

APPENDIX A

ECONOMIC IMPACT REPORT

(Revised)

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Abbreviations

Term	Description
CPI	Consumer Price Index
FDD	Final Domestic Demand
FTE	Full Time Equivalent
GDP	Gross Domestic Product
GNWT	Government of Northwest Territories
IPI	Implicit Price Index
LSA	local study area
n/a	Not available
NWT	Northwest Territories
NWTEIM	Northwest Territories Economic Impact Model
RSA	regional study area

Units of Measure

Unit	Definition
%	percent
\$	dollars

A1 VALUED COMPONENTS FOR THE ECONOMIC IMPACT REPORT

The Terms of Reference for the Jay Project (Project) Developer's Assessment Report establishes as a Key Line of Inquiry "maximizing benefits and minimizing impacts to communities" (Appendix 1A). There are two key elements that will be described in order to fully understand the impacts and benefits of the Project.

The first is to understand the economic landscape of the Northwest Territories (NWT) without the Project. This goes beyond the Socio-Economic Baseline Report (Annex XV) that is focused strictly on the past and present-day human environment. To understand the economics of the Project, the baseline must include the economic future for NWT communities in a scenario that would see the Ekati Diamond Mine continue according to its current mine plan and close in 2020. The Project represents an extension of existing operations, and therefore, the benefits that flow from the Project are largely based on a continuation of benefits that already exist. To understand the impacts and benefits of this, it is critical to discuss the proposed Project in the correct context, which is an economic future without the Ekati Diamond Mine (Ekati Mine). To be clear, for the purpose of this report, the current scenario is not a part of the effects assessment; it is a part of the baseline.

The second critical element is to understand the full breadth of potential economic effects flowing from the Project to the NWT economy as a whole. This includes its effect on the territory's gross domestic product (GDP), employment, personal disposable income, migration, government revenues, and inflation. It is not possible to understand how the Project's construction, operations, and reclamation will affect communities without first understanding how and where the Project proponent will spend money and then tracing the flow of money through the economy and into communities.

In this Economic Impact Report, an evaluation of the NWT economy with and without the Project is presented. The principal areas of study include the following valued components:

- gross output;
- GDP;
- labour income;
- employment;
- labour market activity;
- government revenues;
- population; and,
- inflation.

A2 EFFECTS ASSESSMENT CRITERIA

The results from this assessment are summarized according to the direction, geographic range, magnitude, and duration of the effect. The criteria for each of these impact categories are provided in Table A-2.1-1. In all cases, the impact is assessed relative to the baseline conditions, which includes the historical conditions described in the socio-economic baseline (Annex XV) and the baseline projections made in this report under the assumption that the Project does not proceed.

Table A-2.1-1 Definitions of Criteria Used in the Impact Assessment

Direction	Range	Magnitude	Duration
Neutral: no measurable change from existing conditions—a neutral effect is uncommon in an economic impact assessment	Local Study Area: Lutsel K'e, N'Dilo, Dettah, Yellowknife, Fort Resolution, Tłı̨chʔ communities	Negligible: statistically insignificant (no measurable change) from existing conditions	Short Term: less than two years
Negative: a decrease relative to existing conditions	Regional Study Area: Northwest Territories	Low: the impact is within the natural variation of existing conditions	Medium Term: two years to five years
Positive: an increase relative to existing conditions	National Study Area: a measureable impacts that extend beyond the territorial boundary	Moderate: the impact is approaching but still within the upper or lower limits of variation from existing conditions	Long Term: five years to the end of the Project life
		High: the impact is beyond the upper or lower limit of variation from existing conditions; causes a shift from baseline	Indefinite: beyond the life of the Project

This approach for the economic effects assessment is a derivative of the approach taken in the Socio-Economic Impact Assessment that is itself an adaptation of the approach taken to assess the effects on the natural environment and is based on the suggested significance determination schedule outlined in Section 4.1 of the Terms of Reference. The economic effects assessment does not include the concepts of frequency, likelihood, and reversibility criteria because they are not concepts typically used when evaluating economic impacts.

Even with some modifications, economic impacts do not always fit nicely into this impact assessment schedule. For instance, the Project's direct effects on economic components are, for the most part, discrete. GDP, employment, labour income, and government revenues rise while the Project is underway and fall when the Project comes to an end. However, what people, businesses, and governments do with the proceeds from this temporary rise can have long lasting effects. Similarly, the experience gained by labour and businesses can lend itself to future employment and sales. In this example, the effects are both short- and long term, and generally not reversible; one cannot pretend that the Project never happened or immediately forget the skills and experience he or she has gained. In some cases, it can be useful to explain the rationale behind the different effects rather than finding a definitive place within the Effects Assessment schedule in which to place the effect. And, as the explanations become increasingly complex, the usefulness of the tool diminishes.

A3 STUDY AREA FOR ECONOMIC EFFECTS

A local study area (LSA) for the socio-economic impact assessment is defined to include the following communities:

- Behchokò ,
- Dettah,
- Fort Resolution
- Gamètì,
- Lutsel K'e,
- N'Dilo,
- Whatì,
- Wekweètì, and,
- Yellowknife.

These communities encompass the human environment in which the majority of economic impacts will be felt. This does not preclude other communities from within the NWT, defined as the regional study area (RSA) in this report, from participating and thus benefiting from the Project. However, their relationship to the Project will likely be defined exclusively in terms of labour supply and the broader implications of economic growth in the Territory.

The results from the economic impact analysis on gross output, GDP, labour income, employment, and government revenues are presented at the RSA level. It is accepted that the majority of economic impacts will occur in the LSA, but there is no practical reason to quantify economic variables such as GDP on a local basis. It is understood, for example, that the NWT's gross output will rise from its baseline as a result of the Jay Project and that the entirety of the direct increase is attributable to mineral production in the LSA, and more specifically, to the Ekati Mine site.

A4 TEMPORAL BOUNDARY

There are three phases to the proposed Project. Construction will take place over a three-year period and coincide with ongoing operations at the Ekati Mine. Operations will span a minimum of 10 years. (For the purpose of this Economic Impact Report, it is assumed the project life is 11 years, though Dominion Diamond Ekati Corporation (Dominion Diamond) has publicly reported the Project could span 20 years if production is moved from the open pit to an underground operation.) Activities associated with the mine's closure, including reclamation and lake back-flooding will span two years and will be followed by long-term environmental monitoring. These reclamation activities will include the Jay Project and components from the existing mine including the processing plant and accommodations complex. Also note that reclamation of some of the existing mine site will be carried out as part of the Jay Project's operations.

For the purpose of this Economic Impact Report, it is assumed that construction activities will commence in 2015-16, with the first full year of activities taking place in 2017. The first full year of production will be 2021. The reclamation phase of the project will start in 2032.

A5 EFFECTS MEASURED

The economic effects of the project were analyzed using four variables. They are: (1) gross output, (2) GDP, (3) employment, and (4) labour income. These estimates were generated from the direct, indirect and induced effects on the NWT economy.

From the output-related effects (gross output, GDP, employment, and labour income) additional effects can be estimated. These include projections for labour force activity, defined as the effects on employment, unemployment and participation rates, and population and migration. The population effects have further implications on such things as the demand on community services, infrastructure, and government transfers.

In all cases, the Project effects were studied relative to a baseline scenario that included the Ekati Mine continuing its production through 2019 and ending in 2020. The Gahcho Kué Project is also introduced to the NWT economy as a part of the Baseline. This project has passed most of its regulatory requirements and still requires the final go-ahead from its owners. While the project is not guaranteed to proceed, it is included in the Baseline as a prudent choice, especially when examining the Jay Project's effects on the labour market.

A6 METHODOLOGY

Dominion Diamond provided the data used to conduct the economic impact study. This data includes estimates of construction, operation, and closure costs including direct labour requirements, wages and salaries, total cost of construction, and annual operating costs. These data were organised such that Statistics Canada's *Interprovincial Input-Output Model* could be used to determine the full extent of the direct, indirect, and induced effects. The Northwest Territories Economic Impact Model (NWTEIM) is used to determine the effects on population, labour market, and some government revenues as well as to estimate the distribution of effects within the NWT. The NWTEIM also estimates the induced effect on retail sales in the NWT that can be used in conjunction with the results produced by the Input-Output Model.

The measured economic effects reported by the *Interprovincial Input-Output Model* do not take into account potential capacity constraints that would influence local participation for employment or business opportunities. Local participation is determined using the demographics and labour force satellite models within the NWTEIM based on historical and trending labour force capacity, participation rates, and source population.

An overview of the modelling process is provided below.

A6.1 Description of Economic Models and Modelling Techniques

A model is a scaled-down representation of something larger. In the same manner in which a model airplane is a small representation of a real airplane, an economic model is a scaled-down representation of an economy in whole or in part. Broadly speaking, the discipline of economics can be defined as the study of choices. Economic models improve our understanding of these choices and their outcomes. Economic models are used in this environmental assessment because they provide an approximation of the economic outcomes that flow from the construction and operations of the Project.

A6.1.1 Input-Output Models

Input-Output (I-O) models are one of many tools used in economic analysis. They are best suited when investigating the economic impacts of a change in production, and especially in cases where that change can be thought to occur without significantly altering the structural make-up of an economy.

The Jay Project is perfectly suited to this type of modelling because it represents an extension of existing economic activity.

The Input-Output model used in this study is based on the value of output in construction and mining. It is assumed that the inputs required to produce that output will mimic that of the industry. The approach is often described as a "shock minus control" analysis, where the control is defined as the current economy and the shock is the same economy having added or removed the economic activities being studied.

Determining the value and location of the thousands of transactions that occur as a result of construction and operations of the Jay Project would be virtually impossible to do manually. Input-Output models perform all the necessary calculations through a complex system of resource allocation. A model tracks the value-added component of every round of transactions that occur along the supply chain when a change in production or expenditure is introduced to the economy.

In Canada, Statistics Canada builds and maintains the Inter-provincial Input-Output Model. In addition to calculating the impacts of a change on Canada's gross domestic product, this model has the added complexity of tracing trade flows between Canada's provinces and territories as well as international imports and exports.

Statistics Canada's Input-Output models can now calculate direct, indirect, and induced effects. Direct effects are the components of GDP – or the total gross output minus the cost of inputs (excluding labour). This includes labour income, mixed income, capital consumption allowance, indirect taxes, and any other operating surplus.

Indirect effects are those generated by the expenditures on inputs. Suppliers of goods and services to the mine's operations must purchase their own inputs in order to operate. The producers of these inputs are then impacted, stimulating further transactions. The summation of all of these transactions is often referred to as the multiplier effect; that is, the amount of additional activity spurred by the original expenditure. The majority of indirect effects are related to the manufacturer of goods because of the large number of inputs needed to produce the good. Indirect effects are typically low in the NWT regardless of the industry because of its limited manufacturing base. The provision of services on the other hand tends to have a much smaller downstream effect (a smaller multiplier) because a majority of the expenditure flows to labour.

A third round of effects that flow from a change in production are the induced effects. In economic language, including the induced effects "closes" the model because it accounts for the full effect of the shock. Thus, Input-Output models that include induced effects are referred to as closed Input-Output models. Models that include direct and indirect effects only are referred to as open Input-Output models.

The direct and indirect labour income generated by the change in production enters the economy in the form of consumer expenditures. This new consumer spending has its own effect on gross production, GDP, labour income, and employment. This is called the induced effect.

The induced effects introduce some challenges to the economic modelling process. While accounting for the response of households to the change in labour income, Statistics Canada's model does not account for changes made by government or industry that result from their increased revenues or as a result of the changed economic landscape. For example, a government might choose to alter its taxation regime or spending profile as a result of its new direct income tax revenues—the closed model does not make adjustments for such possibilities.

Determining induced effects requires assumptions on the level of taxation, consumer imports, and household savings, all of which would be affected by the gain or loss of income. These assumptions are exogenous to the Input-Output model. Other complexities arise when someone is working in one jurisdiction, but resides in another because their taxes and consumer activities take place in a jurisdiction that is different from where the income is earned. This necessitates that the Input-Output model results are presented first as those based in the NWT and then in terms of the effects that remain in the NWT.

This requirement places a lot of significance on the assumed level of labour force participation by NWT residents and businesses. It is best to view the total employment and labour income effects as the maximum possible from a project, and the NWT effects as those calculated based on an assumption of participation. Raising or lowering these assumption affect the results accordingly.

The combination of these issues has a measureable effect on the results. Therefore, Input-Output modelling is not the only tool used to determine induced effects. Instead, a satellite model within the NWTEIM that was built specifically to deal with these and other 'local' issues is used.

Input-Output Model Assumptions

Input-Output models are useful for studying impacts of changes in production, but one must be cautious when interpreting the results. Like any other model, Input-Output models are predicated on numerous assumptions that alter or influence the results. Therefore, any results should be viewed as approximations and be combined with other knowledge of the firm or industry being studied and the economic environment in which the project is entering. Other important considerations include the fact that:

- Input-Output models are linear, meaning they do not make adjustments for the size, scale, or direction of any change to an economy.
- Input-Output models do not reflect limitations of capital and labour; that is, there are no capacity constraints.
- Input-Output models are static, meaning they are based on the economy as it exists at a single point in time. The model used in this report has a base year of 2010.
- The data used to develop the relationships between industrial sectors are the result of surveys. They must be treated as approximations of actual relationships because an unknown variability is embedded in the mathematics.

With the areas of caution noted, Input-Output models provide a starting point for understanding economic impacts. They provide reasonable estimates of gross production, gross domestic product, employment and labour income and indirect taxes.

A6.1.2 NWT Economic Impact Model

The NWTEIM¹ was developed to help understand and explain the impact of industrial developments on the people of the NWT. Specifically, it couples a financial accounting and taxation model with the NWT Input-Output model maintained by the NWT Bureau of Statistics as the basis for additional analytical models. It includes a demographics model, a labour force activity model, an income distribution model, and a territory impact model.

Each sub-model (or “satellite” model) is linked to one another to produce a dynamic response to a change in production.

- The financial accounting and taxation model demonstrates the potential for public revenue streams and can compute a project's viability.
- The Input-Output model calculates specific impacts on GDP, employment, and labour income from an expenditure-based simulation that are supplemented by the results flowing from Statistics Canada's Inter-provincial Input-Output Industry Model.
- The results from the Input-Output model feed the demographic, labour force, income distribution, and territory impact models that collectively demonstrate impacts on population, labour force, and migration as well as the induced impacts on retail sales.

The Demographics Satellite Model produces a baseline projection of the territory's population by single-age cohort and gender. It utilises historical fertility rates and mortality rates to calculate a baseline natural rate of population growth. These variables can be adjusted over the forecast period to more accurately reflect demographic trends. Exogenous, endogenous, and age-specific migration components are added to complete the demographic projection.

