **Telemetry** – Remote monitoring – hydro/climate change, etc.
- **Regional franchises**.

FUTURE PROSPECTS FOR INDUSTRIAL GROWTH AND DIVERSITY

It is clear that capital expenditures in the mining industry have accounted for most of the economic growth occurring in the Yellowknife economy. There are few examples of major non-mining related growth in other sectors.

Previous sections of this report have discussed the effects of mining-driven growth. These include:

- Mobility from the smaller to the larger centres.
- Increases in the prices of housing and services.
- New jobs and training opportunities.
- Increased pressure on public services.

With the exception of long-term training (transferable skills) and upgrades to the transportation system and hydro development, the mining industry has not provided the foundation for broader investment in the economy.

The dominance of a mining-driven economy in the last 5 years continues a trend that began more than 70 years ago. In the next 10 to15 years, rising commodity prices, combined with lower access costs could dramatically increase investment in the Slave Geological Province and the territory as a whole. Consequently, it is expected that investment and employment will continue to be led by the mining industry.

The CIS Program could become a counter force to investments in developing the territory's minerals that could diversify the economy and change the commonly held perspective of Yellowknife as a mining community. Therefore, the CIS program should encourage investments that:

- Are independent of or counter cyclical to the non-renewable resource cycles.
- Promote better integration within the various sectors that make up the City's economy.
- Increase the knowledge base of Yellowknife.
- Decrease costs and increase competitiveness with adjacent centres.

Section 4

FRAMEWORK FOR Investment

Photo Credit: Rhonda Kennedy

In the previous section, four values were proposed to guide the search for alternative investments. This section will examine the City's strengths and weaknesses to extend the context for limiting the investments targets illustrated in figure 15.

CITY STRENGTHS

Unique climate and natural phenomena – Yellowknife, as one of Canada's foremost winter cities, provides an excellent opportunity to further the objectives of the CIS Program. In fact, Yellowknife was ranked first among Canadian cities by Environment Canada in the following categories:

- Coldest winter – average temperature – average temp -29.
- Most cold days (-20 C or lower) – 111 days.
- Most high wind chill days (-30 C or lower) - 101 days.
- Longest snow cover season – 190 days.

A comparison between the climates of Edmonton and Yellowknife is provided below:

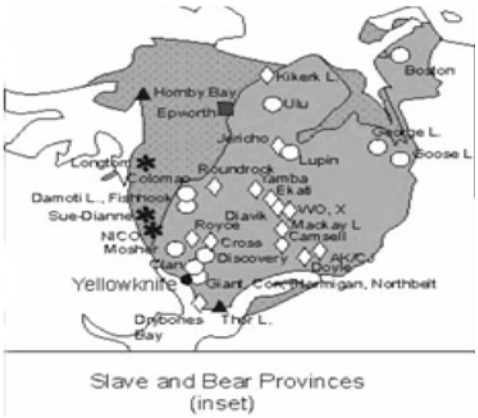
	Yellowknife	Edmonton
Most cold days < -20C	110	28
Longest snow cover season	190	130
Most extreme wind-chill (days)	101	22
Clearest skies - year round (hours)	2,347	2,018

Source: Environment Canada

Yellowknife is also one of the world premiere sites for aurora viewing, attracting visitors from Japan, Canada and the United States. Three major in-bound companies provide integrated cultural-aurora viewing offerings for more than 10,000 winter visitors annually to the Northwest Territories.

Abundant natural resources – Yellowknife is located in the southwest corner of the Slave Geological Province in an area known as the Yellowknife – Greenstone belt. The Slave Geological Province extends to the Arctic Coast and contains numerous kimberlitic and gold deposits. Yellowknife is also the logistical hub for all material and equipment moving to the diamond mines. The mines have agreed to provide local manufacturing operations with preferred access to rough diamonds. Also, as the

Figure 17: Slave Geological Province



Northwest Territories has the only producing diamond mines in Canada, local manufacturers of cut and polished diamonds have exclusive access to the "made in Canada" brand.

Balanced economy – Yellowknife's economy could be considered in equilibrium as evidenced by the fact that labour supply and consumer price indexes are generally tracking their respective Canadian averages. Housing price increases have also moderated. This means that an investor does not have to factor in the higher risks normally associated with a volatile economy.

