

# 5-year Offshore Moratorium Review Committee

Socioeconomic Impact Assessment  
[Final Report - Confidential]

May 13, 2021



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# 1. Executive Summary



# 1. Executive Summary

## Introduction

Ernst & Young LLP (“EY”) has been engaged by the Inuvialuit Regional Corporation (“IRC”) in connection with the Government of Canada funded initiative to perform an assessment of potential socioeconomic outcomes that may arise under different oil and gas activities scenarios in the Beaufort Region.

The EY report was commissioned to provide an overall socioeconomic assessment of the oil and gas development in the region to the members of the 5-year Offshore Moratorium Review Committee which includes the IRC, Government of Northwest Territories, Government of Yukon, and Government of Canada.

For the purposes of this analysis, the socioeconomic impacts of five distinct oil and gas development scenarios in the Inuvialuit Settlement Region (“ISR”) have been modelled. As advised in the Beaufort Regional Strategic Assessment (“BRSEA”), these include the status quo, three oil and gas development scenarios, and one large oil release event scenario. A summary of these scenarios is provided in **Table 1**.

## Summary of Findings

This report provides an assessment of the potential economic contributions and socioeconomic impacts of oil and gas development in the ISR by analysing the effects of various development projects in the region.

A list of socioeconomic categories and associated valued components (“VCs”) were developed for the analysis and were evaluated quantitatively and qualitatively using the following approaches:

**Table 1. Scenarios for Socioeconomic Impact Assessment**

Scenario	Description
<b>1: Status Quo</b>	Includes economic activity that is expected to continue in the absence of oil and gas development.
<b>2: Export of Natural Gas Condensates</b>	Includes the development of infrastructure and pipelines for onshore exploration and production of natural gas and condensate from existing land-based reserves, with a production capacity of 5 million tonnes of natural gas per annum.
<b>3: Large Scale Oil Development within Significant Discovery Licenses</b>	Includes the development and production of oil reserves located 80 km offshore within less than 40 metres of water. Total production capacity is expected to be more than 700 million barrels of oil.
<b>4: Large Scale Oil Development within Exploration Licenses</b>	Includes exploration and hydrocarbon development in deep water (100m to 1200m) 100 km northwest of Tuktoyaktuk, and a total production capacity of approximately 2 billion barrels of recoverable oil potential.
<b>5: Large Oil Release Event</b>	Models a large oil spill in the Beaufort Sea.

Sources: Beaufort Regional Strategic Environmental Assessment.

- ▶ **Economic Contribution Assessment**, through the use of inputs from Statistics Canada combined with EY’s proprietary economic models, which are founded on the principles of Input-Output models; and
- ▶ **Broader Socioeconomic Impacts Assessment**, through the collection and analysis of baseline data, review of benchmark studies, empirical evidence, and inference based on economic theory.

Refer to **Table 2** below for a summary of economic contributions for each of the five scenarios, which are also detailed further in **Section 4.1**. Refer to **Section 4.2** for an assessment of potential royalty

contributions under Scenarios 2, 3, and 4, and refer to **Section 4.3** for consideration of the broader socioeconomic impacts.

Note that estimated economic contributions are strictly limited to the scenarios; thus, they do not reflect impacts from external developments outside of the scenarios. Developments described in scenarios 2, 3, and

4 could lead to additional industry interest and investment, which could generate additional economic contributions. Furthermore, infrastructure investments, basin-opening developments and improvements in technology could drive down costs for future developments. Analysis of the additional impacts beyond the described scenarios is outside of the scope of this study.

**Table 2. Summary of Total Economic Contributions by Scenario**

	Total Economic Contributions from Capital Investment				Total Economic Contributions from Operations				Impacts from Oil Spill (Scenario 5)	
	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Total Impacts from Spending on Clean-up Activities	Annual Losses from Reduced Economic Activity
<b>ISR + Inuvik</b>										
<i>Spending (\$mn)</i>	630.2	2,343.0	3,440.3	5,339.9	196.3	97.8	146.8	167.2	940.6	(161.6)
<i>GDP (\$ mn)</i>	151.9	915.9	1,432.4	2,087.4	132.7	60.3	95.0	108.2	538.8	(92.6)
<i>Wages (\$ mn)</i>	90.9	512.8	834.2	1,168.7	76.7	29.9	50.3	57.3	227.1	(40.2)
<i>Employment (FTEs)</i>	1,049	5,300	8,803	12,080	989	287	502	572	1,234	(332)
<b>Northwest Territories</b>										
<i>Spending (\$mn)</i>	723.8	2,631.1	3,852.7	5,996.3	217.7	107.4	160.8	183.1	1,042.5	(178.5)
<i>GDP (\$ mn)</i>	192.2	1,054.3	1,639.4	2,402.7	147.1	66.2	104.2	118.7	596.3	(102.1)
<i>Wages (\$ mn)</i>	111.5	583.7	940.0	1,330.2	84.2	32.7	54.6	62.2	253.1	(44.6)
<i>Employment (FTEs)</i>	1,196	5,863	9,658	13,362	1,066	311	540	615	1,380	(366)
<b>Yukon</b>										
<i>Spending (\$mn)</i>	12.0	48.1	75.7	109.6	1.3	1.8	3.1	3.5	25.5	(3.9)
<i>GDP (\$ mn)</i>	9.1	40.3	65.2	91.9	1.1	1.6	2.8	3.2	22.3	(3.4)
<i>Wages (\$ mn)</i>	5.0	19.1	32.5	43.5	0.5	0.4	1.0	1.2	5.9	(0.9)
<i>Employment (FTEs)</i>	66	234	403	534	7	4	10	12	44	(7)
<b>Canada</b>										
<i>Spending (\$mn)</i>	1,123.0	3,956.7	5,772.8	9,017.4	301.4	153.3	228.7	260.5	1,527.1	(259.9)
<i>GDP (\$ mn)</i>	434.1	1,849.3	2,811.8	4,214.6	200.1	94.9	148.1	168.6	895.4	(152.1)
<i>Wages (\$ mn)</i>	268.1	1,090.1	1,687.4	2,484.3	114.8	48.7	79.4	90.5	415.9	(72.0)
<i>Employment (FTEs)</i>	3,609	13,562	21,041	30,909	1,533	536	894	1,018	3,042	(741)