The baseline population forecast provides the information necessary to study the potential labour force. Additional details are required for this analysis, including estimates of participation rates and graduation rates.

The Territory Impacts Model combines information from the NWT Input-Output Model and the Demographics model with a government revenue block based on historical data and current taxation regimes and a consumer activity block based on stochastic projections of consumer behaviour, retail sector data and the Final Demand vector from within the NWT Input-Output Model.

¹The NWTEIM was built and is maintained by Impact Economics.

A7 THE REGIONAL ECONOMIC SETTING

This chapter highlights some of the more important aspects of the NWT economy. This does not duplicate or replace the Baseline Study that offers a complete investigation into the economic, social, and socio-economic history and trends in the NWT and the LSA. Rather, this chapter has a narrow focus, concentrating solely on economic issues that have a direct connection to the Project's planned activities. This includes capital investments, mineral production, gross domestic product, labour force activity, personal income growth, government fiscal performance, demographic change, and inflation. These variables form the basis for understanding the existing conditions within the regional economy and are the ones directly affected by the proposed Project.

The NWT has undergone a major transformation since the Ekati diamond mine first went into production in 1998 affecting all aspects of economic life in the territory. The impetus for these changes has been largely driven by resource development, though the creation of Nunavut in 1999 was a contributing factor. But it was the discovery of diamonds in the North Slave Region of the NWT followed shortly thereafter by construction of BHP Billiton's Ekati diamond mine that set the territory on a new path. In 2003, the opening of Rio Tinto's Diavik diamond mine overshadowed the negative effects of the division of the NWT and Nunavut and the closures of Giant and Con Mines

The wealth generated by the diamond industry has changed the territory. Participation in the workforce has grown considerably and has attracted new labour into the marketplace. The larger workforce has resulted in fewer people drawing social assistance. Governments have benefited as a result of increased revenues generated at the corporate and personal taxation levels, through resource royalties, and through indirect taxes on products. Moreover, the decade and a half of diamond mining has not been met by an equally large increase in population. The number of NWT residents grew initially from 1999 to 2004, but has changed little since then. As a result, the anticipated increase in demand for public services and infrastructure as it relates to population growth has not materialised². Existing businesses have expanded, new ones have been created, and viable Aboriginal development corporations have emerged, furthering the size and extent of economic benefits flowing from the diamond industry. Through all this, inflation has also remained in line with the Canadian average.

A7.1 Capital Investment

Capital investments are an important indicator of a region's future economic growth. The NWT's mining sector has been a major contributor to the territory's capital investments over the past 15 years (Table A-7.1-1). In 2000, the three-year construction of the Diavik Diamond Mine began. It brought approximately \$1 billion of new, private sector investment to the territory. In 2005, construction of the Snap Lake Diamond Mine began. This project also spanned three years with a final cost in excess of \$1 billion. Since 2005, Ekati and Diavik have continued to expand their operations beyond the initial site development including further investments in pit operations and development of new underground projects.

² This does not suggest there has been no change in the demand for public services or infrastructure. However, any change that has occurred can be attributed to changing needs of the population, shifts in demographics including the ageing of the population, and from intra-territorial migration.

Table A-7.1-1 Public And Private Capital Expenditures, By Sector, Annual (\$, Millions)

Year	1999	2000	2001	2002	2003	2004	2005	2006
Mining, Oil, and Gas	264	608	1101	936	444	793	1042	1443
All Industries	554	824	1401	1350	817	1248	1469	1848
Mining% of Total	48%	74%	79%	69%	54%	64%	71%	78%
Year	2007	2008	2009	2010	2011	2012	2013p	2014i
Mining, Oil, and Gas	1,469	1,052	568	x	563	769	905	850
All Industries	1,995	1,562	1,071	1,247	1,087	1,263	1,504	1,415
Mining% of Total	74%	67%	53%	x	52%	61%	60%	60%

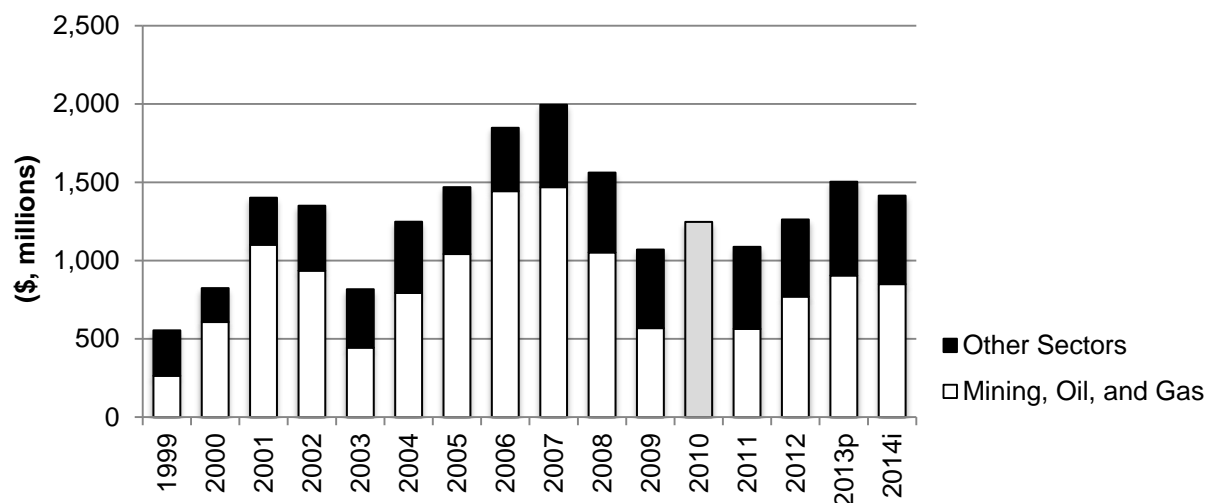
Source: Statistics Canada 2014a.

Note: 'p' means preliminary data, 'i' means intentions. 'x' suppressed to meet the confidentiality requirements of the Statistics Act.
% = percent; \$ = dollars.

It is noteworthy that in the past 15 years, capital investments made by the NWT's mining, oil, and gas sector has never dropped below 50% of all capital investments in the territory, and in select years has represented in excess of 75% of capital expenditures (Figure A-7.1-1).

Private-sector investment represents new money to the territory. This is unlike public-sector investment, which is a redistribution of Canadian taxpayers' wealth. Though it could be argued that, in the NWT, most public sector spending represents new money to the territory since much of the financing comes from taxpayers from southern Canada.

Figure A-7.1-1 Private and Public Capital Expenditures in the NWT, 1999 to 2014



Source: Statistics Canada 2014a.

Note: 'p' means preliminary data, 'i' means intentions.

Data for mining, oil, and gas in 2010 was suppressed to meet the confidentiality requirements of the Statistics Act. The figure for that year represents total capital expenditures by all sectors.

Looking forward at the prospects for future investments in the NWT, it is expected that De Beers will develop its Gahcho Kué Project. If this project does move forward, the cost of construction will exceed \$600 million (De Beers Group of Companies. 2014). Other potential capital investments are less certain. In the Sahtu region, oil and gas exploration activities could attract large capital expenditures, though it is still not clear whether the proposed large-scale hydraulic fracturing will be permitted or whether the active companies will continue with their exploration plans. Longer term, oil companies have expressed interest in offshore exploration in the Beaufort Sea, though this development should not be considered certain at this point in time (LTLC Consulting 2013). Other mining developments, such as NICO, Nechalacho, and Prairie Creek are in advanced stages of exploration and the regulatory process, but development of these sites remains uncertain due to several constraints including commodity prices, infrastructure, and financing. More discussion on the future baseline economy is provided in Section A8 of this Appendix.

A7.2 Mineral Production

Table A-7.2-1 contains data on the value of mineral production in the NWT from 1999 to 2013. The rise of diamond production is evident in this table. The value of this production peaked in 2004 when the combined activities of Ekati and Diavik produced \$2.1 billion in diamonds. The value of production returned to this level in 2008 after the Snap Lake Diamond Mine opened. The drop in 2009 came as a result of temporary shutdowns at Diavik and Snap Lake following the worldwide economic recession that year. The value of production returned to peak levels a year later, but fell to \$1.56 billion in 2013.

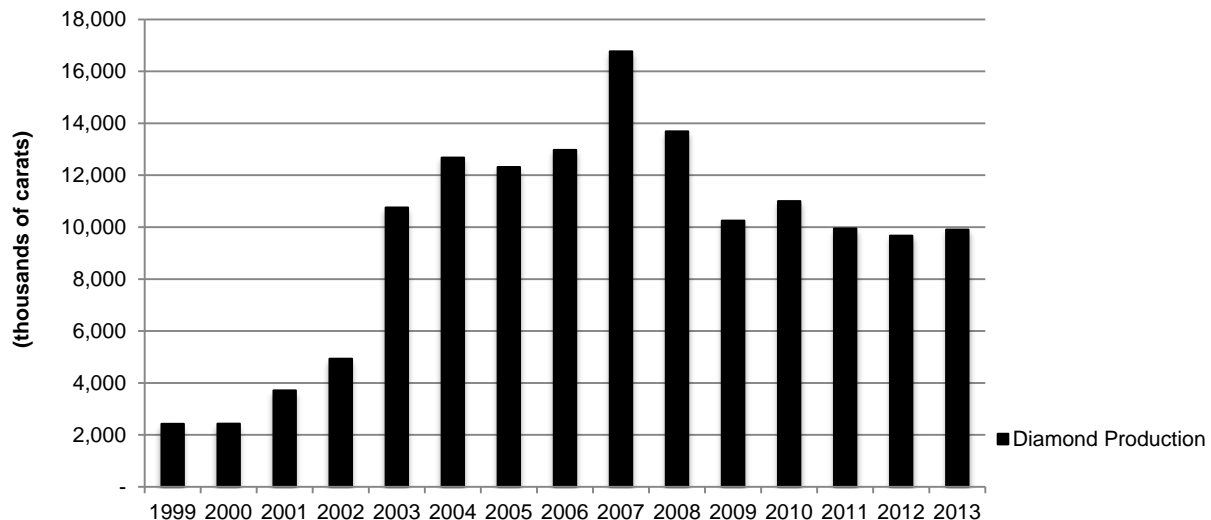
Table A-7.2-1 Value of Mineral Production in the NWT, 1999 to 2013 (\$, millions)

	Diamonds	Oil and Gas	Other Minerals	Total
1999	606	243	47	896
2000	625	484	57	1,165
2001	718	545	61	1,323
2002	792	471	82	1,345
2003	1,588	515	79	2,182
2004	2,097	518	16	2,630
2005	1,762	581	28	2,371
2006	1,567	563	71	2,201
2007	1,765	543	66	2,374
2008	2,057	672	67	2,795
2009	1,448	405	59	1,912
2010	2,029	477	15	2,522
2011	2,053	416	86	2,556
2012	1,626	444	107	2,169
2013	1,561	419	110	2,090

Source: GNWTBS 2014.

Diamond production, in terms of carats, peaked in 2007 at 16.78 million carats and has been on a downward trend since then. In 2013, the three operating diamond mines produced 9.9 million carats (Figure A-7.2-1).

Figure A-7.2-1 Value of Mineral Production in the NWT, 1999 to 2013



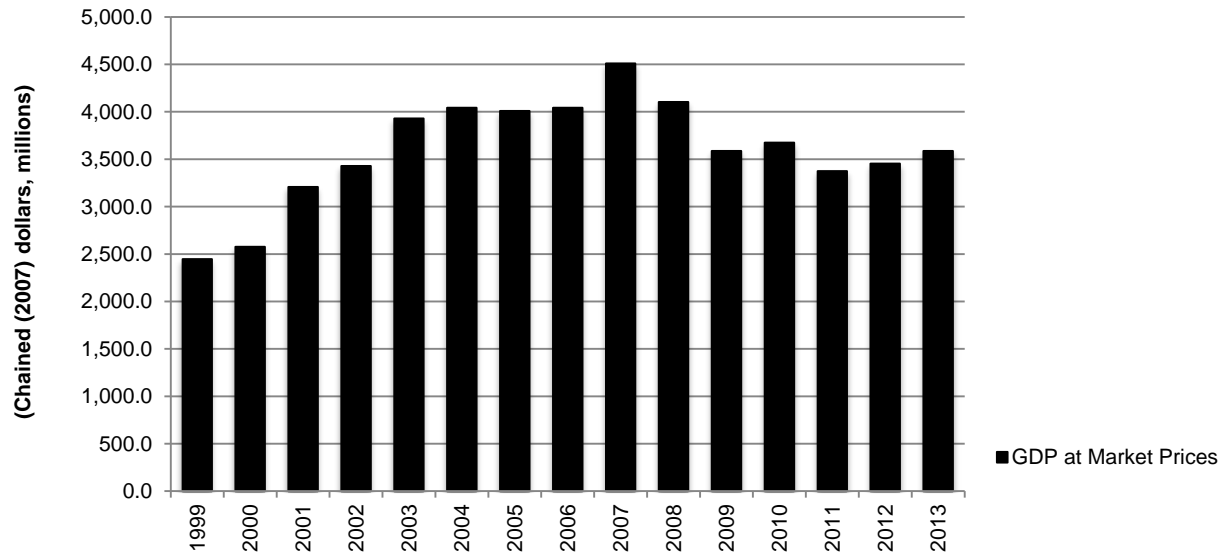
Source: GNWTBS 2014.

A7.3 Gross Domestic Product

Gross domestic product (GDP) is a measure of production or output within a region. There are a few different ways to measure GDP, including GDP by Market Prices, GDP by Income, and GDP by Industry (also referred to as GDP by Basic Prices). GDP by Basic Prices is calculated by summing labour income, mixed income, capital consumption allowance, indirect taxes less subsidies levied on production, and other operating surplus. Adding indirect taxes on products less any subsidies on products gives us GDP at Market Prices. 'Real' GDP at Market Prices, which is the most often cited measure of value-added production, removes the effects of inflation from the data.