Extensive public infrastructure – With the completion of the paving of Highway 3 to the City limits in 2006, and the scheduled completion of the Deh Cho bridge in 2009, travelers and commercial carriers will soon have all-year paved highway access to Yellowknife; marine access across Great Slave Lake; and direct air access to all communities in the Northwest Territories and to the Edmonton and Winnipeg international airports.

Broadband digital communication is available to businesses and to all residential customers living in Yellowknife, and networks will soon be rolled out to enable every community in the Northwest Territories to access broadband services.

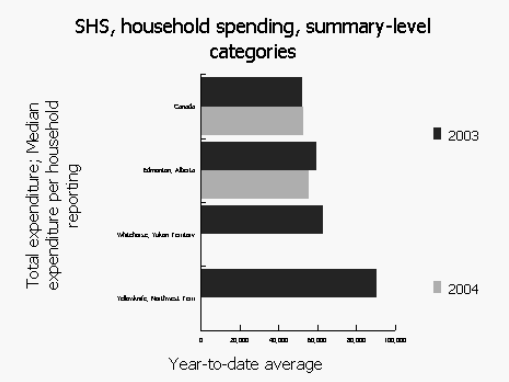
Yellowknife residents have access to high quality indoor and outdoor recreation facilities, wide open spaces, a regional hospital and college campus.

WEAKNESSES

Factors that hurt Yellowknife's competitiveness include:

Remoteness from major markets – Achieving economies of scale is critical in enabling manufacturers and service providers to produce at the lowest possible cost. City businesses are at a major competitive disadvantage because of higher operating costs and distance to markets. In effect, the northern cost premium is a trade barrier in selling into the high density markets in the south and in attracting tourists north.

Figure 18: 2003-4 Household expenditures – Selected cities



Source: Statistics Canada

High cost of living – Yellowknife's remoteness also contributes to a higher cost of doing business. Figure 18 illustrates the difference in the average annual household expenditures in Yellowknife and those in Whitehorse and Edmonton. Household

expenditures for the average Yellowknife household are 52% higher than Edmonton and 43% higher than Whitehorse.

Three leading factors contribute to price differences: population density, supply and demand factors, and cost factors (i.e. remoteness).

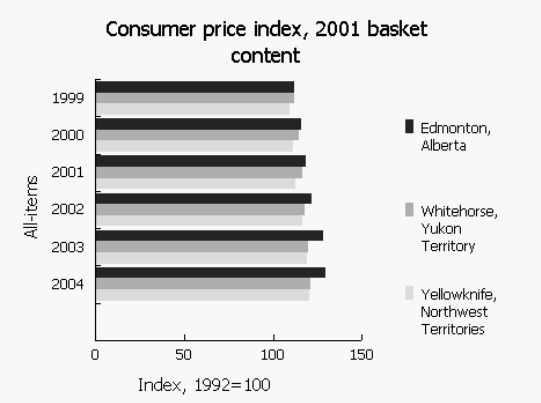
Population density or market size in particular is a major contributing factor to cost differences between communities. Generally, the larger the population, the lower is the average cost of service as fixed costs are borne by a greater number of ratepayers or customers.

Other things being the same, if the Yellowknife population increases relative to its trading partners, price differences will decline.

Yellowknife-based businesses are also at a significant strategic disadvantage in competing outside their market area as they must contend with a northern cost differential plus the added cost of transporting their products to outside markets. The flip side of this argument is that certain City businesses are partly insulated from competition from outside businesses because of the cost (time and cost of transportation) in supplying communities across the Northwest Territories.

Cost differences between Yellowknife and its major trading partners have been declining since 1999.

Figure 19: Consumer Price Index – Selected cities



Source: Statistics Canada

The absence of post–secondary institutions – Several research studies have demonstrated that there is a correlation between economic growth and access to education. It has also been shown that having access to local post-secondary institutions makes it easier to attract and retain professionals, encourages graduates to stay in the community and serves as a catalyst for increased productivity and technological advances.

Analysis of Investment Opportunities

This section of the report builds on the SWOT analysis and provides further criteria for screening identified investment opportunities.

