÷,

Page 1

Economic Impact Analysis for Phase 1 and Phase 2 of Nalcor Energy's Lower Churchill Project

CONFIDENTIAL Final Report



Prepared for:



Prepared by: Strategic Concepts, Inc. and Dr. Wade Locke

December 10, 2010 Revised Jan 23, 2011

Contents

| Executive Summary | i |
|--|------------|
| 1.0 Introduction | 1 |
| 2.0 Methodology | 4 |
| 3.0 Employment and Income Impacts | 6 |
| 3.1 Nalcor's Capital and Operating Expenditure Profiles | 5 |
| 3.2 Cost Decomposition | 8 |
| 3.3.1 Total Direct Employment and Labour Income | 9 |
| 3.4 Direct Employment and Income by Region 10 | D |
| 3.5 Indirect Income and Employment | 3 |
| 3.6 Induced Income and Employment | 9 |
| 3.7 Total Project Income and Employment Impacts | 0 |
| 3.8 Gross Domestic Product (GDP) | 4 |
| 4.0 Direct, Indirect and Induced Taxes | 4 |
| 5.0 Newfoundland and Labrador Direct Impacts: Residency versus Location | 5 |
| 6.0 Conclusion | 7 |
| Appendix A: Detailed Tables | 8 |
| Figure FS 1: Phase 1 Phase 2 and Total Project Capital and Operating Expenditures | : |
| Figure ES 2: Phase 1. Phase 2 and Total Project Capital and Operating Expenditures | a it |
| Figure ES 3: Phase 1, Phase 2 and Total Project Operating Expenditures – Type | ak. Geo |
| Figure ES 4: Lower Churchill Income Benefits for the Canadian Economy (2010), Millions) | .1 |
| ingere 25 in 2000 in charoline meente 2010fts for the Canadian Economy (2010\$, Mintens) | v |
| Figure ES 5: Lower Churchill Employment Benefits for the Canadian Economy (Person | ¥ |
| Years)j | v |
| Figure ES 6: Lower Churchill Treasury Benefits for Canada (2010\$, Millions) | v |
| 5 | |
| Figure 1: Capital Cost Profile by Project Component (M 2010\$) | 8 |
| Figure 2: Phase 1 Capital Expenditure Direct Employment by Region | 2 |
| Figure 3: Phase 2 Capital Expenditure Direct Employment by Region | 2 |
| Figure 4: Phase 1 Capital Expenditure Indirect Employment by Region | 8 |
| Figure 5: Phase 2 Capital Expenditure Indirect Employment by Region | 8 |
| Figure 6: Lower Churchill Phase 1 Income Benefits for the Canadian Economy (2010\$, | |
| Millions) | 2 |
| Figure 7: Lower Churchill Phase 2 Income Benefits for the Canadian Economy (2010\$, | |
| Millions) | 2 |
| | |

| Table 1: Capital Cost Estimates (M \$2010 Cdn) | 6 |
|---|----|
| Table 2: Operating Cost Estimates (M \$2010 Cdn) | 7 |
| Table 3: Direct Costs by Project Category and Cost Type (2010\$ CDN) | 8 |
| Table 4: Total Labour Cost, Direct Labour Income and Direct Employment from Capex | 10 |
| Table 5: Direct Income and Employment by Project Category, Area and Region: | 10 |

| Table 6: Direct Income and Employment by Project Category, Area and Region: Operation | IS |
|---|------|
| (2010\$ CDN and Person Years) | .13 |
| Table 7: Capture Rates/Supply Factors | . 14 |
| Table 8: Value Added Factors | .15 |
| Table 9: Total Indirect Employment by Project Category and Region (Person Years) | .17 |
| Table 10: Total Indirect Income by Project Category and Region (\$M) | .18 |
| Table 11: Induced Income and Employment Parameters | . 19 |
| Table 12: Direct, Indirect and Induced Income Summary | . 20 |
| Table 13: Direct, Indirect and Induced Employment Summary (person years) | .23 |
| Table 14: Phase 1 and 2 GDP from Capital and Operating Expenditures (M\$ 2010) | . 24 |
| Table 15: Tax Parameter Input Summary | . 24 |
| Table 16: Direct, Indirect and Induced Taxes – Total Project | . 25 |
| Table 17: Employment – Resident and Location (person years) | .26 |
| | |

| Table A 1: Annual Employment – Phase 1 CAPEX (2010-2023) | |
|--|--|
| Table A 2: Annual Employment – Phase 2 CAPEX (2010-2023) | |
| Table A 3: Annual Income – Phase 1 CAPEX (2010-2023) | |
| Table A 4: Annual Income – Phase 2 CAPEX (2010-2023) | |
| | |