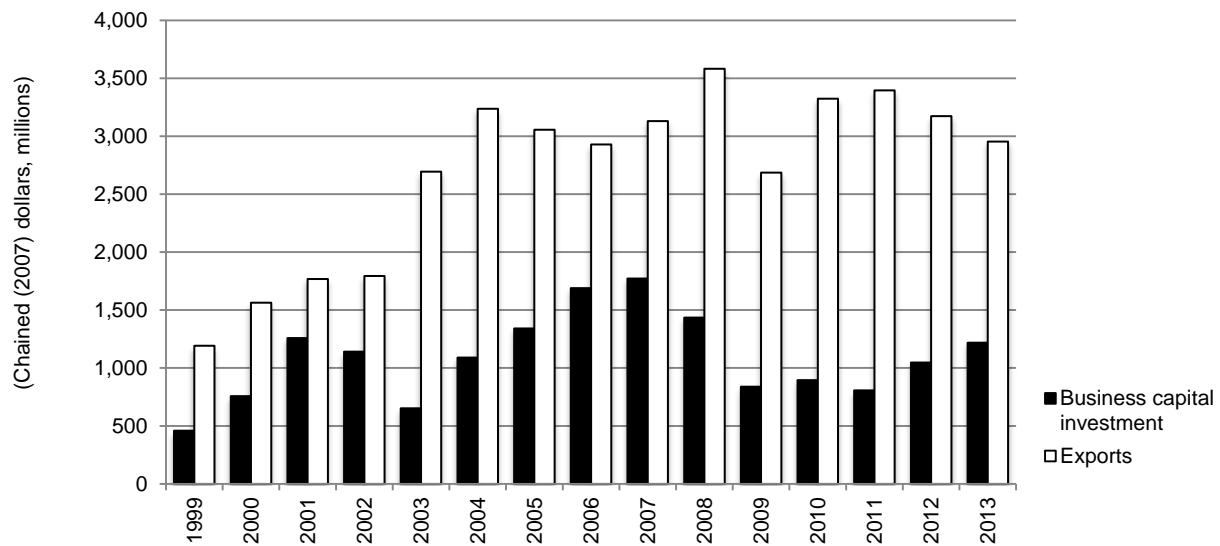
In the NWT, real GDP at Market Prices was equal to \$3.6 billion in 2013, having fallen from its peak in 2007 (Figure A-7.3-1). Much of this decline is the result of lower private-sector capital expenditures and a drop in the value of exports (Figure A-7.3-2). That peak year coincides with the peak carat production at the diamond mines, construction activities at Snap Lake Diamond Mine, and increased development expenditures at Ekati and Diavik diamond mines.

Figure A-7.3-1 GDP at Market Prices, Chained (2007) Prices, 1999 to 2013



Source: Statistics Canada 2014a.

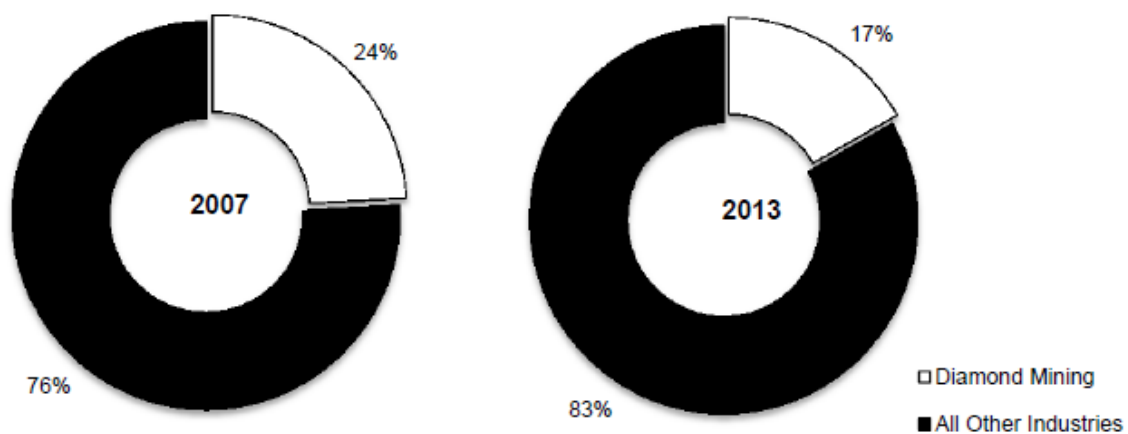
Figure A-7.3-2 Select Components of GDP at Market Prices, Chained (2007) Prices, 1999 to 2013



Source: Statistics Canada 2014a.

GDP at Basic Prices provides further insight on the changes within the NWT's economy. At its peak, diamond mining represented 24% of the territory's total real output. Preliminary estimates for 2013 indicate its share has dropped to 17% (Figure A-7.3-3). These figures do not include other contributions made by the diamond mines to the overall economy, namely, the contribution related to construction and ongoing development, and all indirect and induced effects of diamond mining. The 2010 Statistics Canada *Interprovincial Input-Output Model* includes a GDP multiplier for the indirect effects of diamond mining in the NWT equal to 1.09 and 1.15 when adding in the induced effects (Statistics Canada 2014b).

Figure A7.3-3 Mining's Relative Contribution to NWT Economy (Measured in Terms of Relative GDP at Basic Prices, Chained (2007) Dollars, 2007 and 2013)

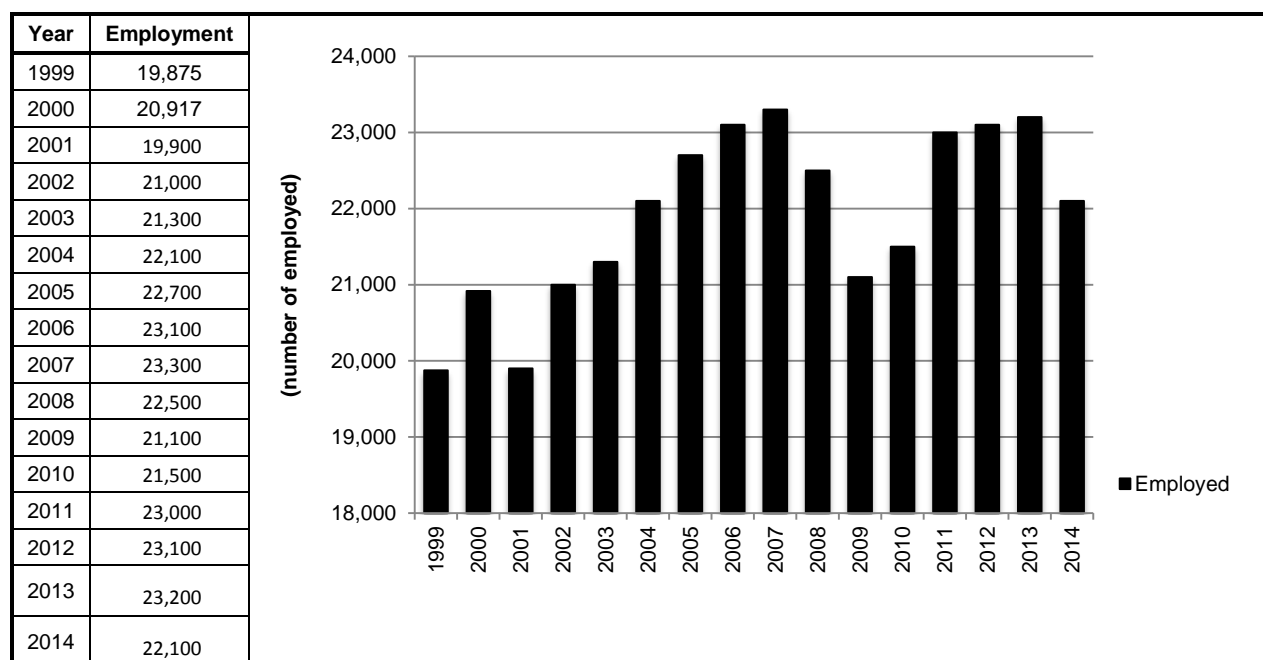


Source: Statistics Canada 2013a.

A7.4 Employment and Labour Force Activity

The NWT witnessed a steady rise in employment from 1999 to 2007 as the diamond industry grew (Figure A-7.4-1). The onset of the recession that began in 2008 and continued through 2009 brought an end to the expansion. The number of people employed in the NWT fell by 2,000 over the two-year period. Job numbers rebounded in 2011, but have never returned to the previous peak reached in 2007. Data for the past 18 months indicate employment is again falling. In 2014, there were 1,100 fewer jobs in the NWT when compared to the previous year..

Figure A-7.4-1 NWT Employment, 1999 to 2013



Source: Statistics Canada 2015c.

As one would expect, other measures of labour force activity show a similar pattern over the past decade. Table A-7.4-1 includes the complete labour force activity dataset from 1999 to 2014. The recent trend is most interesting. It shows a generally weakening of the labour market, with fewer jobs, a smaller labour force, and lower participation rates. In 2012, the NWT unemployment rate grew to 8.4% while the unemployment rate for all of Canada fell to 7.2% – this marked the first time since 2001 that the NWT unemployment rate was higher than the national rate (Statistics Canada 2015c).

Table A-7.4-1 Labour Force Activity in the Northwest Territories, 1999 to 2014

	Population 15+	Labour Force	Employed	Unemployed	Not in Labour Force	Participation Rate	Unemployment Rate	Employment Rate
1999	28,417	21,733	19,875	1,875	6,675	76.5	8.6	69.9
2000	29,158	22,342	20,917	1,450	6,825	76.6	6.5	71.7
2001	28,400	21,800	19,900	1,900	6,600	76.8	8.7	70.1
2002	29,200	22,300	21,000	1,300	6,900	76.4	5.8	71.9
2003	30,200	22,900	21,300	1,600	7,300	75.8	7.0	70.5
2004	30,900	23,600	22,100	1,500	7,300	76.4	6.4	71.5
2005	31,200	23,900	22,700	1,200	7,300	76.6	5.0	72.8
2006	31,200	24,300	23,100	1,200	6,900	77.9	5.3	74.0
2007	31,600	24,700	23,300	1,400	6,900	78.2	5.7	73.7
2008	31,800	23,900	22,500	1,400	7,900	75.2	5.9	70.8
2009	31,700	22,600	21,100	1,500	9,100	71.3	6.2	66.6
2010	32,000	23,200	21,500	1,700	8,800	72.5	7.3	67.2
2011	32,300	24,800	23,000	1,800	7,500	76.8	7.3	71.2
2012	32,400	25,100	23,100	2,000	7,300	77.5	8.4	71.3
2013	32,600	25,100	23,200	1,900	7,500	77.0	8.0	71.2
2014	32,300	24,000	22,100	1,900	8,300	74.3	7.9	68.4

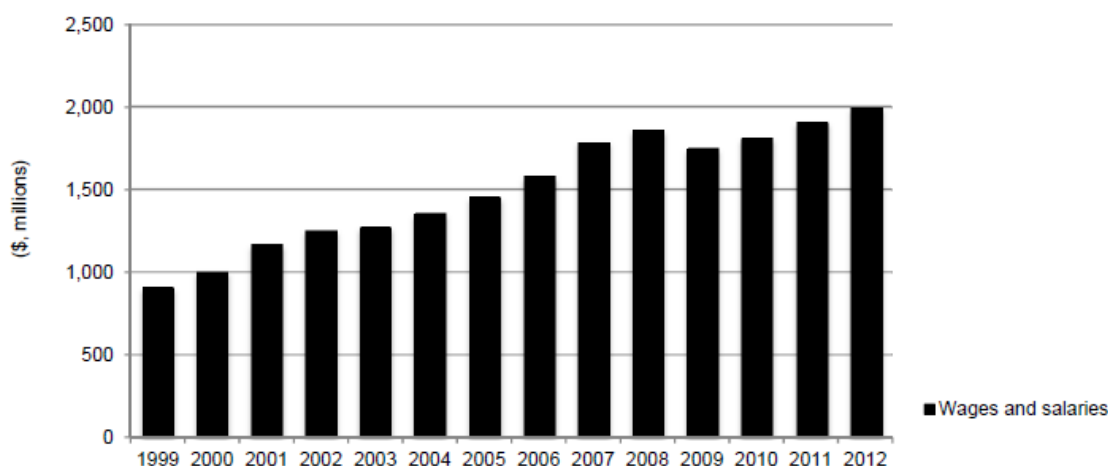
Source: Statistics Canada 2015c.

A7.5 Labour Income

The employment growth over the past decade and a half has brought with it a rise in wages and salaries paid (Figure A-7.5-1). Moreover, many of the jobs created over this time period have been higher paying than the average in the territory causing the growth in total wages to exceed the pace of inflation, which has seen prices grow by 34% in Yellowknife from 1999 to 2013 (GNWTBS 2014).

The increased financial wealth can be seen in the growing average employment income levels throughout the LSA. It is worth noting that in relative terms, the smaller communities have seen their income levels grow at a faster pace than that of Yellowknife (Table A-7.5-1).

Figure A-7.5-1 Total Wages and Salaries Earned in the NWT, 1999 to 2012



Source: Statistics Canada 2013b.

Table A-7.5-1 Average Employment Income from Selected Local Study Area Communities, Indexed (1999=100), 1999 to 2011

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Behchokq`	100	105	120	129	131	139	149	158	167	174	163	186	185
Gamèti	100	105	114	124	124	118	122	146	154	159	155	165	150
Whati	100	90	107	122	131	130	142	138	155	157	154	157	172
Lutsel K'e	100	105	111	129	132	133	125	131	162	153	157	166	176
Fort Resolution	100	103	126	127	128	139	147	153	165	169	165	190	192
Yellowknife	100	102	108	117	118	123	129	133	140	147	147	151	157

Source: GNWTBS 2012.

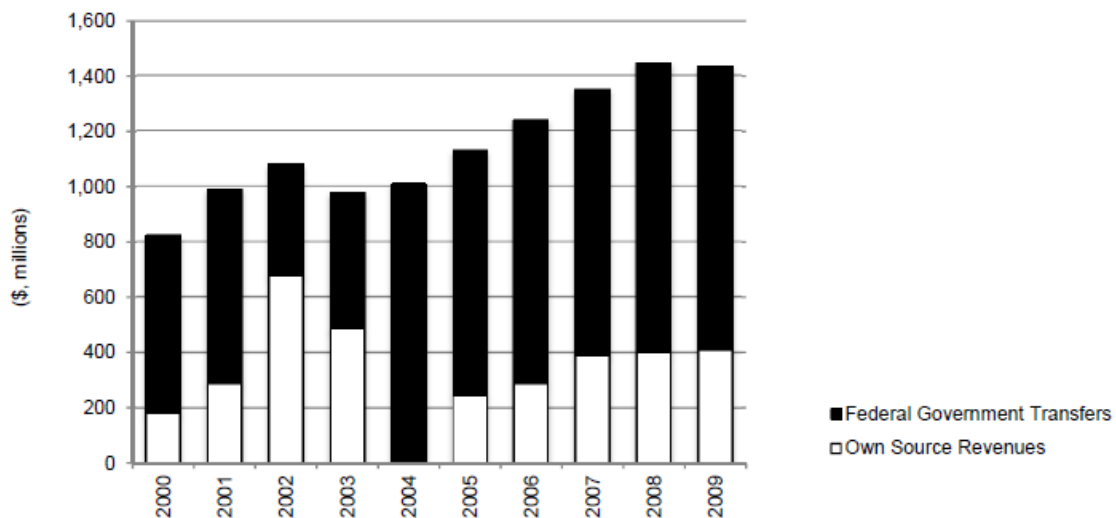
A7.6 Government Revenues

The Government of Northwest Territories total revenues have grown 74% from 2000 to 2009 to equal \$1.432 billion, which equals an average annual increase of 6.3%, compounded annually (Figure A-7.6-1). The growth far outpaces that of inflation and population that has, in the 10 years from 2000, grown by 29%.