The criteria used to assess the opportunities are stated below:

Screening criteria	
1. Consistent with City values & vision	20
2. Sustainability	15
3. Affordability	15
4. Benefit to the community	15
5. Improves the competitive position of the City	15
6. Counter cyclical to the two major industries	15
7. Transformational	15

Investment targets

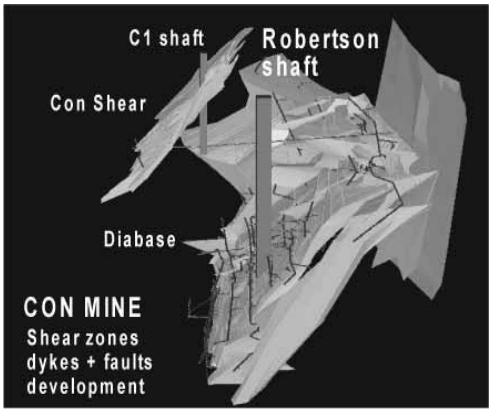
From the foregoing analysis five potential investment targets have been identified for further investment under the CIS Program. They are discussed below.

Renewable Energy

The largest single consumers of energy in the Northwest Territories are the diamond mines which exclusively rely on fossil fuels for heat and electricity. It is expected that carbon emissions in the Northwest Territories will be increased further if Imperial Oil's proposal to transport natural gas out of the territory is accepted. The City could play a leadership role in the Northwest Territories by demonstrating the potential of other energy sources.

One area in which Yellowknife could become a leader is in the area of energy management by demonstrating the potential for recovering geothermal energy associated with the abandoned Con Mine.

Figure 19: Profile of the Nerco-Con Mine Reservoir



When the Con Mine ceased production in 2003, a decision was made to shut down the pumps and let the mine naturally fill up with water. In many parts of the world the recovery of the geothermal energy associated with reservoirs created from flooded abandoned mines has given new life to the abandoned mines.

"Mines in France, Germany, Great Britain, the Netherlands, Poland, Spain, Slovakia and Ukraine are now the subject of detailed reservoir engineering studies. Several installations based on geothermal heat pumps are already working in Canada, Germany and Scotland" [15]

The Con Mine shares many characteristics with other abandoned mines where geothermic potential has been successfully tapped. As yet, no definitive study has been undertaken to evaluate the economic potential of the reservoir or the infrastructure required to take advantage of district heating of the Con Mine reservoir.

HOOKING UP TO GEOTHERMAL IS SIMPLE

Extracting heat from mine water which maintains a temperature of 18 to 20 degrees Celsius is relatively simple. All it takes are two wells drilled to a depth between 50 to 150 meters to reach the warm water, some pipe, and heat pumps in the building. One well draws warm water up while the other returns it back to the mines.

One of the companies located in the industrial park - SURRETTE Battery Company Ltd**. -** utilises 12 heat pumps for heating and cooling. It saves up to 60% on its previous energy bills.

Source: Town of Springhill, Nova Scotia

[15] Maloepszy, Zbigniew, "Man made lower-temperature geothermal reservoirs in abandoned workings of underground mines, International Geothermal Conference, javik, Sept, 2003.

Also, there will be a need to assess the cost of potential environmental and regulatory regulations on the economics of using geothermal energy on a large scale.

However, depending on the source of energy used to freeze the arsenic, there may be some potential for heat recovery to heat facilities located on the site of the abandoned Giant mine.

Other possible business applications include the use of satellite-based telemetry to remotely monitor and manage energy consumption at mine sites and smaller communities. The NWT Power Corporation is in the process of centralizing systems for monitoring energy for its plants throughout the Northwest Territories. When completed, this will enable 24-7 oversight and monitoring capacity for operating systems supplying power to communities across the Northwest Territories.

Secondary Processing Activities – Diamonds

The Conference Board of Canada has described the Northwest Territories manufacturing sector as ": …underdeveloped, with almost all manufactured goods being imported from the South. Indeed, the fact that a manufacturing sector exists is a tribute to the skills of local entrepreneurs in overcoming barriers posed by distance from markets." [16]

Except for the manufacturing of polished diamonds, most manufacturing that occurs in Yellowknife is consumed locally.

A 2004 survey of Yellowknife jewellers revealed that between 50% and 75% of their sales of loose diamonds are outside the Northwest Territories. The survey also revealed that businesses in Yellowknife have a limited capacity to manufacture jewellery to sell outside the City and the Northwest Territories.