Executive Summary

This report, prepared by Strategic Concepts, Inc. (SCI) and Dr. Wade Locke on behalf of Nalcor Energy, evaluates the economic impacts expected to emanate from the capital and operating expenditures associated with the development of Phase 1 and Phase 2 of the Lower Churchill hydroelectric generation project and its associated transmission facilities. The economic impacts are analyzed for the economies of Newfoundland and Labrador (NL), Nova Scotia (NS), Prince Edward Island (PEI), New Brunswick (NB), Quebec (QC), Ontario (ON), the rest of Canada (ROC) and the country as a whole (CAN). The economic impacts associated with the capital and operations expenditures were derived from two perspectives:

- 1. An economy-wide perspective, which included the direct, indirect and induced impacts on employment and income in each of the economies analyzed;
- 2. A treasury perspective, which measured the direct, indirect and induced taxation impacts at both the federal and provincial levels.

Phase 1 of the project analyzed consists of the capital and operating costs associated with: (a) the generation facilities at Muskrat Falls, (b) the island transmission link and associated upgrades, and (c) the Maritime transmission link and associated upgrades. Phase 2 of the project analyzed consists of the capital and operating costs associated with: (a) the generation facilities at Gull Island, (b) the transmission link between Gull Island and the Romaine facility in Quebec, and (c) the required upgrades to Hydro Quebec's transmission facility.

While approximately 99% of the capital expenditure associated with Phase 1 occurs from 2010 to 2017 and a small amount of investment continues on into 2018, the investment period for Phase 1 for this analysis is defined to run from 2010 to 2018. As well, although the operating expenditures for Phase 1 ramp up from 2017 to 2018, the operations period for Phase 1 analyzed in this report extends for 32 years, running from 2018 to 2049. Further, even though relatively a relatively small amount of capital expenditures associated with Phase 2 are undertaken between 2010 and 2012, more than 99% of the Phase 2 capital expenditures occur between 2013 and 2021 and, as such, the period 2013-21 is considered the investment period associated with Phase 2 of the project. For the purposes of this report, the operation period for Phase 2 extends from 2021 to 2049, a 29 year period that overlaps Phase 1 operations.

The project analyzed in this report has an estimated cost of \$15.0 billion to construct and operate, with a total of \$12.8 billion in capital expenditures and \$2.1 billion in operating expenditures. Phase 1 consists of \$2.5 billion in capital expenditures for Muskrat Falls, with an additional \$1.8 billion being consumed by the Island Link and the remaining \$1.0 billion is required for the Maritime Link for a total Phase 1 capital expenditure of \$5.4 billion. Phase 2 consists of \$3.9 billion in capital expenditures for Gull Island, plus \$3.3 billion for the HQ Upgrades and the remaining \$0.3 billion being spent on the Gull Island-Romaine transmission line for a total Phase 2 capital expenditure of \$7.5 billion. Approximately, 65% of the operating costs (\$1.4 billion) are accounted for by Phase 1 operations and the remaining 35% (\$0.8 billion) of operating costs are associated with Phase 2 operations. Figure ES 1 summarizes these numbers.



Figure ES 1: Phase 1, Phase 2 and Total Project Capital and Operating Expenditures

Approximately one-third of the construction expenditure is accounted for by labour. This decreases to 25% during the operations phase. The majority of construction phase expenditure (46%) is allocated to materials and the residual 18% comes from equipment purchase. During the operation phase, services account for nearly 40% of the expenditures, with materials representing nearly 25% and equipment making up the final 14%. Figure ES 2 and Figure ES 3 summarize these numbers.



Figure ES 2: Phase 1, Phase 2 and Total Project Capital Expenditures – Type



Figure ES 3: Phase 1, Phase 2 and Total Project Operating Expenditures – Type

The construction of the Lower Churchill project is expected to create approximately 27,000 person years of direct employment generating more than \$3.5 billion in incomes to direct labour. Approximately 50% of the direct employment (13,400 person years) and almost 50% of the direct labour income (\$1.7 billion) are expected to accrue to Newfoundlanders and Labradorians. Another 4,700 direct person years of employment and \$530 million of direct labour income are expected to be generated during operations, with approximately 75% of employment taking place in NL and an equivalent share of income accruing to local workers.

ON and QC are the greatest recipients of indirect benefits from Nalcor Energy's capital expenditures, with a combined total of almost 13,900 and 17,400 indirect person years of employment, respectively. These results illustrate the significant level of benefits that would be expected accrue to ON and QC as the main suppliers of many of the non-labour inputs required by Nalcor Energy given their respective industrial economic bases. NL is also a significant beneficiary with 13,900 indirect person years of employment.