Notes: Figures for wages, GDP and gross spending are in millions and 2019 CAD\$. Figures represent annual contributions for OPEX and cumulative contributions for the construction phases of each scenario for CAPEX. Impacts represent the sum of direct and indirect contributions. Figures for Scenarios 2,3,4, and 5 represent additional contributions beyond the economic impacts of Scenario 1. For details about the approach and assumptions across scenarios, please refer to **Appendices A.1** and **A.2**. The category *ISR + Inuvik* refers to economic impacts to the Census Division Region 1 in NWT.

Sources: Statistics Canada, Comparator Projects, and EY calculations.

**Limitations**

EY has relied upon the completeness, accuracy and fair presentation of all of the data and other information obtained for the purpose of developing the analyses set out herein. EY conclusions are conditional upon the completeness and accuracy of such information. Subject to the exercise of professional valuation judgement and except as expressly described herein, we have not attempted to verify the completeness, accuracy or fair presentation of any of the information relied upon in developing this report. EY accepts no responsibility for errors, omissions, losses or damages because of any persons or entity relying on this Report.

The report has been prepared solely for the specific purpose identified above and is not to be used in any other context without the express written consent of EY. This report is developed as of a specific date on the basis of identifiable information and EY has not undertaken to update it to any other date. EY reserves the right, but will be under no obligation to revise the analysis set out herein in the future should information relevant to the analysis become available to us subsequent to the time at which this analysis has been finalized.

This Report is not to be reproduced, referred to in any public manner, or otherwise distributed without our prior written consent. EY assumes no duty, obligation or responsibility whatsoever to any third parties that obtain access to this Report (i.e. parties other than those to whom this report is addressed). Our Report has not considered issues relevant to third parties. Any use a third party may choose to make of this report is entirely at its own risk.



## 2. Context



## 2. Context

Defined in the Inuvialuit Final Agreement (“IFA”), the ISR is situated in the northwestern part of NWT and Yukon.<sup>1</sup> The region spans 1,172,749 km<sup>2</sup> and consists of Inuvialuit Private lands, Crown lands, Commissioners lands and Territorial lands, including both land and water area. Subregions in the ISR include the Beaufort Sea, the Mackenzie Delta, the Yukon North Slope and the Western Canadian Arctic islands. The IFA identifies six Inuvialuit communities: Aklavik, Inuvik, Paulatuk, Sachs Harbour, Tuktoyaktuk, and Ulukhaktok.

Inuvik is the largest Inuvialuit Community and serves as the region’s administrative centre. Approximately 6,000 people resided in the six communities in 2018, with the majority of the population being Inuvialuit.<sup>2</sup>

After a decade of negotiations between Inuvialuit and the Government of Canada, the IFA was signed and subsequently given effect through the Western Arctic (Inuvialuit) Claims Settlement Act in 1984. The first comprehensive land claim agreement signed north of the 60th parallel, and only the second in Canada at that time, the IFA defines the Inuvialuit Settlement Region and sets out treaty rights of Inuvialuit within the meaning of section 35(3) of the *Constitution Act*, 1982, including those relating to land, resources, culture, governance, environment and the economy.

The Inuvialuit communities are home to a unique economic structure, including a mix of a modern wage economy as well as traditional economy inherent to the region. The top five industries in the Inuvialuit communities are construction, real estate and rental and leasing, transport and warehousing, health care and social assistance, and professional, scientific and technical services. Other key sectors include

fishing, hunting, and trapping (part of the traditional economy), as well as mining exploration, quarrying, and oil and gas extraction.<sup>3</sup> Traditional harvesting is an integral part of the lives of Inuvialuit as harvesting activities have been part of the Indigenous peoples’ way of life for millennia.

According to the National Energy Board, the NWT has large amounts of onshore and offshore recoverable oil and gas potential. As such, exploration work commitments amounting to \$1.9 billion were held through exploration licenses in the Beaufort Sea as of January 2018. Over time, advanced exploration techniques have improved exploration success rates and increased productivity and efficiency. These improvements have resulted in several environmental, financial, and social benefits. Despite the regional strengths in natural resources, the moratorium placed on oil and gas exploration in 2016, whereby the Canadian Arctic was declared “indefinitely off limits to new offshore oil and gas licensing,” to be reviewed every five years through a science-based review,<sup>4</sup> has stalled exploration activities.