In fact, local sales of custom-made jewellery make up no more than 10% of the local demand[17]. The total Yellowknife market for all jewellery is estimated at between $6 million to $8 million.

A number of Northwest Territories retailers have the ability to expand their capacity to manufacture jewellery using investment casting technology. However, most settings are purchased from the south[18].

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[16] Conference Board of Canada, "Setting the Pace for Development, An Economic Outlook Report for the Northwest Territories.

[17] Industry Canada reports sales by industry. The size of the Yellowknife market was determined by multiplying average Canadian sales per household by the number of households in Yellowknife.

[18] The Nexus Group, Making the Cut: the case for jewellery manufacturing in the NWT, January 2004.

To establish a jewellery manufacturing industry will require an approach similar to the one that was used to establish the City-based cutting and polishing manufacturing plants. That is, it would be necessary to import the skills and equipment to enable larger-scale production. It will also be important to recruit manufacturers that already have global market reach. It is doubtful that without an outside market, medium or large-scale operations could survive. However, there may be some opportunity for expanding small-scale production by recruiting owner or family-operator studios that would cater to local and tourism markets.

In the longer term, the need for skilled workers could be addressed by developing a territorial-based jewellery design and manufacturing training program through Aurora College or by sponsoring individuals to attend southern design schools with a specialty in jewellery making.

In the short term, investors could be sought from other countries (immigrant owner-operators) with skills in jewellery design and manufacturing. The economic viability of such studios may depend on obtaining secure access to smaller rough diamonds.

In respect to the potential for using diamonds as a catalyst to expand tourism opportunities, a 2004 report The Perfect Setting – Diamond Tourism in the Northwest Territories[19] concluded that as much as $5 million could be added to the local economy by including some aspects of the diamond industry within tourism products. The study's author concluded that diamond tourism by itself could not become a destination attraction but could become an important factor in a decision to choose one destination over another.

Expansion of Yellowknife as a Territorial Research Knowledge Centre

Knowledge is a strategic asset and could become a significant factor in the City's economic growth.

Yellowknife companies provide a full range of professional and specialized services for Yellowknife and the Northwest Territories (e.g. accounting, legal, engineering, architectural, and environmental services).

The federal and territorial governments through the CS Lord Northern Geoscience Centre maintain extensive repositories of data and reports on the territory's mineral potential. This information is used almost exclusively by private companies.

The Prince of Wales Northern Heritage Centre maintains significant archival holdings.

[19] The North Group, The Perfect Setting, Diamond Tourism in the Northwest Territories, June 2004.

Yellowknife also hosts one of the Geological Survey of Canada's seismographic centres.

Access to information and analysis can be a critical factor in a business's decision to choose one venue over another. Yet, most of the academic research about the north is being directed by outside agencies. Most Canadian universities maintain significant northern studies programs. For example, the Association of Canadian Universities for Northern Studies (ACUNS) lists 37 members. Of the 37, only Aurora College and Yukon College are based in the north.

Several southern-based companies specializing in research and analysis provide knowledge-based services to City businesses including:

- Laboratory and assay services for the mining industry.
- Environmental, climatological, and geophysical research.

  A long-term investment strategy will need to identify sources of existing data, to identify gaps, and to set priorities for further research.

Retail and Wholesale Trade

The influx of chain stores in the mid-1980s complemented the array of goods and services provided by locally-owned businesses.

Table 8: Percentage of Total Employment in Trade Related Activities – 1999-2004

	1999	2000	2001	2002	2003	2004
Canada						
Wholesale trade [41]	6%	6%	6%	6%	6%	5%
Retail trade [44-45]	12%	12%	12%	12%	12%	12%
Newfoundland						
Wholesale trade [41]	4%	4%	4%	3%	3%	3%
Retail trade [44-45]	14%	14%	13%	14%	14%	14%
Alberta						
Wholesale trade [41]	6%	6%	6%	6%	5%	5%
Retail trade [44-45]	12%	12%	12%	13%	13%	13%
Northwest Territories						
Wholesale trade [41]		3%	3%	2%	2%	2%
Retail trade [44-45]		8%	8%	8%	9%	9%

Source: Statistics Canada

The summary trade data presented in Table 8 for the Northwest Territories is comparable to the Yellowknife data (See table 5). The relatively fewer jobs (percentage of total employment) in retail trade in the City may be explained in part by the difficulty in attracting and retaining entry-level retail service workers because of the competition for higher paying jobs in government and the resource industry.