Total income to persons and businesses in Canada arising from the construction and operation of the Lower Churchill project is estimated to be \$11.2 billion. Regionally, NL labour and businesses will receive approximately 1/3 of the estimated income benefits, while other Canadian jurisdictions will receive 2/3 of the project's income benefits. This distribution of benefits reflects the significant indirect and induced economic impacts accruing to the provinces that have more diversified economic bases in the rest of Canada and are characterized by lower import leakages than experienced in NL. Looked at from a different perspective, approximately 82% of the income benefits result from the capital phase of the project, with the remaining 18% coming thought ongoing operations.

Figure ES 4 summarizes the income benefits for the Canadian economy.





Total employment arising from the construction and operation of the Lower Churchill project is estimated to be almost 153,000 full-time equivalent jobs across Canada, nearly 46,000 person years of which are expected to be created within NL. Thirty percent of the NL based employment occurs during the operating phase and the remaining 70% is accounted for by construction activity. The corresponding numbers for Canada are 20% of the employment occurs during operations and the remaining 80% is accounted for by the construction activities associated with Phase 1 and Phase 2. Figure ES 5 summarizes the employment benefits for the Canadian economy.



Figure ES 5: Lower Churchill Employment Benefits for the Canadian Economy (Person

Years)

The project generates close to \$550 million in direct, indirect and induced taxes for the Government of Newfoundland and Labrador. The Federal Government receives close to \$1.8 billion in direct, indirect and induced taxes. Figure ES 6 summarizes the treasury benefits for Canada.





The project creates 31,837 person years of direct employment, of which 6,188 person years of direct employment are located in Newfoundland and 15,596 person years of direct employment are located in Labrador. Residents of Newfoundland have 16,933 person years of direct employment and residents of Labrador have 6,920 person years of direct employment over the life of the project.

The project creates \$3.9 billion of direct labour income— \$750 million of which are located on the island Newfoundland and \$1.9 billion are located in Labrador. Residents on the island of Newfoundland receive \$2 billion in income and residents of Labrador have \$820 million over the life of the project.

1.0 Introduction

This report, prepared by Strategic Concepts, Inc. (SCI) and Dr. Wade Locke on behalf of Nalcor Energy, evaluates the economic impacts expected to emanate from the capital and operating expenditures associated with the development of Phase 1 and Phase 2 of the Lower Churchill hydroelectric generation project (Project) and its associated transmission facilities. The economic impacts are analyzed for the economies of Newfoundland and Labrador (NL), Labrador (Lab), Nova Scotia (NS), Prince Edward Island (PEI), New Brunswick (NB), Quebec (QC), Ontario (ON), the rest of Canada (ROC) and the country as a whole (CAN). The economic impacts associated with the capital and operations expenditures were derived from two perspectives:

- 1. An economy-wide perspective, which included the direct, indirect and induced impacts on employment and income in each of the economies analyzed;
- 2. A treasury perspective, which measured the direct, indirect and induced taxation impacts at both the federal and provincial levels.

1.1 Project Description

The Lower Churchill Project analyzed in this report is broken down into two phases. Impacts are presented for each phase individually as well as for the total project.

1.1.1 Phase 1

Phase 1 of the project analyzed in this report consists of the capital and operating costs associated with: (a) the generation facilities at Muskrat Falls, (b) the island transmission link and associated upgrades, and (c) the Maritime transmission link and associated upgrades

Muskrat Falls Generation consists of a dam, a powerhouse, a switchyard, the installation and commissioning of 4 Kaplan turbines @ 206 MW each; support facilities and services at Muskrat Falls; two 345 kV HVac transmission lines from Muskrat Falls to Churchill Falls; the expansion of the switchyard at Churchill Falls and the preparation of the reservoir.

Island Link and Upgrades are composed of the Island Link and the required Island System upgrades and include:

- Converter Stations
 - 900 MW Line Commutated Converter (LCC) with overload capacity at Muskrat Falls
 - 810 MW LCC with overload capacity at Soldiers Pond
- Overland Transmission
 - +/- 320 kVdc Muskrat Falls to the Strait of Belle Isle (SOBI)
 - +/- 320 kVdc SOBI to Soldiers Pond
- Marine Crossing
 - 3 +/- 320 kVdc subsea Mass Impregnated (MI) cables
 - Onshore transition compound in Labrador
 - Onshore transition compound in Newfoundland
- Electrodes and Electrode Lines

- Shoreline pond electrode at SOBI
- Shoreline pond electrode at Dowdens Point
- Wooden pole electrode line (MF SOBI)
- Wooden pole electrode line (Soldiers Pond Dowdens Point)
- Island Upgrades
 - Synchronous Condensors
 - 2 x 150 Mega Volt Ampere Reactive (Mvar) (conversions of condensors at Holyrood)
 - 3 x 300 Mvar (new condensors)
 - Breakers
 - 6 x 138 kV
 - 18 x 230 kV