### 3. Approach and Methodology



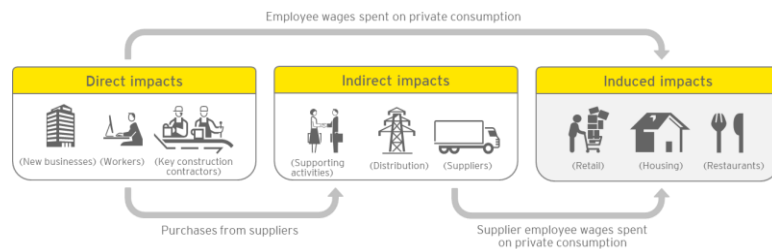
### 3. Approach and Methodology

#### Economic Contribution Assessment

EY performed an economic contribution assessment (“ECA”) for each development scenario using inputs from Statistics Canada, expenditure data from comparable projects in Canada, and combined it with EY proprietary economic model tools, which are founded on the principles of Input-Output (“I-O”) models.

Using the framework from the I-O model, the economic contributions expected from each development scenario can be estimated via three distinct channels; direct, indirect, and induced contributions, which are exemplified in **Figure 1** below. These contributions, individually and collectively, represent the economic contributions.

**Figure 1. Example of Direct, Indirect and Induced Contributions**



Sources: EY illustration.

The economic impacts are expressed in terms of the following economic indicators:

- **Gross Spending:** The total economic activity of new goods and services because of activities occurring within a particular area (i.e. in the ISR and Inuvik, the Northwest Territories, Yukon, and

Canada). This is a broader measure of the economy in comparison to GDP;

- **Gross Domestic Product (“GDP”):** GDP, or local value-added, is a measure of the value of all final goods and services produced in a specific region;
- **Wages or labour income:** A component of the local value-added that measures total employee compensation (value of wages and benefits) and proprietor income; and,
- **Full-time equivalent (“FTE”) employment:** This refers to the total number of employee jobs that are converted to full-time equivalence based on the average full-time hours worked. This measure does not account for those who are self-employed.

To estimate the total economic contribution of each scenario in the Beaufort Region, economic multipliers were used that reflect how the interdependency between all sectors in the economy is tracked. Specifically, each of these multipliers describes the size of the total economic impacts for a given level of spending.

To develop regional economic multipliers for the combined ISR and Inuvik region, we use data and information on industry concentrations, employment levels, and other microeconomic data from the Region 1 Census Division in the Northwest Territories, which is used to represent the ISR and Inuvik’s combined regional economy.

#### Broader Socioeconomic Impacts

Refer to **Section 4.3** for a summary of the socioeconomic categories and the associated VCs that were evaluated using the following quantitative and qualitative approaches:

- ▶ Collection and analysis of baseline data from national and provincial statistical agencies to build a holistic view of the current state in the Inuvialuit communities for each VC;
- ▶ Review of benchmark studies and peer reviewed reports relating to oil and gas development in similar regions and countries;
- ▶ Review of empirical evidence relating to the impacts of oil and gas exploration on various socioeconomic categories; and,
- ▶ Comparison of findings from the above with economic theory.

As part of these key stages of assessment detailed above, EY employed economic theory, statistical inference, and advice from subject matter advisors to arrive at representative impacts to socioeconomic categories and VCs as a result of each oil and gas development under consideration.



## 4. Socioeconomic Impact Assessment

4.1. Economic Contributions by Scenario

4.2. Royalty Contributions

4.3. Broader Socioeconomic Impacts



## 4.1. Economic Contributions by Scenario

Using the I-O framework described in **Section 3**, the potential economic impacts of operational and capital spending under each scenario have been estimated at the regional, territorial and national levels. Regional economic contributions provide information relating to potential benefits that may be realised by the regional economy in the immediate vicinity of the investment. For the purposes of this analysis, the Census Division of Region 1 is used to represent the regional economy of the ISR and Inuvik. Refer to **Table 2** in **Section 1** for a summary, as well as the commentary below for each scenario and the potential economic impacts.






Due to the constraints in the regional economy relating to the availability of resources such as labour, certain leakages are expected as a result of economic activity. To capture the broader economic benefits from proposed investments due to these leakages, the total contributions to the NWT, Yukon, as well as the national economy have been estimated and summarized.

### Scenario 1 - Status Quo

The economic analysis suggests that in the absence of oil and gas development, economic activity in key sectors in the ISR and Inuvik may annually contribute an estimated at **\$196.3 million** in gross spending, **\$132.7 million** in GDP, and **\$76.7 million** in labour income, as well as **989 FTE** jobs over the 30 year timeline in consideration.