On April 1, 2014, the GNWT officially devolved from the Government of Canada. Among other things, the Devolution Agreement included a new approach to resource revenue sharing. "The GNWT will keep 50% of the revenues collected from resource development on public land up to a maximum amount. The Government of Canada will deduct its share from the GNWT's federal transfer payments. The maximum benefit is a percentage of the GNWT's annual budgetary needs. This means it will grow as the territory grows." (GNWT 2014a)

The GNWT has reported that it received \$80.28 million in resource royalties, licenses, and other fees for fiscal year 2014-15 and that a similar amount is expected in fiscal year 2015-16. Half of this amount, \$40.14 million, will be offset through a reduction in the Territorial Formula Financing Grant (GNWT 2014b).

Figure A-7.6-1 Total Revenues by Source, 1999 to 2009



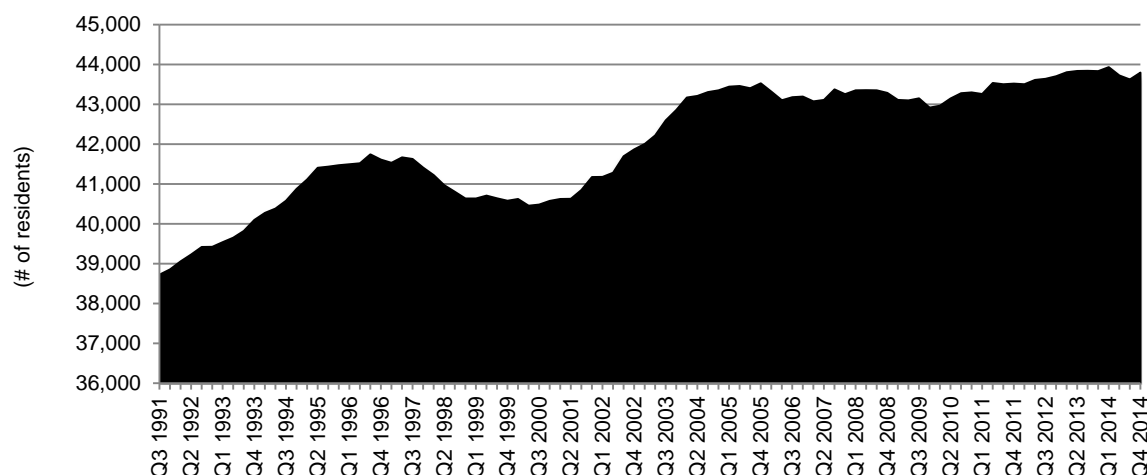
Source: GNWTBS 2010.

\$ = dollars.

A7.7 Population and Demographic Change

The NWT population has undergone four distinct periods of growth over the past 20 years (Figure A-7.7-1). The most recent trend began in 2004 and has continued through until today. Over this time period the territory's population growth has been virtually nil. The latest estimate for 2014 has the NWT's population at 43,623, which is an increase of 318 from the number ten years ago in 2004.

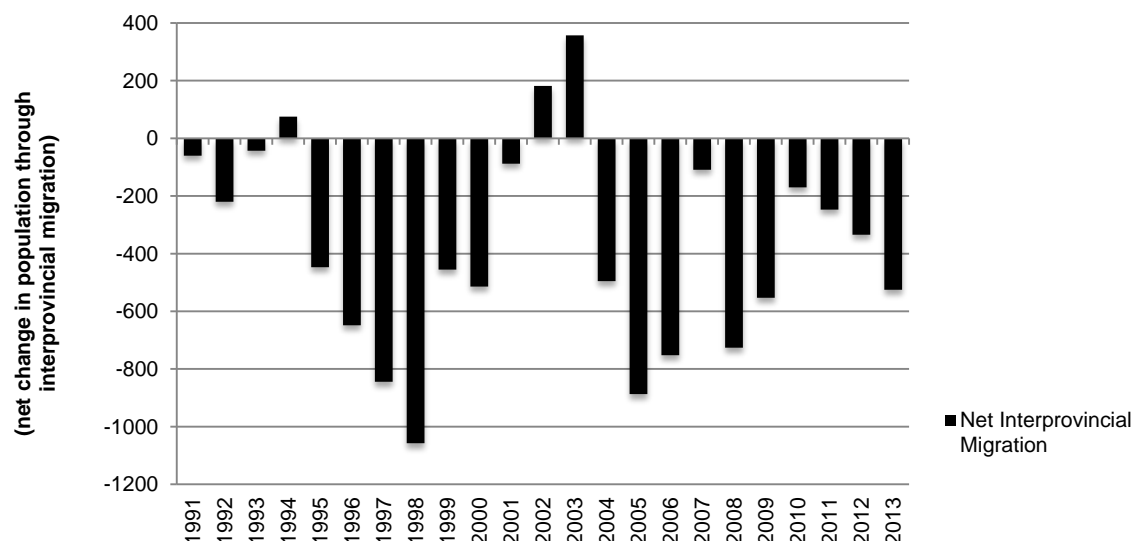
Figure A-7.7-1 Population in the NWT, Quarterly, 1991 Q3 to 2014 Q1



Source: Statistics Canada 2014d.

It appears that the trend is a movement away from smaller and more isolated communities into larger regional centres and Yellowknife and then onto southern Canada. In the past 20 years, the NWT has consistently seen more people move away from the region than have entered (Figure A-7.7-2). It also appears that this trend is not specific to any one group, with both Aboriginal and non-Aboriginal populations seeing a net migration south.

Figure A-7.7-2 Net Interprovincial Migration, 1991 to 2013



Source: Statistics Canada 2014e.

A7.8 Inflation

A period of rapid economic expansion can have an influence on inflation. There was an expectation before the rise of the diamond industry that its demands for labour and capital would lead to higher costs. This would be particularly difficult for anyone who is not benefiting from the economic growth.

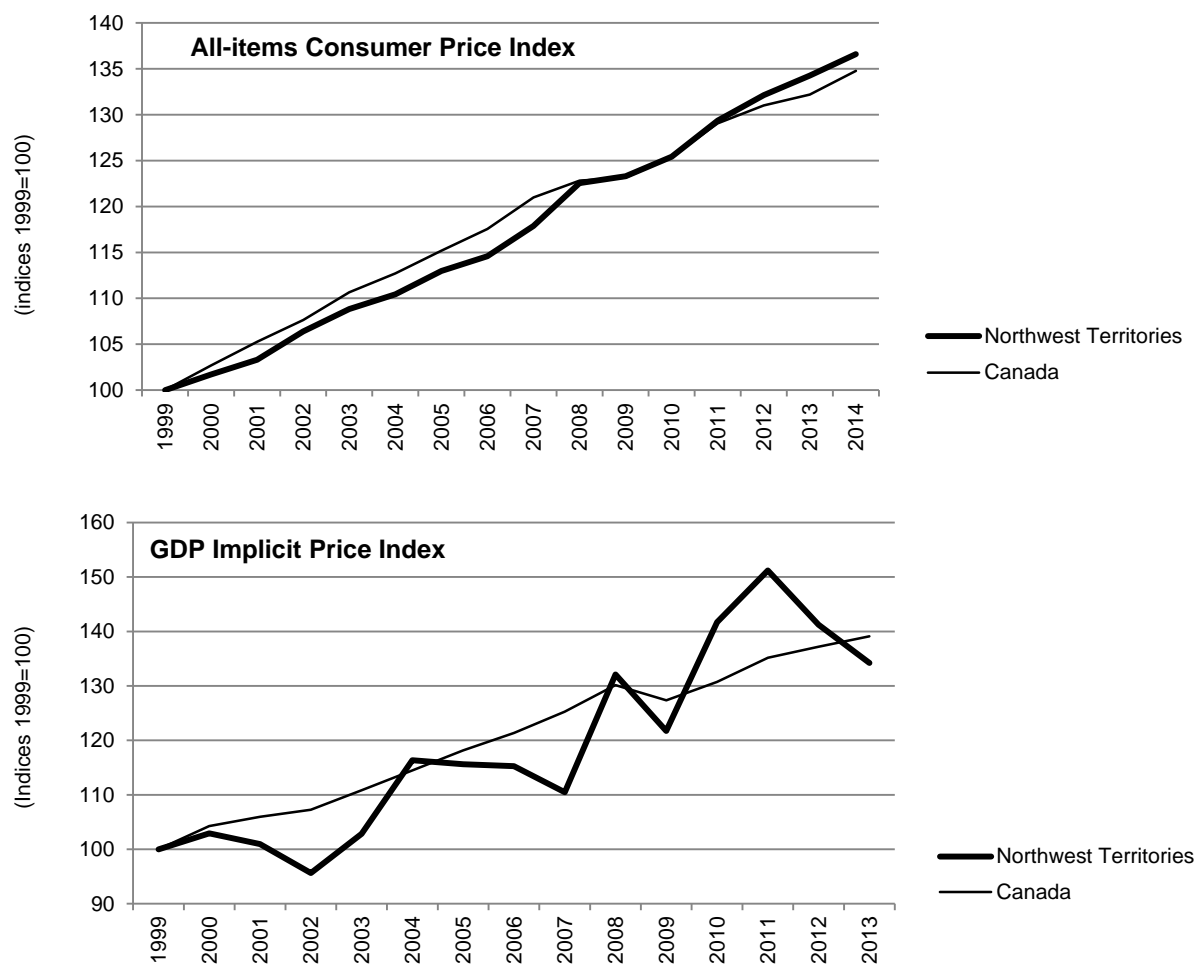
There are several measures of inflation. The most commonly cited is the change in the Consumer Price Index (CPI), which represents the changing prices of a basket of goods and services. In the NWT, CPI is calculated for Yellowknife only. Therefore, price changes that occur elsewhere are not captured. It is nevertheless a good proxy for consumer price movements throughout the territory. CPI omits the prices for government and industry that could follow a different growth path. Depending on what is being studied, it might be relevant to include these non-consumer price effects.

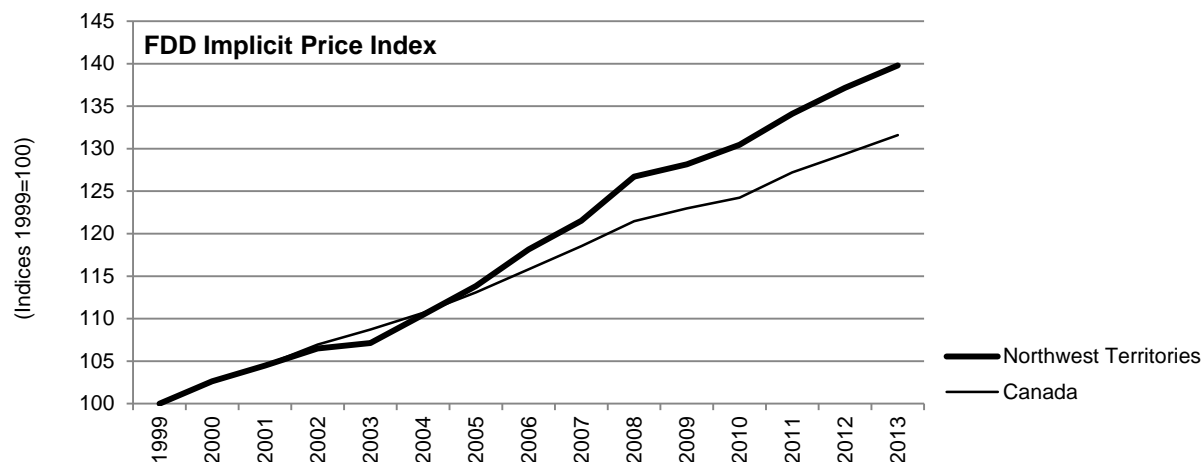
A second measure of inflation is the Implicit Price Index (IPI) for the GDP. It is calculated by finding the difference between GDP and real GDP. Unlike the CPI, the GDP's IPI captures price movements of every sector of the economy. This makes it more complete but does introduce price movements of exports, which may not have any impact on NWT residents. For example, a substantial rise in the price of diamonds would be captured in this index but would falsely reflect a price impact for the territory beyond its effect on mining profits and corresponding taxes.

To address this issue, a third method could be used. The IPI for the NWT's final domestic demand (FDD) is calculated in the same way as that for GDP. Final domestic demand includes the activities of consumers, government and industry and excludes exports. In this way, it is sheltered from price effects on the region's major exports.

Figure A-7.8-1 contains data on the three measures of inflation for the NWT and Canada. Consumer prices for the NWT and Canada are shown to be following an almost identical path. There is extreme variation in the GDP Implicit Price Index for the NWT that is almost entirely a function of the effect of export prices, which include diamonds and oil, and gold before the closure of Con and Giant Mines. The implicit price index for FDD is the only measure to show a clear separation from the national figure. Most of this deviation took place between 2003 and 2008. In the five years since 2008, implicit prices of NWT's FDD have risen by 10.3% compared to a 8.3% rise across Canada.

Figure A-7.8-1 Measures of Inflation, NWT and Canada, 1999 to 2013-14 (All-Items Consumer Price Index, GDP Implicit Price Index, FDD Implicit Price Index)





Source: Statistics Canada 2014a,c.

GDP = Gross Domestic Product; FDD = final domestic demand.

A8 ECONOMIC FUTURE WITHOUT THE JAY PROJECT: A PROJECTION OF THE ECONOMIC BASELINE

In this chapter, a 10-year projection of the NWT economy without the Jay Project is presented. The purpose is to correctly situate the proposed Project in the correct economic context. Unlike a typical proposal that represents an entirely new resource development project, the Jay Project is an extension of an existing mine's life. From the perspective of economics, the real change in the current economic baseline will occur in the years leading up to and immediately following 2020 when the Ekati Mine is scheduled to close. To understand what the Jay Project means to the human environment requires knowledge of what this environment would be like if the Project were not to proceed.

A8.1 Methodology and Baseline Projection Assumptions

The approach taken to develop the baseline projection is identical to that used to study the economic effects of the Jay Project. The key elements of this projection are the assumptions applied to the current economy.