Maritimes Link and Upgrades consists of the Maritime Link and required transmission upgrades, including:

- Converter Stations
 - 500 MW Voltage Source Converter (VSC) at Lingan, NS
 - 500 MW VSC at Bottom Brook, NL
- Overland Transmission
 - +/- 200 kVdc Cape Ray, NL to Bottom Brook, NL
 - = 230 kVac single circuit Bottom Brook to Granite Canal, NL
- Marine Crossing
 - 2 +/- 200 kVdc MI Cable
 - Onshore transition compound at Lingan
 - Onshore transition compound at Cape Ray
- Electrodes and Electrode Lines
 - Shoreline pond electrode at Lingan
 - Shoreline pond electrode at Bottom Brook
 - Wooden pole electrode line at Lingan
 - Wooden pole electrode line at Bottom Brook
- Island Upgrades
 - Allowance (200 km 230 kVac Single Circuit Line)
 - Allowance (Switchyard Modifications)

Phase 1 is shown in Illustration 1 below.

1.1.2 Phase 2

Phase 2 of the Project encompasses the capital and operating costs associated with: (a) the generation facilities at Gull Island, (b) the transmission link between Gull Island and the Romaine facility in Quebec, and (c) the required upgrades to Hydro Quebec's transmission infrastructure.

• **Gull Island Generation** is comprised of a dam, a powerhouse, the installation and commissioning of 5 Francis turbines @ 450 MW each, a spillway, a switchyard, and support facilities and services at Gull Island; and the expansion of the switchyard at Churchill Falls.

- **Gull Island Romaine TX** involves the construction of a new transmission line connecting Gull Island to the la Romaine-4 facility
- HQ Upgrades are upgrades to Hydro Quebec transmission system which are required in order to transmit power from Gull Island through Quebec. These upgrades were based on Option 4 contained in Hydro Quebec's 2007 System Impact Study (SIS) and include transmission lines between the la Romaine facilities, a new transmission substation in southwestern Quebec, over 600 kilometres of new 735 kV transmission lines in Quebec and a new Quebec-Ontario interconnection, consisting of a new line between Quebec and Ontario and converter stations.



Illustration 1: Phase 1 of the Lower Churchill Project

1.2 Scope of Work

The analysis was conducted with Gate 2 capital cost estimates for the Project, as well as with Nalcor-modified estimates for the upgrades to Hydro Quebec's transmission infrastructure. The period covered is 40 years, from 2010 to 2049. While approximately 99% of the capital expenditure associated with Phase 1 occurs from 2010 to 2017 and a small amount of investment continues on into 2018, the investment period for Phase 1 for this analysis is defined to run from 2010 to 2018. As well, although the operating expenditures for Phase 1 ramp up from 2017 to 2018, the operations period for Phase 1 analyzed in this report extends for 32 years, running from 2018 to 2049. Further, even though a relatively small amount of capital expenditures associated with Phase 2 are undertaken between 2010 and 2012, more than 99% of the Phase 2 capital expenditures occur between 2013 and 2021 and, as such, the

period 2013-21 is considered the investment period associated with Phase 2 of the project. For the purposes of this report, the operation period for Phase 2 extends from 2021 to 2049, a 29 year period that overlaps Phase 1 operations.

1.3 Report Structure

This report consists of six sections. The introduction and project description are contained in Section 1. The methodology utilized in this analysis is described in Section 2 and the summary economic results for income and employment are provided in Section 3. This is followed in Section 4 by detailed estimates of provincial and federal tax revenues. Section 5 analyzes the direct employment and income effects that are distinguished by location and residence. A conclusion is offered in Section 6 and a detailed appendix of annual impacts is attached as Appendix A.

2.0 Methodology

The model used to measure economic impacts, the Strategic Concepts Inc. (SCI) model, was developed specifically for Newfoundland and Labrador-based resource projects and has been applied to the majority of large resource projects proposed or occurring within the province and was used previously to analyze the Lower Churchill project considered in the original Environmental Impact Statement (EIS).¹

The economic impact model is based on the principal of tracking expenditures through the economy and applying reasonable coefficients to determine direct, indirect and induced impacts on employment, incomes, gross domestic product, and taxation.² The economic impact parameters used in the analysis were derived from data obtained from a number of sources including Statistics Canada, Canada Revenue Agency, various provincial government departments and agencies and from economic impact assessments on other projects in NL. The primary sources of information used in the economic impact analysis were construction phase expenditure profiles and ongoing operating costs prepared by Nalcor Energy and provided to SCI for the purpose of estimating the economic impacts.

The working basis underlying the SCI model is that the economic impacts that flow throughout the economy emanate from the project expenditures incurred during construction and operations. These impacts are further magnified as incomes earned by labour and businesses associated with the expenditure activities are re-spent throughout the economy.