The lower number of workers in wholesale trade can be explained, in part by the fact that wholesale industries generally establish central distribution facilities

in locations close to major transportation hubs where the cost of warehouse facilities is lower.

Knowledge-Based Investment Opportunities

Previous sections have described the strategic role of information and knowledge in economic growth. Gaining a competitive advantage by collecting and maintaining data in the following areas will be important for achieving success in building knowledge-based industries consistent with the City's strategic advantages. The current study focuses on the need to fill data gaps in three areas.

- Base-line data on climatic effects of extreme cold weather on various technologies, products and services, construction processes, and the long-term effects of global warming.
- Environmental impacts monitoring – site clean-up, neutralization of hazardous wastes, cumulative long-term environmental effects, etc.
- Geophysical data on mineralization potential within the Northwest Territories.

Scandinavian communities such as Arjeplog, Arvidisjaur and Alvesbyn in Sweden, and Lapland, Finland have established extensive cold weather testing facilities. Similar facilities have been established in the communities of Koshitoshi and Katayama, Japan. In the United States, Fort Wainwright, Alaska, was one of the first communities to start a cold weather centre in 1940. Since then, other American cold weather test centres have been established in communities in Minnesota and Michigan. In Canada, the communities of Thompson and Portage La Prairie, Manitoba, and Kapuskasing, Ontario offer similar cold weather testing facilities. The National Research Council, based in Ottawa, is a world leader in undertaking climatic tests.

Also, several Canadian universities are engaged in projects that provide research into cold weather design technologies. For example, the University of Alberta's Dr. Dan Smith's work in engineering water and wastewater treatment facilities for use in the far north earned him the 2004 Harold R. Peyton Award for Cold Regions Engineering. This award is given out by the American Society of Civil Engineers (ASCE). Dr. Smith is the Canada Research Chair in environmental engineering at the U of A and is a founding member of both the ASCE Technical Council on Cold Regions Engineering and the Cold Regions Engineering Division of the Canadian Society of Civil Engineers.

By moving some of the research north, private sector engineering firms would have access to state of the art technology and data, minimizing the time gap between research and application.

The scope of work undertaken by the Scandinavian centres differs from the North American venues in that they have built local economies around testing. Also, their businesses tend to be more strategically integrated by co-locating a critical mass of companies throughout the value chain.

Some of the factors critical to establishing a successful industry cluster around cold weather testing include:

- Availability of consistent, predictable extreme weather conditions.
- Market access to companies wishing to undertake cold weather testing of their products.
- Sharing investments in purchasing state-of-the art testing and analysis technology.
- Availability of on-site expertise – or partnerships with academic institutions.
- Private sector support services available – hotels, garages, restaurants, etc.

The extreme weather conditions in Yellowknife offer many advantages over the other test centres; but, the City has yet to develop the critical testing infrastructure to compete with the European centres. Staff from the City of Yellowknife has made numerous contacts with the auto and aerospace industry. These contacts have netted some interest. Also, a number of auto companies have tested vehicles in winter conditions in the City but not on a consistent basis.

Interest in cold weather testing continues to grow. Revenues from cold weather testing contributed 40 million euros to the Lapland, Finland economy in 2003.