In the absence of oil and gas activity, certain ongoing capital expenditures and planned infrastructure upgrades over the next 30 years are also anticipated to generate local economic activity. EY's analysis displayed in **Table 3** indicates capital investment in Scenario 1 could contribute **\$630.2 million** in gross spending, **\$151.9 million** in

**Table 3. Scenario 1 - Total Economic Contributions**

	 Spending (\$ mn)	 GDP (\$ mn)	 Wages (\$ mn)	 Employment (FTEs)	 Taxes (\$mn)
<b>Annual OPEX Contributions</b>					
<i>ISR + Inuvik</i>	196.3	132.7	76.7	989	2.2
<i>Northwest Territories</i>	217.7	147.1	84.2	1,066	3.1
<i>Yukon</i>	1.3	1.1	0.5	7	0.01
<i>Canada</i>	301.4	200.1	114.8	1,533	2.4
<b>Total CAPEX Contributions</b>					
<i>ISR + Inuvik</i>	630.2	151.9	90.9	1,049	5.2
<i>Northwest Territories</i>	723.8	192.2	111.5	1,196	6.2
<i>Yukon</i>	12.0	9.1	5.0	66	0.1
<i>Canada</i>	1,123.0	434.1	268.1	3,609	4.0

**Notes:** Figures for wages, GDP and gross spending are in millions and 2019 CAD\$. OPEX related contributions are presented as annual contributions. Figures for CAPEX contributions represent cumulative contributions. Figures for GDP, wages, employment and taxes represent totals of direct, and indirect contributions. Figures for taxes show a total of federal, provincial, and municipal tax revenue from taxes on products and production. Category *ISR + Inuvik* refers to economic impacts to the Census Division Region 1 in NWT.

**Sources:** Statistics Canada Data and EY calculations.

GDP, **\$90.9 million** in wages, and **1,049 FTE** employment to the ISR and Inuvik.

Results also suggest that activities in key sectors in the ISR and Inuvik may contribute an estimated total of **\$15.4 million** related to capital investment over the 30 year timeline, and **\$7.6 million** annually in local, provincial, and federal government revenues. Tax contributions include taxes on production (e.g., payroll and real property taxes) and taxes on products (e.g., sales taxes, custom duties, excise taxes etc.).

## Scenario 2 - Export of Natural Gas and Condensates






The first two years of the project are assumed to be dedicated to construction activities, and the operations phase is assumed to span over 28 years. The anticipated annual contributions of natural gas extraction in the ISR and Inuvik are estimated at **\$97.8 million** in gross spending, **\$60.3 million** in GDP, **\$29.9 million** in labour income, sustaining **287 FTE** employment.

The development of the necessary infrastructure and facilities for natural gas extraction in this scenario require significant capital investments to be made. The total capital spending for this hypothetical scenario is estimated to be approximately **\$2.7 billion**.

A capital investment of this amount is anticipated to contribute an estimated total of **\$2.3 billion** in gross spending, **\$915.9 million** in GDP, **\$512.8 million** in wages, and **5,300 FTE** jobs in the ISR and Inuvik during its 2-year construction phase.

Results also suggest that in this scenario, project construction activities may contribute an estimated total of **\$64.8 million** over two years and operational activities may contribute an estimated annual total of **\$21.0 million** in local, territorial, and federal government revenues.

Table 4. Scenario 2 - Total Economic Contributions

	 Spending (\$ mn)	 GDP (\$ mn)	 Wages (\$ mn)	 Employment (FTEs)	 Taxes (\$mn)
<b>Annual OPEX Contributions</b>					
<i>ISR + Inuvik</i>	97.8	60.3	29.9	287	0.8
<i>Northwest Territories</i>	107.4	66.2	32.7	311	1.3
<i>Yukon</i>	1.8	1.6	0.4	4	0.02
<i>Canada</i>	153.3	94.9	48.7	536	18.9
<b>Total CAPEX Contributions</b>					
<i>ISR + Inuvik</i>	2,343.0	915.9	512.8	5,300	19.3
<i>Northwest Territories</i>	2,631.1	1,054.3	583.7	5,863	25.7
<i>Yukon</i>	48.1	40.3	19.1	234	0.4
<i>Canada</i>	3,956.7	1,849.3	1,090.1	13,562	19.3

Notes: Figures for wages, GDP and gross spending are in millions and 2019 CAD\$. OPEX related contributions are presented as annual contributions. Figures for CAPEX contributions represent cumulative contributions from 2020 to 2050. Figures for GDP, wages, employment and taxes represent totals of direct, and indirect contributions. Figures for taxes show a total of federal, provincial, and municipal tax revenue from taxes on products and production. Category *ISR + Inuvik* refers to economic impacts to the Census Division Region 1 in NWT.

Sources: Statistics Canada Data and EY calculations.



### Scenario 3 - Large Scale Oil Development with Significant Discovery Licenses on the Continental Shelf






Operations from the oil development in this scenario are estimated to span over 23 years and are anticipated to create annual economic contributions of **\$146.8 million** in gross spending for the ISR and Inuvik, **\$95.0 million** in GDP, **\$50.3 million** in labour income, and sustain **502 FTE** employment.

The offshore oil development in the Beaufort Sea for this scenario requires significant capital investments to be made. The total capital spending for this hypothetical scenario is estimated to be approximately **\$4.1 billion** over 7 years.

A capital investment of this amount is anticipated to contribute an estimated total of **\$3.4 billion** in gross spending, **\$1.4 billion** in GDP, **\$834 million** in wages, and **8,803 FTE** employment in the ISR and Inuvik during its 7-year construction phase.