^{1.} A sample list of the projects analyzed with this model include IOC's iron ore operations in Labrador City, New Millennium Capital's proposed iron ore development in Labrador, Husky Energy's White Rose oil field development and extension to the White Rose Oil field development, ExxonMobil's Hebron oil field development, and the Vale Inco's nickel mine in Labrador and its processing plant at Long Harbour.

^{2.} Direct impacts are those associated directly with the project. For example, direct operating employment is composed of people who operate the facilities or are engaged in maintenance activities. On the other hand, direct capital phase employment is composed on individuals directly involved in construction activities such as erecting transmission lines or operating heavy equipment constructing the dam at Gull Island or Muskrat Falls. Indirect impacts are those impacts associated with materials, services and equipment purchased by the project during its operating and construction phases. This would include, for instance, the extra workers needed by the contractor to meet the project's needs for cement or the extra employees needed by the contractor who supplies services to Nalcor Energy during the operations phase of the project. Induced impacts are those occur in the services sector throughout the economy as direct and indirect incomes get spent throughout the economy. This would include extra employment in restaurants, hotels and the retail sector that is supported by the project.

Core cost components that drive the economic impact analysis are costs associated with labour, materials, services and equipment. The decomposition of expenditures into these cost types allows for a more precise calculation of employment and incomes generated by the capital and operating phases of each of the project components. From Nalcor Energy's expenditure decomposition, the direct employment and income impacts were calculated by applying an estimate of labour cost per person year of employment³ to the direct expenditures allocated to labour.

Next, indirect impacts are estimated by applying supply or capture rates for materials, services and equipment. The expected proportions of each expenditure component to be purchased by jurisdiction were provided by Nalcor Energy and are detailed in this report. Within each jurisdiction, SCI weights these capture rates by value-added parameters to more accurately reflect the import content of each component. More specifically, the value-added parameters utilized are contingent on both the type of goods and services required and the ability of the business communities in Newfoundland and Labrador, and across the country, to supply and/or add value to the particular type of good or service required by the project. From this detail, it is possible to derive the indirect employment and incomes that flow from the business opportunities associated with the project. By way of illustration, indirect income impacts are calculated as the product of the direct expenditure impacts, the assumed capture rate and the estimated valued added factors. From this income, employment estimates are obtained by dividing indirect income by an average representative income associated with indirect employment.

Following this is the calculation of induced economic impacts that result from construction and operations. These are determined by applying an appropriate income multiplier to the direct and indirect incomes generated by jurisdiction. In the context of the current analysis, because there is no attempt to measure the value of output produced in this analysis, GDP and income effects are equivalent and are reported simply as income effects.

The final step for this economic analysis involved calculating taxation impacts for the provincial and federal treasuries utilizing taxation scalars. The direct and indirect personal income tax parameters were obtained from the most recent taxation statistics available through the Canada Revenue Agency's website. They were estimated based on the implied average tax rates and federal/provincial government split of taxes for income ranges that correspond to the direct and indirect labour incomes earned by workers associated with the project. The indirect corporation income taxes were taken to be the current tax rate in each jurisdiction applied to the estimate of corporate profits associated with the indirect income estimate for the project.⁴ The induced tax parameters for personal income and corporate income taxes and GDP calculation within each jurisdiction. Induced HST revenues were calculated by applying the statutory rates to induced GDP in each jurisdiction.

³ In this analysis, a person year of employment has been defined as 2,080 hours per annum, worked by one or more individuals within the calendar year considered.

⁴ The proportion of indirect income allocated to corporate profits were derived as the average proportion of corporate income profits as a share of GDP, which was derived from the most recent Provincial Economic Accounts data for Canada and the provinces.

One of the most important concepts to appreciate in assessing the economic impacts of any project is the leakage from the local economy because leakages determine the size of the income multiplier that can be expected for a given level of expenditure. Leakages are the different ways by which money spent in the area can be withdrawn from the local economy, rather than be re-spent. High leakages will result in relatively low impacts through small income multipliers and vice versa. There are three main sources of leakages that reduce the amount of money available for re-spending in the local economy: (1) imports of goods and services, (2) government taxes, and (3) savings and retained earnings.

As well, an Input-Output (IO) profile was developed in support of this report using data reflecting the electric power industry in Canada. The input-output analysis was run to determine reasonable ranges of the leakages that result for the various types of expenditures. These estimated coefficients were utilized to confirm and refine the portion of project expenditures that can reasonably be expected to be produced within each province. The coefficients generated through this work, along with the study team's experience with similar resource projects and from discussions with Nalcor Energy officials, are reflected in the value added capture rates used in this report.