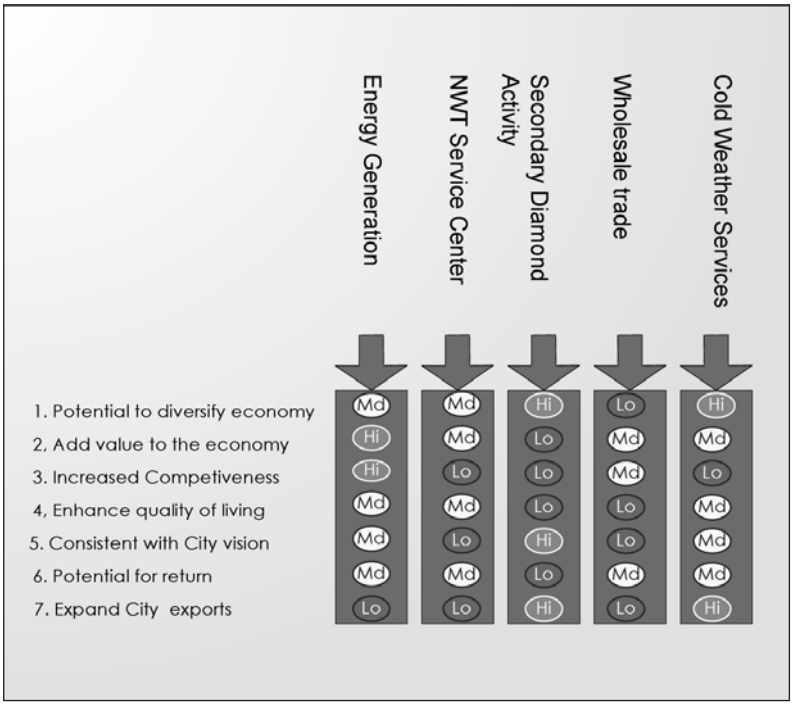
In June 2005, the National Research Council, a leader in de-icing certification testing, announced it would be partnering with MDS Aero Support Corporation, a world leader in the manufacture of gas turbine test facilities, to construct an outdoor test facility in an appropriate northern Canadian location.

To compete with other centres it may be necessary to find a private sector partner to invest in testing infrastructure and equipment.

Assessment of Alternatives

The SWOT analysis was undertaken to identify broad investment targets. The final step in identifying target investments will be to assess the opportunities against various capacity and market demand measures.

Figure 20: Impact Matrix



The five opportunities described in the foregoing sections have each been further rated according to the seven objectives listed in figure 20.

Based on the analysis, the top-three investment opportunities based on the scoring system are:

- Establishing Yellowknife as a world-class, cold weather testing centre.
- Geothermic energy – exploitation of the potential of the Con reservoir.
- Small-scale jewellery manufacturing.

Cold weather testing and exploitation of Yellowknife's geothermic energy potential –The two top-rated alternatives both relate to the positioning of the City as a cold weather centre.

The impact of these choices is enhanced because they:

- Are independent of resource investment cycles.
- Are knowledge-based, which would help to re-define the City's identity.
- Will advance northern knowledge and research and accelerate the lag between research and application.
- Are transformational in that they create a new direction for the economy.
- Have the potential to differentiate the City from other North American cold weather regions.

Maximize the value-added potential of the diamond industry – The availability of northern-manufactured cut and polished diamonds provides a foundation that could be broadened to include other value-added products and services. Some of the City's jewellery retail stores offer Yellowknife-made diamond jewellery to local markets and loose diamonds globally. Prior to going out of business, Sirius Diamonds profiled Yellowknife jewellers diamond products in their North American market campaigns. Laurelton Diamonds piloted a limited selection of northern-themed products designed by northern artists.

The success of aboriginal themed, high-cost "wearable art" offers some promise that a similar industry might emerge in the Northwest Territories. Laurelton has signed agreements with Aboriginal organizations to help test-market Inuit-designed jewellery in North America. "The new facility contributes to our stated objective of providing meaningful economic opportunities to the local community and establishing closer ties to our Canadian partners," says Tiffany & Co. Chairman Michael J. Kowalski.

To be successful, the quality of the design must match the value of the diamond. Laurelton Diamonds' pilot project demonstrated that it is technically feasible to develop a line of products that are unique and reasonably high quality. Key to the success of similar campaigns is they are not one-shot efforts but focus on the long term by gathering essential market research and testing a variety of themes and product lines. Another key to success is a long-term commitment to training skilled northern artisans and designers in the practical aspects of the industry.

A jewellery manufacturing industry could not develop without access to Northwest Territories produced and cut and polished diamonds. Other keys to developing the potential of this market are:

- Investment in diamond jewellery equipment and technology.
- Gaining access to the market.

Nevertheless, most of the studies completed on this subject have concluded that without a pool of skilled artisans there is limited potential for the production of high-value diamond jewellery products. Furthermore, the higher cost of production in the north mitigates against mass-produced diamond jewellery products.

Other diamond producing countries have been able to develop a range of tourism-related products around diamonds. However, a study completed by the North Group in 2004, concluded that while diamonds may not be a "destination attraction" by themselves the availability of diamonds differentiates Yellowknife from other northern cities.