- The Current scenario is based on the existing economy that includes the Ekati, Diavik, and Snap Lake diamond mines operating in the North Slave region of the NWT according to their current mine plans. This means the Ekati Mine will close in 2020, Diavik in 2023, and Snap Lake in 2029.
- The Gahcho Kué Project is introduced to the territory's economy to form the Baseline Scenario, with the first full year of production being 2017 with operations continuing for 11 years. No other mining project or major economic event is introduced to the baseline (this is described in more detail below).
- The assumed mining sector activities affect the demand for labour, which in turn affects labour force, labour income, direct personal tax revenues, and migration, which then affects consumer activity and overall population.

- Other major economic sectors within the NWT economy, such as public administration, health and social services, and education services are held constant in real terms, but are allowed to respond to changes in the mining sector.
- Population is projected forward using the NWT Demographic Model that is a satellite to the NWTEIM. This projection is based on historical and projected fertility rates and migration patterns. The model has a dynamic link to the economy.

The NWTEIM is used to complete all the necessary calculations.

A8.2 Other Resource Development Projects to Enter the Regional Study Area (Cumulative Economic Effects)

Unlike the natural sciences approach to cumulative effects assessments, the study of economics treats all activities as a part of the overall cumulative effect. Today's spending or workforce choices affect the state of the economy tomorrow and cannot be reversed. Even in the case where a decision today is later reversed, the memory of that decision, what was learned, and the outcomes that resulted from it remain forever as a part of economic history.

A corollary of this approach to cumulative effects is in the way economics treats potential projects.

There are several mining projects listed as part of the potential cumulative effects in the biophysical effects assessment. In economics, projects are not included as a part of a scenario simply because it has been named as such. The establishment of a reasonable scenario must consider the economics of each potential project. Including projects with unproven economics generates questionable results that are not helpful in understanding the economic effects of the actual project being studied.

Instead, potential projects with a strong likelihood of proceeding are included in the primary scenario, while all other projects can be investigated to understand how the baseline and new Project-driven scenarios will be affected if and when they are introduced to the territory's economy.

There are several projects that fit this "what if" criteria in the NWT. The potential Prairie Creek Mine, NICO Mine, and Nechalacho Mine have all completed Developer Assessment Reports and in the case of Prairie Creek, have acquired all necessary licences. But passing these regulatory requirements have not led to the immediate development of the projects because other factors are preventing that from happening, including issues of low commodity prices, missing infrastructure, and capital financing. These are not small things, and are in fact, significant enough that any one of them will keep a project from being developed indefinitely. Until these issues are addressed, it is unfair to include them in the main baseline economic scenario because it is not possible to estimate a reasonable project scope or timeframe and because including them arbitrarily skews the results causing a shift in the focus of discussions toward an entirely fictional future state of NWT's economy. It is far better to add these projects as part of a separate scenario (or several scenarios). In this way, it is possible to learn how each project will affect the economy without biasing the response or choices made regarding the proposed Project.

The baseline scenario does include the Gahcho Kué Project. It is included because of its advanced stage of development, because some initial staging of materials and construction activities have commenced, and because the current price of diamonds makes the project financially viable. There is some question regarding its timeframe, however. For the purpose of the Baseline Scenario included in this report, it is assumed that the first full year of construction will be 2015 with the first full year of production commencing in 2017. These assumptions do not mean that the Gahcho Kué Project's development and operations is certain. Rather, that it is reasonable to include it in the NWT's future economy and thus, be a part of the baseline discussion.

Because the Gahcho Kué Project was not 100% guaranteed when the initial Economic Impact Report was written, the economic assessment also includes a scenario without this project labelled the Current (no new growth) Scenario.

Other projects included as a part of the cumulative effects in the biophysical effects assessment are not studied as part of the economic baseline or any additional economic scenario.

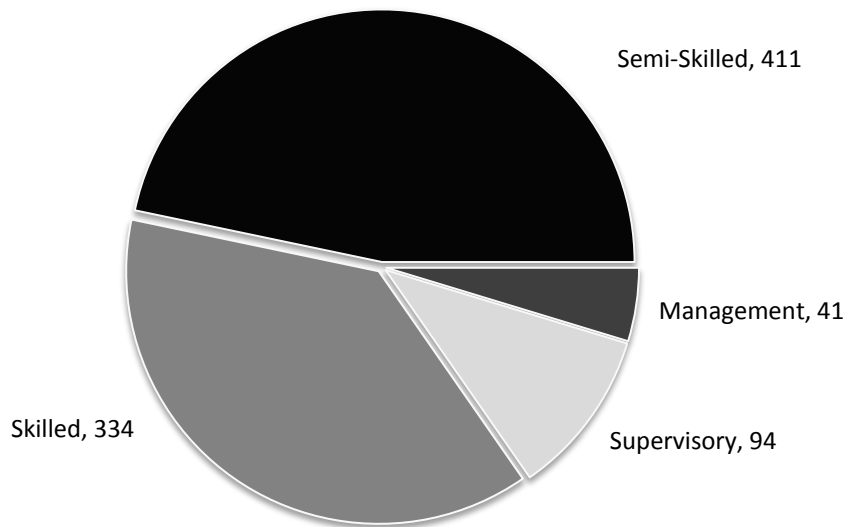
A8.2.1 Ekati Diamond Mine Baseline Assumptions

Over the next five years, the Ekati Mine will continue to operate according to its current mine plan. This includes continued production at the Fox and Misery open pits and the underground mining of the Koala kimberlite pipe. Two new diamond-bearing kimberlite pipes, named Pigeon and Lynx, will be developed in this time frame. The latter is currently undergoing regulatory review and is expected to enter production in 2017. The last full year of activity will be 2019, with some production occurring in 2020 alongside the start of reclamation activities that will continue until 2023.

Mining activities over the six-year period, from 2014 to 2019, are assumed as follows:

- Employment will average 881 person years annually. From this total, 41 jobs will be in management, 94 in supervisory positions, 334 in skilled jobs, and 411 in semi-skilled positions (Figure A-8.2-1).
- Production will continue at or near the processing plant's capacity, meaning average production will equal approximately 4.3 million tonnes annually, with carat production averaging 2.4 million annually.
- Annual operating costs will average \$371 million, while total development costs will approach \$450 million.
- Reclamation activities will continue into 2023, followed by several years of environmental monitoring.

Figure A-8.2-1 Average Employment by Job Classification, Annual, Person Years, 2014 to 2019



A8.2.2 Diavik Diamond Mine Assumptions

The Diavik Mine will operate according to its existing mine plan until 2023. Diavik currently operates as an underground mine exclusively. In the fall of 2014, Diavik announced it would proceed with the development of a resource known as A-21 that is located beneath Lac de Gras. This project has been added to the baseline economic projections. The project will start with a construction phase in 2015 with production commencing in the latter half of 2018. A21 does not represent an extension of the existing mine life of Diavik.

Assumptions for A21 include development cost of \$350 million and a production lifespan of 5 years.

With the addition of A21, it is assumed that production at Diavik Mine will continue at a relatively steady pace over the remainder of the mine's life, with some drop in production and employment in the final year of operations. Reclamation activities will take place during the mine's operational life and continue once the mine has closed.

A8.2.3 Snap Lake Diamond Mine Assumptions

Snap Lake Diamond Mine is expected to operate until 2029. The economic baseline projection assumes production at this mine will remain relatively constant over the next 15 years. Reclamation of the mine will follow the mine's closure.

A8.2.4 Gahcho Kué Diamond Mine Assumptions

Construction of the Gahcho Kué Project enters the baseline scenario in 2014, with production starting two years later with the first full year of production being 2017. The following is a list of the assumptions used in adding the mine to the baseline scenario.

- The details of the Gahcho Kué Project were taken from the Gahcho Kué Project Feasibility Study NI 43-101 Technical Report and the latest information posted on the Project's website (Hatch 2014, De Beers Canada Inc. 2014).
- Construction has already started and will be furthered in 2014. The first full year of construction is 2015. The total cost is \$650 million.
- Total direct employment during construction is 1,090 person-years over a two-year period.
- Production is to start in the second half of 2016 with the first full year of production in 2017.
- The average rate of production is 3 million tonnes of diamond-bearing kimberlite annually producing an estimated 4.5 million carats.
- Employment at the mine site is 365 person years, on average, annually, over 11 years of production.
- Reclamation is a part of the mine plan, with much of the reclamation activities taking place during the final years of production.

A8.3 Baseline Results

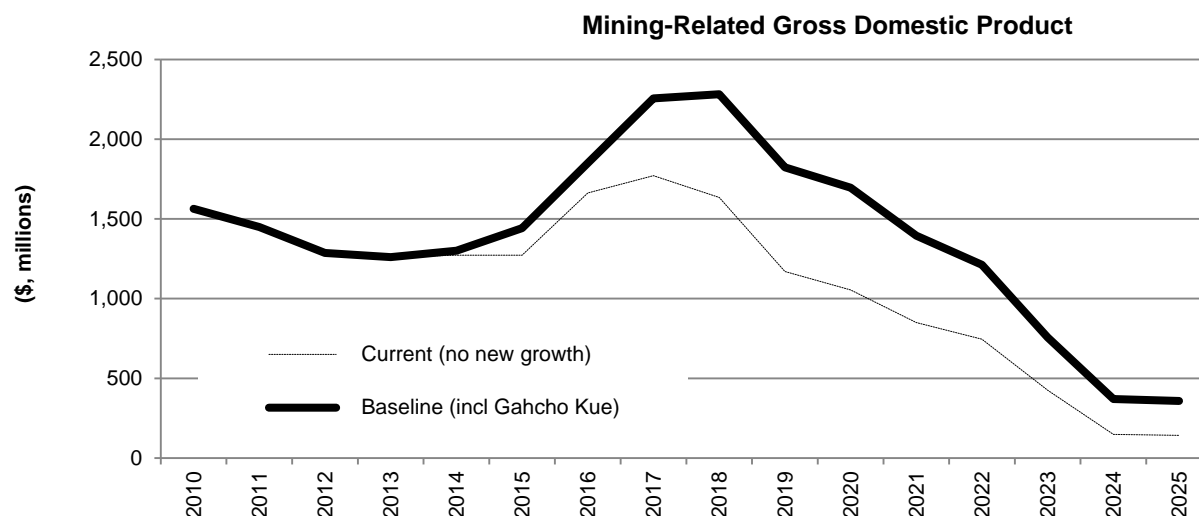
A8.3.1 Gross Domestic Product

The baseline scenario includes Ekati, Diavik, and Snap Lake diamond mine operating until their scheduled closures in 2020, 2023, and 2029 respectively and then adds the Gahcho Kué Project starting with initial construction in 2014.

Figure A-8.3-1 contains the model results for GDP, including all direct, indirect, and induced effects. Looking first at the Current Scenario that does not include the Gahcho Kué Mine, the existing diamond mines' contribution to GDP will remain relatively constant through 2015. Starting in 2016, development of Lynx and Pigeon and production from Misery at the Ekati Mine and the construction of A21 at the Diavik Mine will give a boost to GDP. Beyond 2018, the effects of a slowdown in production at the Ekati Mine will overshadow the new production coming from A21 and continued activity at the Snap Lake Mine. By 2020, under the Current (no new growth) Scenario, mining's contribution to GDP will decline until 2024 when the only remaining activity will come from the Snap Lake Mine and the the reclamation of the Diavik Mine.

Adding the Gahcho Kué Project to the Current Scenario establishes the Baseline Scenario. When the Gahcho Kué Project is developed, its construction will coincide with the increased activity at the Ekati and Diavik Mines, causing mining-related GDP to rise close to its all-time high. This project would also offset the initial decline at the Ekati Mine. The Gahcho Kué Project is currently proposed as an 11-year mine, so it would be closed by 2027.

Figure A-8.3-1 Baseline Gross Domestic Product Effect from NWT Diamond Mining, 2010 to 2025



\$ = dollars.

A8.3.2 Labour Income

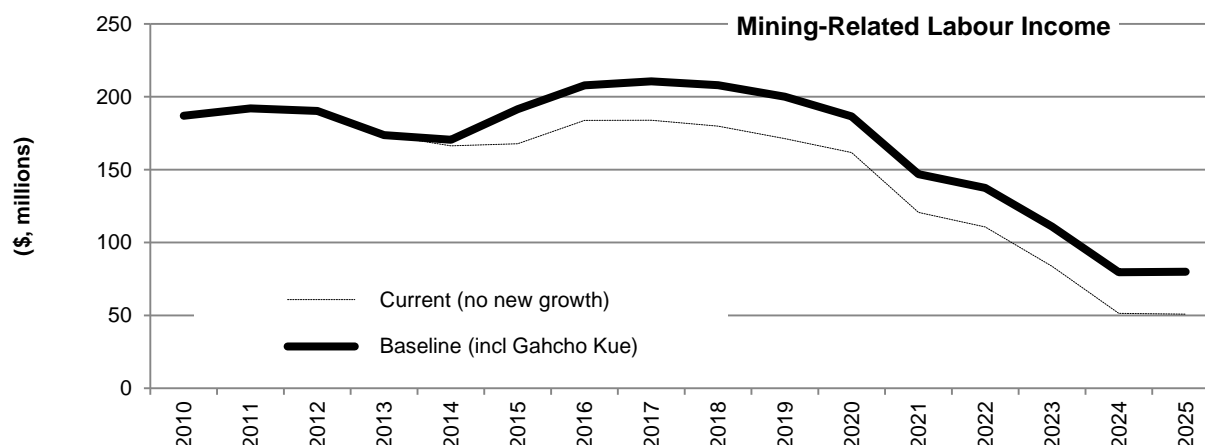
Labour Income is a component within GDP, alongside capital consumption allowance, indirect taxes on production, and other operating surplus. Therefore, it should follow a path similar to that of GDP.

Figure A-8.3-2 contains the labour income results from the baseline economic scenario with and without Gahcho Kué. This includes the direct, indirect, and induced income.

Labour income will grow as a result of the added labour requirements to build A21 at the Diavik Mine and to develop new pits at the Ekati Mine. However, the majority of temporary construction jobs will be filled by non-resident labour. The result is a relatively stable labour income in the NWT through to 2020. Beyond 2020,, the territory should expect a decline in mining jobs and consequently, a drop in labour income. These job losses will initially come from the closure of the Ekati Mine and then the closure of the Diavik Mine three years later. The one-year decline in labour income from 2020 to 2021 is estimated at \$43 million.

Adding Gahcho Kué will add between \$20 million to \$30 million in labour income to the NWT economy, raising the overall labour income from mining above current levels. This higher income would remain over the entire life of the mine, which is scheduled to continue operating for 11 years.