Results also suggest that project construction activities may contribute an estimated total of **\$95.3 million** over 7 years and operational activities may contribute an estimated total of **\$30.6 million** annually in local, territorial, and federal government revenues.

Table 5. Scenario 3 - Total Economic Contributions

	 Spending (\$ mn)	 GDP (\$ mn)	 Wages (\$ mn)	 Employment (FTEs)	 Taxes (\$mn)
<b>Annual OPEX Contributions</b>					
<i>ISR + Inuvik</i>	146.8	95.0	50.3	502	1.2
<i>Northwest Territories</i>	160.8	104.2	54.6	540	1.9
<i>Yukon</i>	3.1	2.8	1.0	10	0.03
<i>Canada</i>	228.7	148.1	79.4	894	27.4
<b>Total CAPEX Contributions</b>					
<i>ISR + Inuvik</i>	3,440.3	1,432.4	834.2	8,803	28.8
<i>Northwest Territories</i>	3,852.7	1,639.4	940.0	9,658	37.8
<i>Yukon</i>	75.7	65.2	32.5	403	0.6
<i>Canada</i>	5,772.8	2,811.8	1,687.4	21,041	28.0

Notes: Figures for wages, GDP and gross spending are in millions and 2019 CAD\$. OPEX related contributions are presented as annual contributions. Figures for CAPEX contributions represent cumulative contributions from 2020 to 2050. Figures for GDP, wages, employment and taxes represent totals of direct, and indirect contributions. Figures for taxes show a total of federal, provincial, and municipal tax revenue from taxes on products and production. Category *ISR + Inuvik* refers to economic impacts to the Census Division Region 1 in NWT.

Sources: Statistics Canada Data and EY calculations.

## Scenario 4 - Large Scale Oil Development with Exploration Licenses on the Continental Slope






Operations from the oil development in this scenario are assumed to be 31 years in length and are expected to generate annual contributions estimated at **\$167.2 million** in gross spending, **\$108.2 million** in GDP, **\$57.3 million** in labour income, and sustain **572 FTE** jobs for the ISR and Inuvik.

The offshore oil development in the Beaufort Sea for this scenario requires significant capital investments to be made by the project developer. EY estimates the total capital spending for this hypothetical scenario to be approximately **\$6.3 billion**.

A capital investment of this amount is anticipated to contribute an estimated total of **\$5.3 billion** in gross spending, **\$2.1 billion** in GDP, **\$1.2 billion** in wages, and **12,080 FTE** jobs in the ISR and Inuvik during its 12-year construction phase.

Results also suggest that project construction activities may contribute an estimated total of **\$147.7 million** over 12 years and operational activities may contribute an estimated annual total of **\$46.7 million** in local, territorial, and federal government revenues.

Table 6. Scenario 4 - Total Economic Contributions

	 Spending (\$ mn)	 GDP (\$ mn)	 Wages (\$ mn)	 Employment (FTEs)	 Taxes (\$mn)
<b>Annual OPEX Contributions</b>					
<i>ISR + Inuvik</i>	167.2	108.2	57.3	572	1.4
<i>Northwest Territories</i>	183.1	118.7	62.2	615	2.2
<i>Yukon</i>	3.5	3.2	1.2	12	0.03
<i>Canada</i>	260.5	168.6	90.5	1,018	43.1
<b>Total CAPEX Contributions</b>					
<i>ISR + Inuvik</i>	5,339.9	2,087.4	1,168.7	12,080	44.1
<i>Northwest Territories</i>	5,996.3	2,402.7	1,330.2	13,362	58.7
<i>Yukon</i>	109.6	91.9	43.5	534	0.9
<i>Canada</i>	9,017.4	4,214.6	2,484.3	30,909	44.1

Notes: Figures for wages, GDP and gross spending are in millions and 2019 CAD\$. OPEX related contributions are presented as annual contributions. Figures for CAPEX contributions represent cumulative contributions from 2020 to 2050. Figures for GDP, wages, employment and taxes represent totals of direct, and indirect contributions. Figures for taxes show a total of federal, provincial, and municipal tax revenue from taxes on products and production. Category *ISR + Inuvik* refers to economic impacts to the Census Division Region 1 in NWT.

Sources: Statistics Canada Data and EY calculations.

## Scenario 5 - Large Oil Release Event

In the event of an oil spill during operations of offshore oil development in Scenario 5, economic activity could be adversely affected. In addition to a loss in economic activity from ongoing operations of the facility, other non-economic VCs, such as outdoor recreation, cultural vitality, traditional activities, and wildlife health will be negatively impacted. Key sectors that will be negatively impacted include: Mining, Quarrying, and Oil and Gas Extraction; Fishing, Hunting and Trapping; Transportation and Warehousing; and Arts, Entertainment and Recreation.






Market impacts associated with the spill are estimated to last between 1-5 years in length. The economic analysis suggests that in the event of an oil spill, the ISR and Inuvik region may collectively lose an estimated total of **\$161.6 million** in gross spending, **\$92.6 million** in GDP, **\$40.2 million** in labour income, and **332 FTE** jobs annually.