Horizon & Co's. recent announcement that it is offering a package for high-end tourists themed around wilderness and diamonds could become an important step in building links between diamond production, manufacturing, jewellery making and tourism in Yellowknife.

A partial solution to this problem might be to assist immigrants who own and operate small-scale operations in other countries to relocate to Yellowknife to set up a manufacturing business.

Risks

The above investment opportunities are broadly defined. All require further market research, needs assessments, and an estimate of the capital investment required. The City can champion these initiatives by providing political will and a progressive investment environment. Realization of these potential initiatives will require strong and committed private sector partners. By undertaking the research through the CIS Program, the City can advance the initiatives listed above by filling data gaps, networking between the various levels of governments and private partners, and reducing access barriers.

In the early 1990s, a private-public partnership was able to take an idea for establishing Yellowknife as an internationally-known destination for aurora viewing and grow it into a $3 million to $4 million a year industry.

NOTES

Section 5

NEXT Steps

Photo Credit: Fran Hurcomb

The goal of Canada's CIS Program is to encourage foreign direct investment in municipalities in order to promote economic growth and to diversify the economy.

In the foregoing analysis three investment targets were been chosen in order of priority:

- Cold weather testing.
- Geothermic energy generation.
- Diamond jewellery manufacturing.

An action plan is described for each of the targets listed above.

1. Cold weather testing – To become a successful centre for cold weather testing, the City must move beyond providing a simple venue for testing vehicles under extreme weather conditions. Lessons learned from successful centres highlight the importance of developing a cluster or network of service providers that can provide testing services under real and simulated conditions.

Yellowknife has the advantage of having extreme conditions, accessibility, and state-of-the-art communications infrastructure. However, it has neither the research and testing facilities nor the academic or private sector support needed to compete with communities in Scandinavia and Japan at the moment. In order to compete with other leading centres it must:

- Undertake a needs assessment to establish the requirements to establish a centre in the City.
- Complete an inventory of the City's resources and undertake a gap analysis of the services required for Yellowknife to become a full service testing centre.
- In collaboration with a university or research institute, undertake a pilot project using Yellowknife as a cold weather centre. The pilot project should include a detailed competitor analysis, market research, identification of key stakeholders, etc.
- Develop a high-quality prospectus on Yellowknife as a northern testing centre targeted at leading companies with experience and knowledge in cold weather testing.
- Organize familiarization tours for potential investors or users.

2. Geothermic energy generation – While the technology is proven, each application brings a unique set of problems. Research is required to establish the heating capacity of the reservoir, potential applications for use of the heat drawn from the reservoir, and the distribution infrastructure required. Mory M. Ghomshei (Ph. D, P. Eng., P. Geo.), an adjunct professor with the University of British Columbia, Centre for Environmental Research in Minerals, Metals, and Materials, has conducted an on-site visit of the Con Mine site and has expressed

an interest in becoming involved through UBC in participating in the initial feasibility study.

The work plan envisioned for filling the knowledge gaps is described below:

Phase 1 – Technical feasibility study – the technical feasibility study will demonstrate:

- The energy capacity of the reservoir.
- Analysis of potential applications – district heating and electricity generation.
- Analysis of alternate distribution systems.

Phase 2 – Economic feasibility study – Assuming that the phase 1 study finds that it is technically feasible, the next step would be to estimate the revenues required to justify the capital investment. The study would deal with:

- Estimating the total capital and operating costs.
- Establishing breakeven pricing based on industry return on investment benchmarks.
- Assessing alternative sources of funds.
- Assessing potential carbon credits.

Phase 3 – Develop the business case – market analysis, generating financial statements, and assessing management requirements.

Phase 4 – Develop an Investor prospectus – The business case would form the basis for a prospectus to seek investors to move the project forward.

3. Value-added processing related to the diamond industry – In order to develop mid-range diamond jewellery products to complement other industries the City should:

- Research immigration policies and programs which can be used to attract skilled individuals involved in jewellery design and production. Preferably, these individuals would be business owners and operators, with international connections to low-cost labour.
- Prepare promotional materials and distribute through Canadian trade embassies to showcase the potential for production in Yellowknife.
- Participate in selected "Team Canada" trade shows in countries involved in diamond jewellery manufacturing.

Photo Credit: Rhonda Kennedy

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