Figure A-8.3-2 Baseline Labour Income Effect from NWT Diamond Mining, 2010 to 2025



A8.3.3 Employment

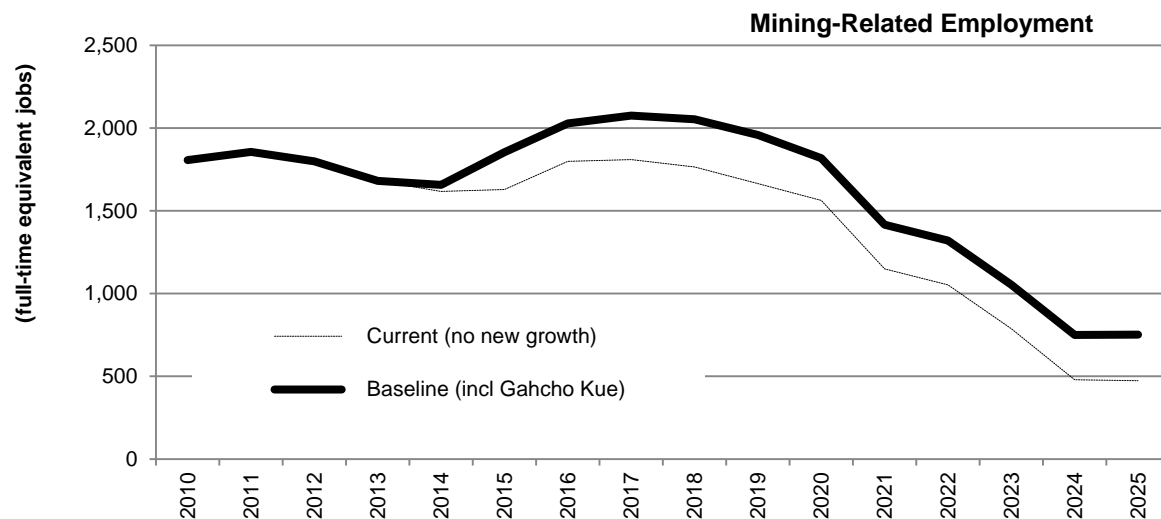
According to the socio-economic reports produced by the three operating diamond mines, employment in full-time equivalent (FTE) terms in 2012 equalled 3,466. Of that total, 1,551 were residents of the NWT. Figure A-8.3-3 contains the total employment effect from the territory's mining industry, including all direct, indirect, and induced employment. The total mining-related employment in 2013 was 1,681. .

The Current Scenario includes the development work at Ekati Mine, including the construction work associated with the Lynx and Pigeon deposits, and the construction and operation activities associated with A21 at the Diavik Mine. The added development work will have a limited effect on NWT employment however. Historical evidence shows resident participation for new mine construction tends to be higher than ongoing development work. The result is that these construction jobs at the Ekati and Diavik Mines do not create a lot of employment for NWT residents. At the same time, production at these new pits will mean more work for NWT residents; enough to bring the total direct, indirect, and induced employment to 1,800 in 2017.

Employment will decline beyond 2020 due to the closure at the Ekati Mine. The weakened demand will continue after 2023 when the Diavik Mine closes.

The addition of the Gahcho Kué Project will have a positive and immediate effect on the NWT labour market. That project's construction and first year of operations coincides with development projects at the Ekati and Diavik Mines that will cause mine-related employment to near previous highs seen between 2005 and 2008. The project is small in comparison to the Ekati and Diavik mines though, with direct operational employment averaging 365 over the life of the project. Once the Ekati and Diavik mines start shedding jobs, the presence of the Gahcho Kué Project will help but not fully compensate for those losses.

Figure A-8.3-3 Baseline Employment Effect from NWT Mining, 2010 to 2025



A8.3.4 Labour Force Activity

The economic analysis contained in this report is concerned with changes in the mining sector only. Therefore, all other sectors within the economy are held constant relative to the size of the economy and adjust only if a change in the mining sector causes it to do so. This approach isolates the effects of the project being studied. And, because of the stability in territory's population, it is reasonable to assume any existing equilibrium within other components of the economy will be maintained.

For the baseline economic projections, this means that the major changes in labour force activity, including the number of people in the labour force, the number people employed, the number of people unemployed, and the employment, unemployment, and participation rates, are related to the direct, indirect, and induced effects of the mining sector. The underlying labour market is allowed to make minor adjustments as the economy expands or contracts.

However, there are some constraints imposed through the model on these relationships in order to maintain reasonable and prudent results. The most important is the ceiling and floor (that is, the maximum and minimum) placed exogenously on the participation rate. The model does not allow the participation rates to exceed 80% or drop below 66% – which are the historical bounds. In the absence of these restrictions, the model results can spiral out of control as the participation rate rises or falls further and further causing the labour force to grow or shrink well beyond historical highs or lows, which then causes the unemployment rate to become unreasonably low or high. If allowed, such changes would cause exaggerated movements within the population – where the model allows migration to occur as a result of changes in the economy and the labour market—that would feed back into the model further distorting the results.

In the Current Scenario, the number of people employed in the economy would rise in 2016 and again in 2017 and then stabilizing for an additional two years, with the employment rate remaining close to 70%.

After that point, employment numbers will begin to fall. Initially, this is the result of the closure at the Ekati Mine followed by the closure of the Diavik Mine. Recall that in this scenario, this would leave Snap Lake as the only operating mine in the Northwest Territories.

It is difficult to predict the labour market's response precisely. But the response would certainly include a decline in the participation rate and the out-migration of residents. These two changes would effectively lower the number of residents in the labour force, which would reduce the rate of decline in the unemployment rate (Table A-8.3-1).

Adding the Gahcho Kué Project to establish the Baseline Scenario has a positive effect on the labour market, though not enough to bring employment numbers back to the 2011 level. The overall employment numbers in the NWT would approach 23,000 by 2017 in this scenario. However, the Gahcho Kué Project is not equal in size to either the Ekati or Diavik mines, so once those two mines close, the direction and rate of change in the NWT's labour market would be similar to that of the no growth scenario, albeit with a higher number of people employed.

Table A-8.3-1 Baseline Labour Market, 2010 to 2025

	Pop15+		Labour Force		Employed		Unemployed		Employment Rate		Unemployment Rate		Participation Rate	
	Current (No New Mines)	Baseline (+Gahcho Kue)	Current (No New Mines)	Baseline (+Gahcho Kue)	Current (No New Mines)	Baseline (+Gahcho Kue)	Current (No New Mines)	Baseline (+Gahcho Kue)	Current (No New Mines)	Baseline (+Gahcho Kue)	Current (No New Mines)	Baseline (+Gahcho Kue)	Current (No New Mines)	Baseline (+Gahcho Kue)
2010	32,000	32,000	23,200	23,200	21,500	21,500	1,700	1,700	67.2%	67.2%	7.3%	7.3%	72.5%	72.5%
2011	32,300	32,300	24,800	24,800	23,000	23,000	1,800	1,800	71.2%	71.2%	7.3%	7.3%	76.8%	76.8%
2012	32,400	32,400	25,100	25,100	23,100	23,100	2,000	2,000	71.3%	71.3%	8.0%	8.0%	77.5%	77.5%
2013	32,600	32,600	25,100	25,100	23,200	23,200	1,900	1,900	71.2%	71.2%	7.6%	7.6%	77.0%	77.0%
2014	32,300	32,300	24,000	24,000	22,100	22,100	1,900	1,900	68.4%	68.4%	7.9%	7.9%	74.3%	74.3%
2015	32,300	32,300	24,000	24,000	22,000	22,100	2,100	1,900	68.0%	68.6%	8.7%	7.9%	74.5%	74.5%
2016	32,300	32,300	24,400	24,400	22,400	22,600	2,000	1,800	69.5%	70.0%	8.0%	7.2%	75.5%	75.5%
2017	32,300	32,400	24,600	24,600	22,600	22,900	2,000	1,700	70.0%	70.6%	8.0%	7.0%	76.0%	76.0%
2018	32,300	32,400	24,600	24,600	22,600	22,900	2,000	1,800	69.8%	70.6%	8.1%	7.1%	76.0%	76.0%
2019	32,400	32,400	24,600	24,700	22,500	22,800	2,100	1,900	69.6%	70.4%	8.5%	7.5%	76.1%	76.1%
2020	32,400	32,500	24,700	24,800	22,500	22,800	2,200	2,000	69.4%	70.1%	9.0%	8.1%	76.2%	76.2%
2021	32,400	32,400	24,700	24,700	22,100	22,300	2,600	2,400	68.1%	68.8%	10.5%	9.6%	76.1%	76.1%
2022	32,300	32,400	24,500	24,600	21,900	22,200	2,600	2,400	67.8%	68.5%	10.7%	9.9%	76.0%	76.0%
2023	32,300	32,400	24,500	24,700	21,600	22,000	2,900	2,700	67.0%	67.8%	11.7%	10.9%	75.9%	76.1%
2024	31,800	32,200	23,800	24,300	21,000	21,500	2,800	2,800	66.0%	66.8%	11.8%	11.5%	74.8%	75.5%
2025	31,500	31,900	23,300	23,800	20,700	21,300	2,500	2,600	65.9%	66.8%	10.8%	10.7%	73.9%	74.8%

Note: numbers rounded to the nearest hundred.

A8.3.5 Population

The population model within the NWTEIM projects forward the territory's population by single age cohort and by gender using historic and trending fertility and mortality rates and migration patterns. The economic events related to the mining sector also influence migration.

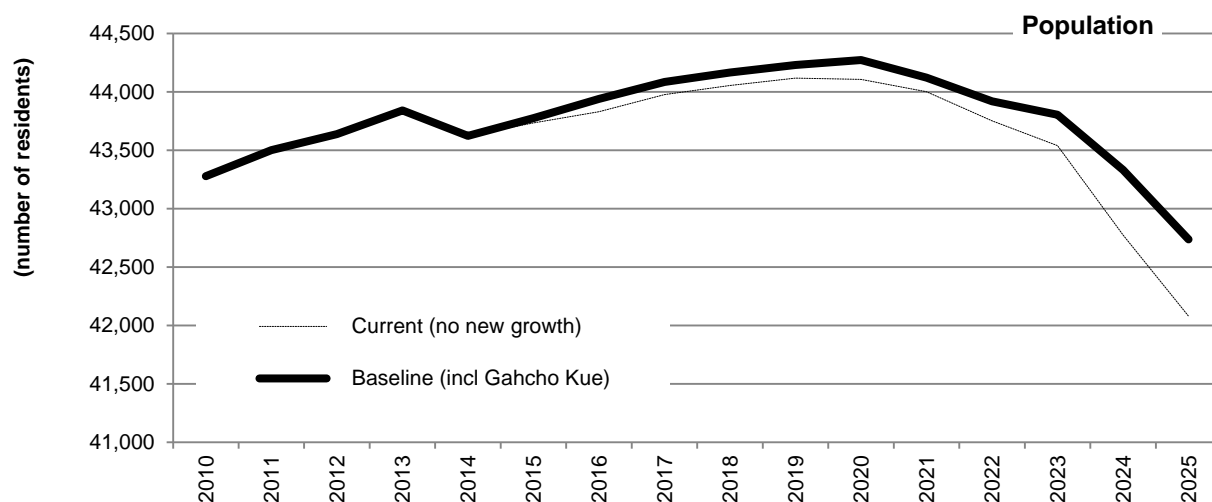
The current economic scenario is one where the two largest private-sector employers in the territory will have exited the economy by the end of 2023, without any new economic activities elsewhere. Because this is an extreme scenario, it is difficult to predict exactly how people would react in this situation, in particular, the choices regarding residency.

In reality, one might expect government to intervene at some point in a situation where the economy collapses as it does in this scenario. For the purpose of this economic impact report, there have been no attempts to predict what this reaction would be and how it would influence the resident population.

Figure A-8.3-4 contains the population projections based on this Current (no new growth) Scenario. It shows that population will slowly edge upwards over the next five years. The multiple developments at Ekati and Diavik Mines contribute to some of this growth, though the majority of the increase is a function of an assumption that the underlying net migration is between -250 and -300. This level is in line with what the territory was experiencing between 2010 and 2012. More recently, in 2013, net interprovincial migration has been lower, close to -500, but has been somewhat offset by international immigration that, in some years, exceeds 150 people. The territory's population projection is very sensitive to the net migration number.

Beyond 2019, the reduced activity and pending closures will bring about increased out migration that will stabilize briefly before descending further. This migration will continue until a new equilibrium in the labour market is established – a level likely to be below 43,000.

Figure A-8.3-4 Baseline Population, 2010 to 2025



The Baseline Scenario adds the Gahcho Kué Project, which introduces two effects to the Current Scenario. First, the start of the project should have a small effect on migration during the construction phase and early in its operations phase. The second effect occurs after 2021 where the presence of the mine will stabilize the population at a level above 43,500 for a few years until the Diavik Mine closes. .

A8.3.6 Inflation

The evidence presented in Section A7.8 on the effects of diamond mining on inflation was inconclusive. However, the concern related to prices in the Current and Baseline scenarios is not one of inflation, but rather the possibility of deflation and/or a decline in standard of living as total personal incomes fall relative to steady or slightly inflationary prices.

Most of the price effects experienced in the NWT are imported. That is to say, any increase in the price of goods and services that are imported into the territory will be passed onto consumers in the territory. In economic terms, the NWT is a price taker in this regard. The concern is that this imported price inflation will have a greater effect on the standard of living of residents in a scenario where labour income falls. In the Baseline Scenario that includes the addition of the Gahcho Kué Project to the economy, the territory will still lose more than 1,300 jobs from 2018 to 2025.

Deflation could occur in markets where NWT residents have some control over pricing. One such example is housing. In a scenario where the Ekati and Diavik mines close and there are no other job options available, the expectation is that a portion of the effected workers and their families will leave the territory. This will increase the supply of homes for sale that will put downward pressure on prices. The extent of this downward price movement under the baseline scenario has not been estimated.

A8.3.7 Summary of Baseline Scenario Results

The results from the Current and Baseline simulations provide insight into the economic future of the NWT if the Ekati, Diavik, and Snap Lake mines were to operate according to their current schedule and close in 2020, 2023, and 2029 respectively. The Gahcho Kué Project was added to create the Baseline Scenario because this project is nearing its potential start date, and initial construction has begun.

The results show that the NWT can sustain its current population and labour force needs with the existing diamond mines for another four to five years. In that time, development projects at Ekati, including the extension of Misery and the development of the Lynx and Pigeon deposits, and the development of A21 at the Diavik Mine, will be enough to preserve existing jobs and even create a few new ones. However, beyond 2019, the absence of the Jay Project or any other major economic development in the territory will mean the economy will shrink. Keeping in mind that the Ekati and Diavik mines collectively employ approximately 2,500 people, their closures within a three-year time period will have a measureable impact on the territory's economy, job market, and population.

Should the Gahcho Kué Project proceed as it is currently planned, it will expand GDP and create new jobs. Mine-related employment will peak in the territory in 2017 with more than 2,000 FTE jobs. But, the Gahcho Kué Project is small relative to the Ekati and Diavik mines, and while it will preserve some jobs in the mining industry after the Ekati and Diavik Mines close, it will not stem the negative effects on the territory's labour market and population.