An oil spill in the Beaufort Sea would require significant expenditures by the developers to clean up. Based on insights from a study on the impacts of an oil spill occurred in BC, the total spending on clean-up activities for this hypothetical scenario is estimated to be approximately **\$1.1 billion**.<sup>5</sup>

Total spending associated with oil spill clean-up activities in the region is estimated to total **\$940.6 million** over the duration of clean-up activities. The extra spending incurred as a result of the oil spill is anticipated to generate economic impact in the region, resulting in an estimated total of **\$538.8 million** in GDP, **\$227.1 million** in wages, and **1,234 FTE** employment in the ISR and Inuvik.

Tax revenue generated from the total spending in this scenario for the local, territorial and federal governments is anticipated to be **\$32.9 million** related to the clean up effort, while an estimated annual loss of **\$5.5 million** in revenues is expected from reduced operations of the facility and reduced activity in other identified sectors for up to 5 years.

Table 7. Scenario 5 - Total Economic Impact

	 Spending (\$ mn)	 GDP (\$ mn)	 Wages (\$ mn)	 Employment (FTEs)	 Taxes (\$mn)
<b>Annual Losses in Economic Activity</b>					
<i>ISR + Inuvik</i>	(161.6)	(92.6)	(40.2)	(332)	(1.1)
<i>Northwest Territories</i>	(178.5)	(102.1)	(44.6)	(366)	(2.2)
<i>Yukon</i>	(3.9)	(3.4)	(0.9)	(7)	(0.04)
<i>Canada</i>	(259.9)	(152.1)	(72.0)	(741)	(2.2)
<b>Total Impacts from Spending on Clean-up Activities</b>					
<i>ISR + Inuvik</i>	940.6	538.8	227.1	1,234	6.4
<i>Northwest Territories</i>	1,042.5	596.3	253.1	1,380	12.8
<i>Yukon</i>	25.5	22.3	5.9	44	0.3
<i>Canada</i>	1,527.1	895.4	415.9	3,042	13.5

Notes: Figures for wages, GDP and gross spending are in millions and 2019 CAD\$. Loss in economic activity is presented as annual contribution losses. Figures for CAPEX contributions represent cumulative contributions from 2020 to 2050. Figures for GDP, wages, employment and taxes represent totals of direct, and indirect contributions. Figures for taxes show a total of federal, provincial, and municipal tax revenue from taxes on products and production. Category *ISR + Inuvik* refers to economic impacts to the Census Division Region 1 in NWT.

Sources: Statistics Canada Data and EY calculations.



## 4.2. Royalty Contributions

The royalty contributions payable to the federal and territorial governments from oil and gas exploration activity were estimated for **Scenarios 2, 3 and 4** under their respective federal and territorial legislations.<sup>6</sup> Specifically, the royalty is estimated using the following schedule:

- ▶ From the start of production, the royalty is 1% of gross revenue;
- ▶ Every 18 months, the royalty increases by 1 percentage point to a maximum of 5% of gross revenue until payout;
- ▶ In the month of payout or any subsequent month, the greater of 30% of net revenue or 5% of gross revenue is applied.

The royalty contributions under each scenario are estimated based on anticipated annual revenues and the corresponding royalty rate. Annual revenues were calculated using projected production volumes and forward curves for natural gas and crude oil prices. Production schedules for each scenario were modelled in consideration of comparator benchmark projects.

**Table 8** displays the estimated average annual royalty contributions for each scenario.

It is important to note that the royalty contributions are annual averages over varying production timelines for each scenario, and should be interpreted with caution. In addition, it is crucial to understand that these scenarios are hypothetical in nature. In the event that the development actually occurs, annual operating expenses may vary year over year, which will affect net revenues and the resulting estimated royalty contributions. The estimated royalty contributions are also dependent on the estimated cost in the construction phase for

**Table 8. Estimated Average Annual Royalty Contributions**

	Scenario 2	Scenario 3	Scenario 4
<i>Average Annual Royalty Contributions (\$ mn)</i>	124.8	548.7	1,242.4

Notes: Figures are in 2019 CAD\$. Royalty contributions are presented in average annual terms based on the projects production timeline for each scenario. These figures are subject to change depending on future changes to operating costs, payout month and commodity prices.

Sources: Bloomberg, Benchmark Projects and EY estimates.

each scenario; any change to the capital investments during construction phase will impact the cumulative project cost, the payout month, and the resulting royalty payments. In addition, the anticipated payout month in the model is based on mathematical calculations and in reality, may be reached much farther into the project lifecycle. Furthermore, any unforeseen future changes in commodity prices could result in different revenues over time, and as a result, royalty contributions could be materially different.

## 4.3. Broader Socioeconomic Impacts

Based on a detailed review of industry reports and input from key stakeholders and EY subject matter advisors, a detailed list of socioeconomic indicators was developed to effectively evaluate the socioeconomic outcomes from oil and gas development scenarios in the

ISR. An overview of the potential socioeconomic impact of oil and gas development to the VCs in each socioeconomic category is provided in **Table 9** below. The magnitude of the impact within each category varies based on the level of oil and gas activity in each scenario.