3.0 Employment and Income Impacts

The most intuitive way to understand the methodology underlying SCI's model, and to review the results, is to visualize the estimation procedure as consisting of a number of sequential steps. In this report, each step in the economic impact analysis is listed in turn, along with its corresponding methodological approach, associated details and results.

3.1 Nalcor's Capital and Operating Expenditure Profiles

The starting point for SCI's model was Nalcor Energy's internal capital and operating cost estimates covering the period 2010-49.

Table 1 and Table 2 below summarize, respectively, the direct capital and operating costs (expressed in 2010 dollars) used to drive the economic impact analysis. All dollar estimates presented in this report are expressed in 2010 Canadian dollars.

| | Total | Peak |
|--------------------------------|---------|---------|
| Capital Expenditures - Phase 1 | | |
| Muskrat Fails | \$2,514 | \$742 |
| Island Link | \$1,810 | \$487 |
| Maritime Link | \$1,029 | \$338 |
| Phase 1 Capital - Sub total | \$5,354 | \$1,372 |
| Capital Expenditures - Phase 2 | | |
| Gull Island | \$3,880 | \$721 |
| Gull Island - Romaine TX | \$262 | \$87 |
| HQ Upgrades ¹ | \$3,335 | \$667 |
| Phase 2 Capital - Sub total | \$7,477 | \$1,431 |

Table 1: Capital Cost Estimates (M \$2010 Cdn)

| | Total | Peak |
|---|----------|---------|
| Total Capital Expenditures - Phases 1 & 2 | | |
| Total Capital Costs | \$12,831 | \$1,978 |

1 The costs for upgrades to HQ's transmission infrastructure were converted to 2010\$ by using a proxy to convert the costs contained in HQ's SIS to 2010\$. Additionally, Nalcor Energy also assumed a typical construction expenditure profile for HQ's expenditures in order to allocate the costs over time as per a typical construction project.

| Operating Expenditures - Phases 1 | Total | Average |
|---|---------|---------|
| Muskrat Falls | \$543 | \$17 |
| Island Link | \$432 | \$14 |
| Maritime Link | \$405 | \$13 |
| Phase 1 Operating - Sub total | \$1,380 | \$43 |
| Operating Expenditures - Phases 2 | | |
| Gull Island | \$403 | \$14 |
| HQ Upgrades ¹ | \$352 | \$12 |
| Phase 2 Operating - Sub total | \$755 | \$26 |
| Total Operating Expenditures - Phases 1 & 2 | | |
| Total Operating Costs | \$2,134 | \$67 |

Table 2: Operating Cost Estimates (M \$2010 Cdn)

1 The operating costs for HQ's transmission infrastructure were estimated to be equivalent to those costs required to operate the Island Link.

The project analyzed in this report has an estimated cost of almost \$15.0 billion to construct and operate, with a total of \$12.8 billion in capital expenditures and \$2.1 billion in operating expenditures. Phase 1 consists of \$2.5 billion in capital expenditures for Muskrat Falls, with an additional \$1.8 billion for the Island Link and the remaining \$1.0 billion is required for the Maritime Link for a total Phase 1 capital expenditure of \$5.4 billion. Phase 2 consists of \$3.9 billion in capital expenditures for Gull Island, plus \$3.3 billion for the HQ Upgrades and the remaining \$0.3 billion being spent on the Gull Island-Romaine transmission line for a total Phase 2 capital expenditure of \$7.5 billion. Approximately, 65% of the operating costs (\$1.4 billion) are accounted for by Phase 1 operations and the remaining 35% (\$0.8 billion) of operating costs are associated with Phase 2 operations. The annual profile of capital costs is illustrated in Figure 1 below.



Figure 1: Capital Cost Profile by Project Component (M 2010\$)

3.2 Cost Decomposition

In this step, the costs associated with each project category were broken down into cost types consistent with Nalcor Energy's analysis and estimates. These categories included the following:

- Labour
- Materials
- Equipment
- Services (used for operating costs only)

The breakdown by cost type enables the SCI model to achieve a level of analysis of how different types of expenditures flow through the economy. Table 3 below presents the results from this decomposition exercise for Phase 1 and 2 capital and operating costs, respectively.