A9 ECONOMIC EFFECTS OF THE JAY PROJECT

A9.1 Project Description

The Jay Project consists of three phases, construction, operations, and reclamation. The proposed schedule includes construction that will span five years, with a projected completion date in mid-2020. . The total cost of that construction is estimated at US\$607 million. This includes US\$97 million of equipment that will be imported into the territory. Dominion Diamond has assumed an average dollar conversion rate of US\$0.91 to CDN\$1.00. The direct labour requirement for this construction phase is estimated to equal 434 FTE jobs.

Operations will commence in the latter half of 2020 with the first full year being 2021. At this point in time, the mine is being developed as an open pit operation with production spanning 11 years until 2030-31. Dominion Diamond is considering the possibility of following the open pit with underground operations that would add as much as 10 more years to the mine's life, however, there is not enough information available at this time to determine the feasibility of that option. Typical employment numbers during the 11 years of operations is estimated to range between 1,100 and 1,200 annually. Once into full production, average operating costs is estimated at US\$326 million.

A reclamation phase will follow the mine's operations. This phase will include the reclamation of the entire site including the Jay open pit, camp, and processing facility. Reclamation of the original mine operations that are not needed for the Jay Project operations will take place throughout the operational life of the Jay Project.

A9.2 Economic Effects of Project Construction

The Jay Project is an extension of the existing Ekati Diamond Mine. Therefore, most of the construction-related activities are associated with accessing the new deposit, which will require the construction of a dike on Lac du Sauvage and an access road. Other elements of a mine site, such as a processing plant, airstrip, power plant, and accommodations, are already in place. The only other new infrastructure needed is a truck shop.

A9.2.1 Cost

The estimated cost of this project is US\$607 million that includes US\$97 million in new equipment (this figure excludes a contingency of US\$82 million). This is equal to CDN\$566 million after subtracting imports, accounting for transportation costs, and converting to Canadian dollars.

A9.2.2 Gross Domestic Product

The portion of spending that is value added (that is, the portion of gross output that will add to the territory's GDP) is estimated at \$163 million. The majority of that contribution will be made between 2017 and 2019 when the dyke is being built. The indirect effect on GDP from the spending is estimated to equal \$39 million. The induced effect on GDP from the spending of wages and salaries is estimated to equal \$6 million.

A9.2.3 Job Creation

The construction will start in 2015-16 with the majority of work starting in 2017. For this construction phase, 434 direct jobs will be created, the business demand will create 154 indirect jobs, while the spending of the direct and indirect wages and salaries will result in a further 33 induced jobs.

The NWTEIM estimates the participation of NWT residents based on the labour market at that time and the historical record of employment for construction and development work in the NWT mining sector. In estimating this participation rate, the model does not attempt to anticipate externalities. That means, for example, the results are not adjusted based on commitments made by the proponent that are not made public or by speculation of changes in the labour market as a result of new education or training programs. With specific knowledge of these or any other efforts that would affect the workforce, new estimates can be calculated with the information included. Induced jobs are calculated assuming that the NWT-based labour spends their earned wages and salaries in the territory.

There are a number of key features to NWT mining sector that will influence the labour market over the next five years, from 2016 through to 2020. The first three years of this period will see the Ekati Mine providing work for approximately 1,500 people (direct and indirect FTE employment) as a result of its ongoing operations and the development work at the Lynx and Pigeon deposits. During that same period, the A21 deposit at the Diavik Mine will be in development, creating additional jobs there. Direct and indirect diamond mining-related employment will peak in 2016 at 4,261, just over the all-time high achieved in 2007 when 4,193 direct and indirect jobs were associated with the diamond mines.

The increased demand for labour elsewhere in the NWT mining sector is a factor in the model's calculation of NWT resident labour participation in the direct and indirect jobs associated with the Jay Project construction. The modeling results show the participation will equal 150 FTE jobs, equal to 25% of the overall workforce. A total of 183 jobs will be created when combining all direct, indirect, and induced effects of the construction project.

A9.2.4 Labour income

In line with the labour demand estimates, labour income in the NWT will grow as a result of the Jay Project construction. Over the life of the construction project total labour income in the NWT will grow by \$19.2 million, with the peak coming in 2018 when labour income will rise \$6.0 million over the baseline scenario.

A9.2.5 Population

The construction phase of the Jay Project is not, by itself, expected to have a noticeable impact on interprovincial migration and will not cause a change in the baseline population projection.

A9.2.6 Inflation

The construction phase of the Jay Project will not, by itself, have an effect on inflation.

A9.3 Economic Effects of Project Operations

The Jay Project is an extension of operations at the Ekati Diamond Mine. As such, the Project's effects on the NWT economy are more closely associated with a continuation of status quo than they are the creation of new effects. However, because the effects are being compared to a baseline scenario that does not include this production, the results are presented as an addition to that baseline.

A9.3.1 Cost

Dominion Diamond has estimated that the Jay Project's operational costs will average \$326 million. This expenditure will pay for all goods and services needed to operate the mine including the cost of labour. Another \$20 million, on average, will be needed annually to cover the cost of sustaining capital.

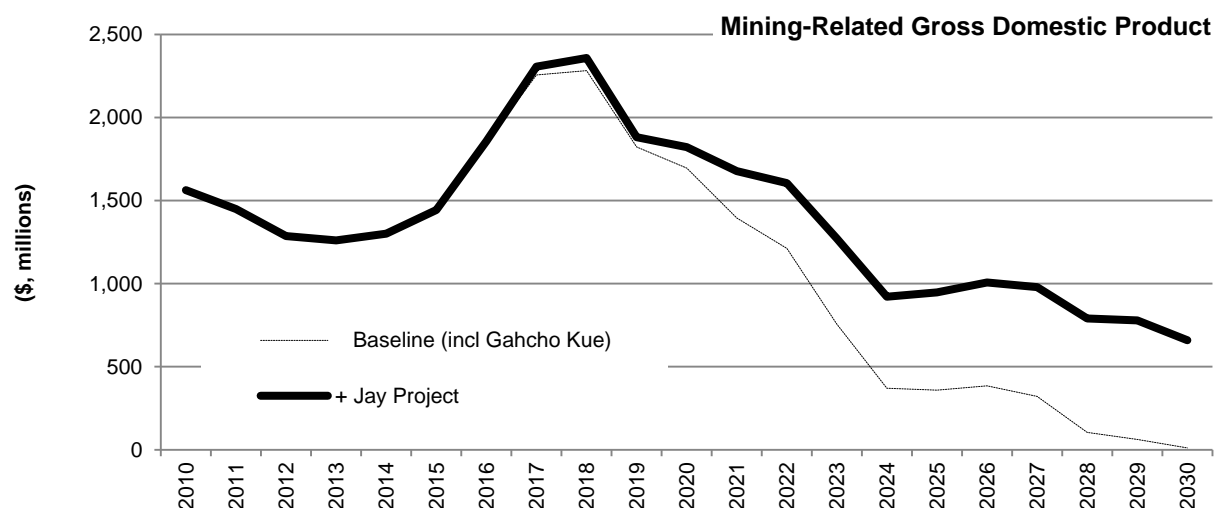
A9.3.2 Gross Domestic Product

The current mine plan shows an average rate of production equal to 4.3 million tonnes of diamond-bearing kimberlite annually once into full production. The grade will vary from 1.2 to 2.3 carats per tonne, with a value that will fall between US\$75 and US\$100. This results in an estimate for the mine's Gross Output equal to CDN\$698 million annually, though there will be variation between years.

Using the mine data supplied by Dominion Diamond and Statistics Canada's *Interprovincial Input-Output Model*, it is estimated that the Ekati Mine will add \$5.3 billion to the NWT's Gross Domestic Product over the lifetime of the Jay Project. Combining the indirect and induced GDP effects, this number climbs to \$6 billion (Figure A-9.3-1).

In terms of annual averages and once into full production, GDP will grow by \$574 million, with the majority of that – \$507 million – coming from the direct contribution of diamond production to the territory's total output. The indirect GDP effect is estimated to equal \$46 annually (average). The induced effect will raise GDP by a further \$19.9 million, annually.

Figure A-9.3-1 Estimated GDP Effect from NWT Diamond Mining, 2010 to 2030



A9.3.3 Employment

Dominion Diamond expects the Jay Project will require approximately 1,150 full-time workers to operate the mine once into full production. This number includes many of the jobs that already exist at the mine site, such as those jobs associated with the processing plant, while other jobs will transition from an existing pit operation into the Jay pit operation. In that sense, the Jay Project is not creating new jobs, but rather is preserving existing jobs. Note however that during the transition period, from when the original mine plan ends and the new Jay Project begins, a small number of jobs at the mine site remain associated with the original Ekati mine operations, including some reclamation activities and final production activities.

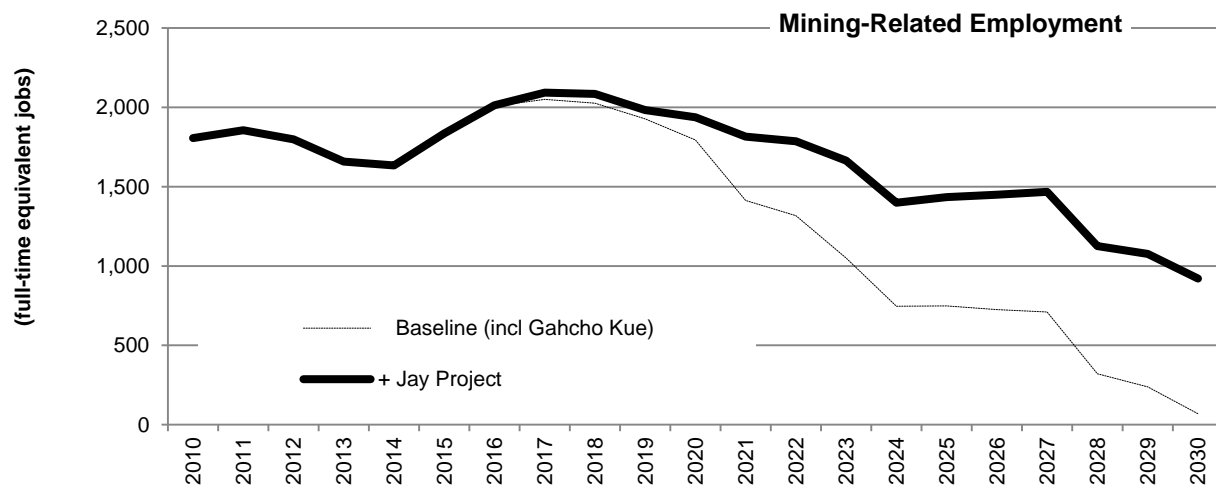
In 2013, Ekati's workforce (including contractors) totalled 1,485 person years that included 1,336 FTE jobs in production and 149 FTE jobs in development (Dominion Diamonds. 2014). NWT resident contribution to this workforce was (48%), with 671 working in production and 35 working in development – 50% and 21% of their respective totals.

Projections made for the Baseline Scenario demonstrated how the labour market will change between now and the first full year of production scheduled for 2021. By that time the territory's unemployment rate will be 9.5% with approximately 2,400 residents unemployed in a scenario that excludes the Jay Project.

Continued operations at the Ekati Diamond Mine as a result of the Jay Project will result in a much-improved labour market over the Baseline Scenario. Over the 11 years of production from the Jay deposit, it is estimated that the average employment, including all direct and indirect jobs created through the operations at Ekati is equal 1,141 (Figure A-9.3-2). The contribution of NWT residents to that direct and indirect workforce is estimated to average 637, growing from 50% of the workforce in 2021 to 63% by 2030. The growing participation is based on calculations made in the NWTEIM where a rise in the number of available workers coupled with a decline in the available mining-related jobs puts upward pressure on NWT resident employment rate in the mining sector.

Average induced employment during the 11-year time period is estimated to equal 110. The model estimates induced employment for the NWT economy only, and assumes that NWT residents fill all of these jobs.

Figure A-9.3-2 Estimated Employment Effect from NWT Diamond Mining, 2010 to 2030



The result is a labour market during the 2020s quite different than the one shown in the Baseline Scenario. The unemployment rate is estimated to equal 8.0% in 2021 rather than 9.5%, and will remain below 10% until 2028 – the year when, according to the Baseline Scenario, the Gahcho Kué Project is scheduled to close and when operations at Snap Lake will begin to slow down (Table A-9.3-1).

Table A-9.3-1 Estimate NWT Labour Market, 2010 to 2030

	Pop15+		Labour Force		Employed		Unemployed		Employment Rate		Unemployment Rate		Participation Rate	
	Baseline (+Gahcho Kue)	+Jay Project	Baseline (+Gahcho Kue)	+Jay Project	Baseline (+Gahcho Kue)	+Jay Project	Baseline (+Gahcho Kue)	+Jay Project	Baseline (+Gahcho Kue)	+Jay Project	Baseline (+Gahcho Kue)	+Jay Project	Baseline (+Gahcho Kue)	+Jay Project
2010	32,000	32,000	23,200	23,200	21,500	21,500	1,700	1,700	67.2%	67.2%	7.3%	7.3%	72.5%	72.5%
2011	32,300	32,300	24,800	24,800	23,000	23,000	1,800	1,800	71.2%	71.2%	7.3%	7.3%	76.8%	76.8%
2012	32,400	32,400	25,100	25,100	23,100	23,100	2,000	2,000	71.3%	71.3%	8.0%	8.0%	77.5%	77.5%
2013	32,600	32,600	25,100	25,100	23,200	23,200	1,900	1,900	71.2%	71.2%	7.6%	7.6%	77.0%	77.0%
2014	32,300	32,300	24,000	24,000	22,100	22,100	1,900	1,900	68.4%	68.4%	7.9%	7.9%	74.3%	74.3%
2015	32,300	32,300	24,100	24,100	22,200	22,200	1,900	1,900	68.6%	68.6%	7.9%	7.9%	74.5%	74.5%
2016	32,400	32,400	24,400	24,400	22,700	22,700	1,800	1,800	70.1%	70.1%	7.2%	7.2%	75.5%	75.5%
2017	32,400	32,400	24,600	24,600	22,900	22,900	1,700	1,700	70.6%	70.8%	7.1%	6.9%	76.0%	76.0%
2018	32,400	32,400	24,700	24,700	22,900	23,000	1,800	1,700	70.6%	70.8%	7.2%	6.9%	76.0%	76.0%
2019	32,500	32,500	24,700	24,700	22,800	22,900	1,900	1,800	70.4%	70.5%	7.6%	7.3%	76.1%	76.1%
2020	32,500	32,500	24,800	24,700	22,800	22,900	2,000	1,900	70.1%	70.4%	8.1%	7.5%	76.2%	76.2%
2021	32,500	32,600	24,700	24,900	22,400	22,900	2,400	2,000	68.9%	70.2%	9.5%	8.0%	76.2%	76.4%
2022	32,400	32,600	24,700	25,000	22,300	23,000	2,400	2,000	68.6%	70.3%	9.8%	8.1%	76.1%	76.5%
2023	32,500	32,700	24,700	25,100	22,000	23,000	2,700	2,200	67.8%	70.1%	10.9%	8.6%	76.1%	76.8%
2024	32,200	32,700	24,400	25,100	21,600	22,700	2,800	2,400	66.9%	69.3%	11.5%	9.6%	75.6%	76.7%
2025	31,900	32,700	23,900	25,100	21,300	22,700	2,600	2,400	66.9%	69.4%	10.7%	9.4%	74.9%	76.7%
2026	31,900	32,700	23,800	25,100	21,300	22,700	2,500	2,400	66.8%	69.5%	10.7%	9.4%	74.8%	76.7%
2027	31,800	32,700	23,700	25,100	21,200	22,700	2,500	2,300	66.7%	69.6%	10.5%	9.2%	74.6%	76.6%
2028	31,600	32,600	23,500	24,900	20,700	22,300	2,800	2,600	65.5%	68.5%	11.7%	10.3%	74.2%	76.4%
2029	31,100	32,400	22,700	24,600	20,300	22,200	2,400	2,500	65.2%	68.4%	10.8%	10.1%	73.0%	76.0%
2030	31,000	32,400	22,600	24,600	20,100	22,000	2,500	2,600	64.6%	67.9%	11.3%	10.7%	72.8%	76.0%