**Table 9. Key Findings**

Socioeconomic Category	Impact of Oil and Gas Activity to VCs
<b>Demographics</b>	<ul style="list-style-type: none"> <li>▶ Oil and gas activity may result in a larger regional <u>population</u> through increased job opportunities.</li> <li>▶ The potential inflow of workers could impact the regional <u>demographic</u> makeup by increasing the working age population and in turn, affect the region's <u>dependency ratio</u> during the project construction and operations phase.</li> </ul>
<b>Economy and Society</b>	<ul style="list-style-type: none"> <li>▶ The influx of population from outside the region could put a strain on the rental <u>housing market</u> due to increased demand but could also lead to the <u>construction of new units</u> increasing the housing stock in the medium and long-term.</li> <li>▶ Industry research proposes that resource development could lead to increased <u>cost of living</u>.</li> <li>▶ Proponents of oil and gas development could provide <u>training programs</u> for local workers, hence improving their skill levels.</li> </ul>
<b>Cultural Vitality</b>	<ul style="list-style-type: none"> <li>▶ Increased economic activity in the region may have the potential to reduce <u>traditional harvesting</u> activity in Inuvialuit communities. On the other hand, <u>economic opportunities</u> due to increase in economic activity could lead to <u>additional spending</u> on necessary equipment, fuel and supplies, supporting on-the-land activities.</li> <li>▶ Formal employment opportunities and an influx of workers could reduce the use of <u>Indigenous languages</u> by residents of Inuvialuit communities.</li> </ul>
<b>Community Wellbeing and Public Health</b>	<ul style="list-style-type: none"> <li>▶ Oil and gas development may have the potential to impact outcomes in <u>general health</u>, <u>diet and nutrition</u>, and potential <u>food contamination</u>.</li> <li>▶ Potential reduction in local harvesting and engagement in other traditional activities could in turn affect cohesion among individuals and reduce the sense of <u>social inclusion</u> in the region.</li> </ul>
<b>Education and Governance</b>	<ul style="list-style-type: none"> <li>▶ Through population growth due to incoming workers, school enrolment could increase over time, impacting general <u>educational attainment</u> in the region.</li> <li>▶ Increased economic activity from oil and gas development can increase <u>maintenance costs</u> to governments through infrastructure upgrades, such as roads or airports.</li> </ul>

Sources: EY Analysis.

## Broader Socioeconomic Impacts of a Large Oil Release Event

The potential impacts of a large oil release event on the VCs may include the following:

- ▶ Increase in demand for transient labour and a potential increase in the population and interaction amongst non-Indigenous individuals;
- ▶ Increase in demand for local goods and services related to increased employment;
- ▶ Disrupted economic activity resulting in losses in income, unemployment, and losses in sales and profits to businesses;
- ▶ Further reduction in harvesting activities related to contamination of marine animals and other wildlife;
- ▶ Health risks, including risks of consuming contaminated fish and meats;
- ▶ Negative impacts to marine activities, including cruise ships, fishing and polar bear hunting, and harvesting related recreational activities; and
- ▶ Increased government costs to facilitate the clean up process and limit environmental impacts.



# Appendices



## A.1. The Input-Output Model: Assumptions and Limitations

The following Appendix outlines the assumptions and limitations associated with the I-O model used to perform the economic impact analysis in this Report. The I-O model is subject to limitations both in concept and implementation. Like any economic model, the I-O model is conceptually an abstraction that attempts to be complex enough to accurately capture and estimate the most significant impacts to the real-life economy caused by economic activities, yet simple enough to be analytically and intuitively meaningful.

An I-O model reflects the observed interdependency between all sectors of the economy. For Canada, Statistics Canada reports for the 236 industrial sectors in the economy: (1) how each sector relies on the other 235 sectors for inputs to their production; and (2) how each sector supplies its products and services to each of the remaining 235 sectors. While an I-O model provides a consistent and innovative way of measuring the economic effects of an economic activity, one should be aware of the assumptions and limitations imposed on the model's underlying approach. Some of these assumptions include:

- ▶ The relationship between industry inputs and outputs is linear and fixed, meaning that a change in demand for the outputs of any industry will result in a proportional change in production;
- ▶ The model assumes constant returns to scale, and cannot account for economies/diseconomies of scale or structural changes in production technologies, an assumption that does not necessarily hold in the actual economy;
- ▶ Prices are fixed in the model; thus, the model is unable to account for elasticities, or more formally, how one economic variable changes in response to another;
- ▶ I-O models are static, and therefore do not consider the amount of time required for changes to happen. Changing the timeframe would not affect the magnitude of the estimates;
- ▶ There are no capacity constraints, and all industries are operating at full capacity. This implies that an increase in output results in an increase in demand for labour (rather than simply re-deploying existing labour). It also implies that there is no displacement that may occur in existing industries as new projects complete;
- ▶ I-O models assume that the technology and resource mix (ratios for inputs and production) is the same for all firms within each industry, i.e., the 236 industry categories reported in Statistics Canada's input-output table. As such, our analysis describes industry average effects;
- ▶ The model assumes that the structure of the economy remains unchanged, and any structural changes in the economy since 2015 will therefore lead to changes to the multipliers, which could be implemented once Statistics Canada release updated input-output tables. As such, the further the year of analysis is away from the year of the input-output tables used, the greater the uncertainties;
- ▶ The model does not consider the economic impacts or opportunity costs associated with using resources elsewhere. In the case of this analysis for example, funds used to purchase lab equipment may be allocated to other areas. Using these funds for alternative uses would generate their own economic impacts, which could potentially be larger or smaller. However, the model will not be able to capture this difference.
- ▶ Results from the I-O model should not be interpreted as causal impacts, that is, one should not take the economic impacts

presented in this report as verbatim. We cannot say with certainty that X dollars of capital or operational spending will produce X number of FTEs or have an X amount of impact on GDP; and

- ▶ The model does not consider substitutions amongst inputs, and that each industry in the model is regarded as having a single production process.