| Functional Category | Total | Labour | Materi <u>als</u> | Equipment | Services |
|------------------------------|-------------|-----------------|-------------------|-----------|----------|
| | Capital Exp | enditures Phase | e 1 | | |
| Muskrat Falls | \$2,514 | \$930 | \$1,368 | \$216 | \$0 |
| Island Link | \$1,810 | \$556 | \$869 | \$386 | \$0 |
| Maritime Link | \$1,029 | \$239 | \$519 | \$272 | \$0 |
| Phase 1 Capital - Sub total | \$5,354 | \$1,725 | \$2,755 | \$873 | \$0 |
| Phase 1 Capital % | | 32.2% | 51.5% | 16.3% | 0.0% |
| Capital Expenditures Phase 2 | | | | | |

| Functional Category | Total | Labour | Materials | Equipment | Services |
|---|---------------------------|-----------------------------|------------------------|----------------------------|------------------|
| Gull Island | \$3,880 | \$1,599 | \$1,544 | \$737 | \$0 |
| Gull Island - Romaine TX | \$262 | \$115 | \$133 | \$13 | \$0 |
| HQ Upgrades | \$3,335 | \$1,167 | \$1,534 | \$634 | \$0 |
| Phase 2 Capital - Sub total | \$7,477 | \$2,881 | \$3,194 | \$1,384 | \$0 |
| Phase 2 Capital % | | 38.5% | 42.9% | 18.5% | 0.0% |
| | Total Capital Expe | nditures – Pha | ses 1 & 2 | | |
| Total Capital Cost | \$12,831 | \$4,606 | \$5,949 | \$2,257 | \$0 |
| Total Capital Cost % | | 35.9% | 46.4% | 17.6% | 0.0% |
| | Operating Exp | <mark>enditures – Ph</mark> | ase 1 | | |
| Muskrat Falls | \$543 | \$174 | \$136 | \$71 | \$163 |
| Island Link | \$432 | \$99 | \$91 | \$60 | \$181 |
| Maritime Link | \$405 | \$36 | \$61 | \$24 | \$283 |
| Phase 1 Operating - Sub total | \$1,380 | \$309 | \$287 | \$155 | \$628 |
| Phase 1 Operating % | | 22.4% | 20.8% | 11.3% | 45.5% |
| | Operating Exp | enditures – Ph | ase 2 | | |
| Gull Island | \$403 | \$117 | \$107 | \$66 | \$114 |
| HQ Upgrades | \$352 | \$105 | \$88 | \$74 | \$84 |
| Phase 2 Operating - Sub total | \$755 | \$222 | \$195 | \$139 | \$198 |
| Phase 2 Operating % | | 29.5% | 25.8% | 18.5% | 26.3% |
| ſ | Fotal Operating Ex | penditures - Ph | ase 1 & 2 | | |
| Total Operating Cost | \$2,134 | \$532 | \$482 | \$295 | \$826 |
| Total Operating Cost % | | 24.9% | 22.6% | 13.8% | 38.7% |
| | Total Project Expe | enditures - Pha | se 1 & 2 | | |
| Total Project Cost | \$14,965 | \$5,138 | \$6,431 | \$2,552 | \$844 |
| Total Project Cost % | Π | 34.3% | 43.0% | 17.1% | 5.6% |
| Total Project Cost % Notes: For reporting purposes and c | onsistent with Nalco | 34.3% r Energy's deve | 43.0% lopment of costs | 17.1% sustaining capite | 5.6 ⁴ |

expenditures have been included in the Operating Cost estimates.

Approximately 36% of the construction expenditure is accounted for by direct labour. This decreases to 25% during the operations phase. The majority of construction phase expenditure (46%) is allocated to materials and the remaining 18% comes from equipment purchase. During the operation phase, services account for nearly 40% of the expenditures, with materials representing nearly 25% and equipment making up the final 14%.

3.3.1 Total Direct Employment and Labour Income

The next step was to determine the labour costs and incomes generated for each of the functional categories. This was achieved by first determining, in consultation with Nalcor Energy officials, the full costs per person year of employment for each functional category. Following this was a decomposition of the full costs per person year of employment into the income received by the workers and the associated labour benefits, such as pensions, payroll taxes, vacation pay, etc. This enabled SCI to estimate the incomes earned by labour for each of the functional categories. For each functional category, SCI's model divided the total labour income by the total cost of one person year of employment to yield the total number of person years of employment. The total project employment for the capital phase by project components is illustrated in Table 4 below.

| Project | Labour Cost (\$M) | Cost per PY | Direct | Direct Labour |
|---------------|-------------------|-------------|-----------------|---------------|
| Component | | _ | Employment (PY) | Income (\$M) |
| Muskrat Falls | \$930 | \$165,000 | 5,638 | \$739 |
| Island Link | \$556 | \$181,091 | 3,069 | \$422 |
| Maritime Link | \$239 | \$181,091 | 1,318 | \$181 |
| Gull Island | \$1,544 | \$160,000 | 9,991 | \$1,215 |
| GI-Rom TX | \$133 | \$181,091 | 637 | \$88 |
| HQ Upgrades | \$1,534 | \$181.091 | 6,445 | \$887 |
| Total Capex | \$4,606 | | 27,098 | \$3,533 |

| Table 4: Total Labour | Cost. Direct I | Labour Income and | Direct Employmer | t from Canex |
|-------------------------|----------------|-------------------|------------------|--------------|
| I doit 4. I Ctai Daooui | CO34 DILCCU | Labour Income and | Duce Duplotine | к пош сарса |

The construction of the Lower Churchill project is expected to create approximately 27,100 person years of direct employment and generate more than \$3.5 billion in incomes to direct labour.