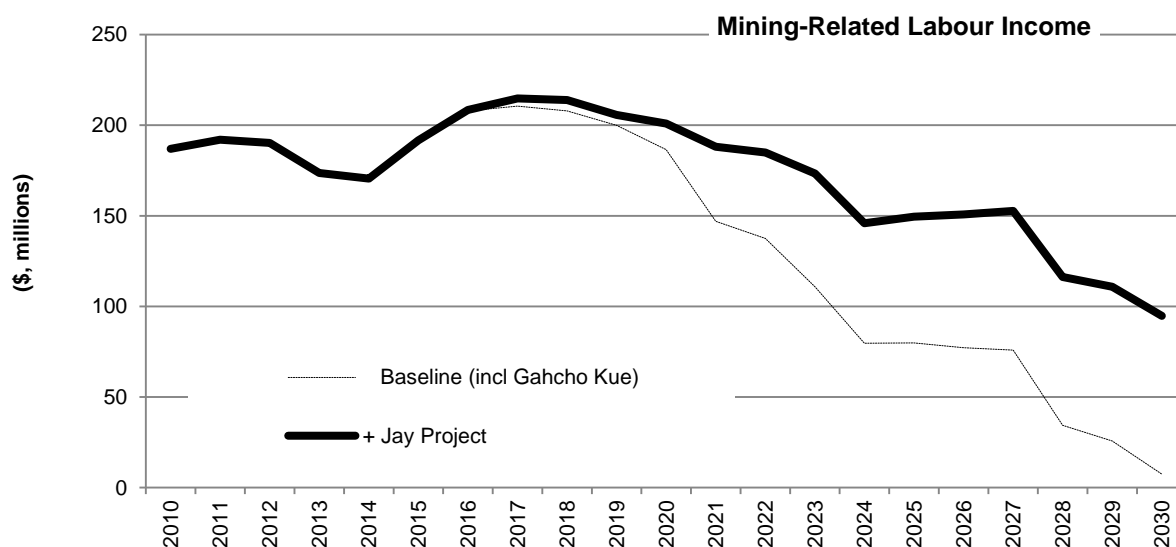
Figures rounded to the nearest hundred.

A9.3.4 Labour Income

The direct and indirect labour income generated by the Jay Project at the Ekati Mine will total \$1.49 billion. When in full production, a typical year will see the Project generate \$143.6 million in direct and indirect labour income. Induced labour income during the 11-year time period will equal \$77.3 million, or \$7 million annually (Figure A-9.3-3).

NWT resident's share of the total labour income generated by this project, including all direct, indirect, and induced labour income, is estimated to equal \$729 million. Their annual share will grow alongside their increased employment at the Ekati Mine, rising to \$87 million by 2030.

Figure A-9.3-3 Estimated Labour Income Effect from NWT Diamond Mining, 2010 to 2030



A9.3.5 Tax Revenues

The Jay Project will generate revenues through several forms of taxation. These include direct personal and corporate tax, resource royalties (or mining tax), and taxes on products and on production. A summary of the estimated taxation revenues generated by this project is provided in Table A-9.3-2.

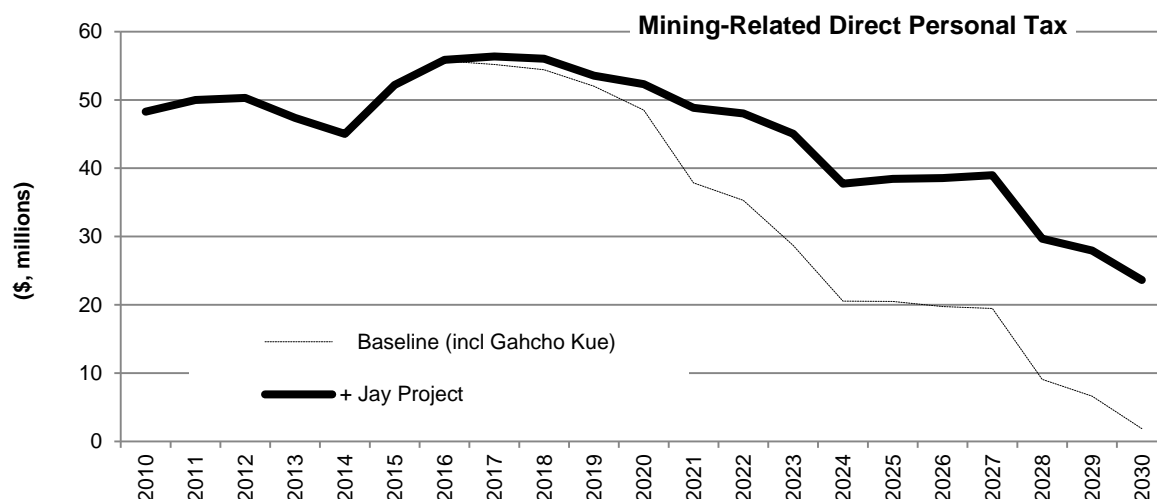
Table A-9.3-2 Estimated Tax Revenues from the Jay Project Operations

	(millions)
Direct Personal Tax	
Territorial Income Tax	\$40
Federal Income Tax	\$74
Other Payroll Taxes	\$92
Direct Corporate Tax	
Territorial	\$273
Federal	\$356
Indirect Tax	
Resource Royalties	\$347
Tax on Products	\$48

Direct Personal Taxes

The NWTEIM includes a satellite model that estimates direct personal taxes paid by NWT residents affected by the mining sector. The model separates income earners into job classifications including management, professional, skilled, unskilled, and general labour. Average earnings for each category are applied. Direct personal taxes, including Canadian and territorial income tax, payroll tax, employment insurance, Canada pension plan, and Workers Safety are calculated based on average tax rates applied at the different average income levels. These calculations show that Ekati Mine's extended mine life will generate \$19 million in direct personal taxes, on average, over the 11-year operating extension (Figure A-9.3-4).

Figure A-9.3-4 Estimated Direct Personal Tax Revenues from NWT Diamond Mining, 2010 to 2030



Direct Corporate Taxes

Dominion Diamond estimated that the Jay Project will generate \$629 million in corporate taxes. The portion payable to the Government of the Northwest Territories is estimated to equal \$273 million.

Resource Royalties

Dominion Diamond estimated that the Jay Project will generate \$347 million in resource royalties.

Indirect Taxes on Products and on Production

Indirect taxes are paid at two stages within the production process, defined as taxes on production, which are a part of GDP at Basic Prices, and taxes on products, which are added to generate an estimate of GDP at Market Prices. The System of National Accounts lists the common areas of taxation within the two indirect tax forms as follows:

- Taxes on products, on goods and services themselves, include the Goods and Services Tax, provincial sales taxes, federal and provincial taxes on sales volumes of gasoline and other motive fuel taxes, tobacco and alcohol. These taxes only arise as a result of the actual production or sale of goods and services (Statistics Canada 2008).
- Taxes on production include property taxes, and the costs of business licences, permits and fees. These taxes are levied regardless of the current level of production of goods and services.

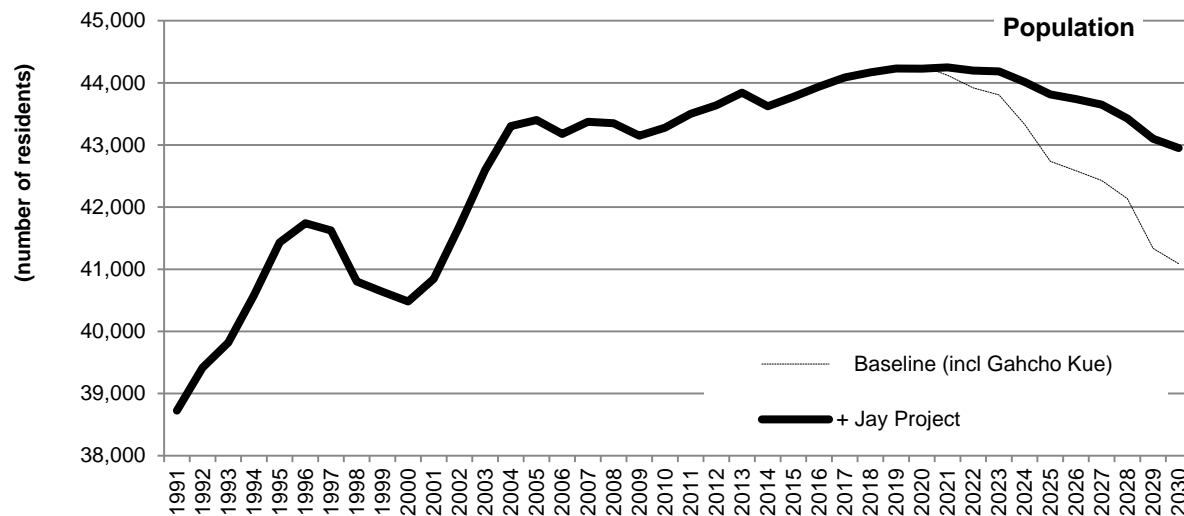
The estimated tax on products is calculated by the NWTEIM using information from Statistics Canada's *Interprovincial Input-Output Model*. It is estimated that the Jay Project will generate \$48.2 million in taxes on products, equal to an average of \$4.4 million annually.

A9.3.6 Population

The baseline scenario results demonstrated that the NWT will see a dramatic increase in out migration from 2020 to 2025 as a result of the closures at the Ekati and Diavik mines. With the extension of operations at the Ekati Mine, the exodus during that time period will be avoided. Instead of losing 1,500 residents during this 5-year time period, the territorial population is expected to remain steady close to 44,000 (Figure A-9.3-5).

The NWT's population will drop below 44,000 in 2025 in the Jay Project Scenario, with the decline attributed to the remaining effects from the Diavik Mine closure, and then the effects of closures at the Gahcho Kué and Snap Lake Mines.

Figure A-9.3-5 NWT Population Estimates, 2010 to 2030



A9.3.7 Inflation

In the description of the Baseline Scenario results, concern was raised not for inflation but for the possibility of deflation brought about by the out migration of residents and the lower disposable income across the territory. Extending the life of the Ekati Mine will not cause inflation since it is not expected to bring new people into the territory on net or create new jobs. As discussed, the Jay Project will serve to stabilize the population base of the territory by slowing the rate of out migration, while the jobs associated with the Jay Project are not new. As a result, in this scenario, the possibility of price deflation or the loss of standard of living is reduced.

A9.4 Economic Effects of Project Reclamation

A lot of the reclamation work associated with the Ekati Mine, including the Jay Project, will be carried out during the operations phase. This will limit the economic effect of the reclamation phase after operations have ended. The current plan has the majority of reclamation activities taking place in 2032 and 2033 at a cost of \$266 million. Lake back-flooding and monitoring will continue for several more years, however, the cost and labour associated with those activities is small and is not included in the economic effects calculations.

The reclamation activities will have a small but positive effect on GDP. Using Statistics Canada's *Interprovincial Input-Output Model* and the NWTEIM, it is estimated that GDP will rise by approximately \$100 million when including the direct, indirect, and induced effects over the two years of reclamation.

The reclamation phase will create 282 full-time equivalent jobs during the two-year period, and generate \$24 million in labour income. The NWTEIM is not used to determine the contribution of NWT residents to the reclamation workforce. Expectations are that NWT residents would qualify for and fill a majority of the jobs.

A9.5 Summary of Economic Effects

From the perspective of economic effects, the Jay Project's contribution to the NWT economy is one of preservation. This Project will serve to maintain the territory's population and therefore maintain its consumer base. Over the five year period beginning in 2016, the NWT economy will expand as a result of the construction and operations of the Gahcho Kué Mine, development work at the existing Ekati Mine, the development of A21 at the Diavik Mine, and the construction of the proposed Jay Project, should it be approved. These projects will raise labour demand close to historic highs.

The economic modeling presented in this report has demonstrated how GDP, employment, labour income, and population will be affected by these economic activities. A summary of the economic effects of the Jay Project is provided in Table A-9.5-1.

Table A-9.5-1 Summary of Economic Effects of the Jay Project on the NWT Economy

	Construction (Total)	Operations^(a) (Average Annual)	Reclamation^(b) (Total)
Time Period	2015 to 2020	2021 to 2030	2032 to 2033
(millions)			
Cost	\$566	\$326	\$266
GDP			
Direct	\$163	\$507	\$78
Total	\$208	\$574	\$100
Labour Income			
Direct	\$43	\$109	\$19
Total	\$53	\$150	\$24
(Person Years of Employment)			
Employment			
Direct	434	740	196
Total	622	1,251	282

a) Figures are shown representing the period 2021 to 2030 when the Jay Project is full operational for the entire year.

b) the reclamation data represents the first two full years of activities, when the majority of expenditures will be made.

Assessment of Effects

Table A-9.5-2 contains the final assessment of effects according to the effects assessment criteria described in Chapter 2. The Jay Project will have a positive, long-term, and moderate to high effect on the LSA within the NWT.

Table A-9.5-2 Assessment of Effects

	Direction	Range	Magnitude	Duration
effect on GDP, income, employment, and taxes	positive	LSA	moderate to high	long term

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