As per the assumptions above, the structure and limitations of I-O models lend themselves to measuring the impacts of projects that are shorter term in nature; generally, they are used to look at shocks to the economy. For long term analysis, time series and general equilibrium models are more appropriate.

### Limitations of Approach

The scenarios evaluated in this study are hypothetical in nature resulting in many gaps in data and information. As such, project costs are reflective of benchmarked projects and are subject to change based on actual project details provided by potential project proponents in the future. Thus, the underlying approach is subject to the following assumptions and limitations:

- ▶ In the event that development actually occurs, operating and capital expenses may vary which will result in different contributions to the regional, territorial and national economies assessed in this study;
- ▶ Impacts to Yukon are based on its economic linkages with the NWT from the Input-Output model. These impacts are subject to change based on the actual share of inputs sourced from the Yukon in potential future projects;
- ▶ Estimated royalty contributions are dependent on the estimated cost in the construction phase for each scenario; any change to the capital investments during the construction phase will impact the

cumulative project cost, the payout month, and the resulting royalty payments;

- ▶ Revenues are driven by commodity prices. Any unforeseen future changes in commodity prices could result in different revenues over time, and as a result, royalty contributions could be materially different;
- ▶ Population, demographics, and dependency ratio estimates are dependent on estimated employment from the Input-Output model. Changes in employment contributions as a result of different capital and operating costs can affect these estimates.
- ▶ Labour from neighbouring regions is assumed to be mobile in the model, thus, changes in labour mobility can result in different population, demographics, dependency ratio and housing estimates.
- ▶ Assumed camp facilities in each scenario contribute to the housing stock in the Inuvialuit communities. In the event the development actually occurs, the number of net new units constructed for these facilities (in addition to existing camps) can vary which will affect the availability of housing in the region.

## A.2. Oil and Gas Development Scenarios

For the purposes of this analysis, the socioeconomic impacts of five distinct oil and gas development scenarios in the ISR have been modelled. As advised in the Beaufort Regional Strategic Assessment (“BRSEA”), these include the status quo, three oil and gas development scenarios, and one worst case oil spill scenario.

Consistent with the hypothetical scenarios defined in the BRSEA, all scenarios have been modelled over a 30-year time frame, except Scenario 4. Due to the large scale nature of the activity in Scenario 4 and a longer construction timeline, the maximum years of operation considered are 31 years. An overview of the scenarios and benchmarked projects is provided in **Table 10** below. Development scenarios are modelled after comparable projects that were proposed or are currently active in Canada.

**Table 10. Oil and Gas Development Scenarios**

	1: Status Quo	2: Export of Natural Gas and Condensates	3: Large Scale Oil Development with Significant Discovery Licenses in Shallow Water	4: Large Scale Oil Development with Exploration Licenses in Deep Water	5: Large Oil Release Event
Description	The Status Quo scenario considers economic activity that is expected to continue in the absence of oil and gas development in the region.	This scenario involves the development of infrastructure and pipelines for the exploration of natural gas and condensates from existing reserves in the Mackenzie Delta.	This scenario involves the development and production of oil and gas reserves in geographic areas with significant discovery licenses in shallow water (resources are known and delineated).	This scenario involves the development and production of oil and gas in geographic areas with exploration licenses in deep water.	This scenario involves a large scale oil spill in the Beaufort Sea.
Location & Depth	N/A	Majority of development to happen onshore. However, there are nearshore infrastructure, pipelines, and loading platforms.	Located 80 km offshore with depth less than 40m.	100 km northwest of Tuktoyaktuk with depth ranging from 100m to 1200m.	N/A
Production Capacity	N/A	5 million tonnes per annum or 40 million barrels of oil equivalent per annum.	700+ million barrels of high quality oil.	2 billion barrels of high quality oil.	N/A

Sources: Beaufort Regional Strategic Environmental Assessment.



## A.3. References and Comments

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<sup>1</sup> Inuvialuit Settlement Region, <https://www.irc.inuvialuit.com/inuvialuit-lands>

<sup>2</sup> NWT Bureau of Statistics.

<sup>3</sup> Statistics Canada, December 2018 Business Location Counts.

<sup>4</sup> Beaufort Regional Strategic Environmental Assessment (2019).

<sup>5</sup> Potential Economic Impact of a Tanker Spill on Ocean-BASED Industries in British Columbia (Ngaio Hotte and U. Rashid Sumaila, 2012).

<sup>6</sup> Onshore development (Scenario 2) is subject to territorial legislation (Petroleum Resources Act) while offshore development (Scenarios 3, and 4) is subject to federal legislation (Canada Petroleum Resources Act). Irrespective of the difference in legislations, both Acts provide the same royalty structure.