3.4 Direct Employment and Income by Region

Following the calculation of total project employment, the next step involves the estimation of the shares of direct employment and income by the expected geographic residency of workers. The labour shares were determined in consultation with Nalcor Energy and were based on their internal review of labour supply issues combined with SCI's experience. By applying the provincial percentages to these project figures on a functional category basis, SCI derived the direct employment and income attributable to provincial-based labour. Table 5 below lists the breakdown of Phase 1 and Phase 2 direct employment, labour cost and labour income by region and by functional category for Nalcor Energy's capital costs. Figure 2 and Figure 3 illustrate the direct employment by region for Phase 1 and Phase 2 capital expenditures, respectively.

Approximately 50% of the direct employment (13,400 person years) and almost 50% of the direct labour income (\$1.7 billion) is expected to accrue to Newfoundlanders and Labradorians.

| | NL | LAB ¹ | ON | QC | NS | NB | PEI | ROC | CAN |
|-------------------------|-------|------------------|-------------|-------|------|------|-----|------|-------|
| | | Pł | nase 1 (201 | 0-18) | | | | | |
| Muskrat Falls | | | | | | | | | |
| Labour cost (\$165,000) | \$607 | \$230 | \$46 | \$48 | \$32 | \$32 | \$5 | \$28 | \$796 |
| Direct employment | 3,676 | 1,396 | 276 | 293 | 192 | 192 | 28 | 169 | 4.826 |
| Direct labour income | \$493 | \$207 | \$35 | \$37 | \$24 | \$24 | \$4 | \$21 | \$637 |
| Island Link | | | | | | | | | |
| Labour cost (\$181,091) | \$397 | \$138 | \$28 | \$28 | \$17 | \$17 | \$3 | \$15 | \$506 |
| Direct employment | 2,194 | 760 | 153 | 153 | 96 | 96 | 14 | 85 | 2,793 |
| Direct labour income | \$302 | \$105 | \$21 | \$21 | \$13 | \$13 | \$2 | \$12 | \$384 |
| Maritime Link | | | | | | | | | |
| Labour cost (\$181,091) | \$72 | \$0 | \$12 | \$12 | \$72 | \$12 | \$0 | \$3 | \$182 |

Table 5: Direct Income and Employment by Project Category, Area and Region: Capital Expenditures (2010\$ CDN and Person Years)

| | NL | LAB ¹ | ON | QC | NS | NB | PEI | ROC | CAN |
|--------------------------|---------|------------------|-------------|----------|-------|-------|------------------|-------|---------|
| Direct employment | 395 | 0 | 65 | 67 | 395 | 66 | 0 | 15 | 1,004 |
| Direct labour income | \$54 | \$0 | \$9 | \$9 | \$54 | \$9 | \$0 | \$2 | \$138 |
| Combined Phase 1 Capex | | | | | | | | | |
| Labour cost | \$1,076 | \$368 | \$85 | \$88 | \$121 | \$61 | \$7 | \$46 | \$1,484 |
| Direct employment | 6,266 | 2,156 | 495 | 514 | 683 | 354 | 42 | 269 | 8,623 |
| Direct labour income | \$850 | \$312 | \$65 | \$67 | \$92 | \$46 | \$5 | \$35 | \$1,160 |
| | | Pl | nase 2 (20) | 13-21) | | | | | |
| Gull Island | 10000 | | | | | | | | |
| Labour cost (\$160,000) | \$1,042 | \$396 | \$78 | \$83 | \$54 | \$54 | \$8 | \$48 | \$1,368 |
| Direct employment | 6,514 | 2,473 | 490 | 520 | 340 | 340 | 50 | 300 | 8,552 |
| Direct labour income | \$792 | \$301 | \$60 | \$63 | \$41 | \$41 | \$6 | \$36 | \$1,040 |
| Gull Island - Romaine TX | | | | | | | | | |
| Labour cost (\$181,091) | \$83 | \$29 | \$6 | \$6 | \$3 | \$3 | \$1 | \$8 | \$110 |
| Direct employment | 459 | 158 | 32 | 32 | 19 | 19 | 3 | 45 | 608 |
| Direct labour income | \$63 | \$22 | \$4 | \$4 | \$3 | \$3 | \$0 | \$6 | \$84 |
| HQ Upgrades | | | | | | | | | |
| Labour cost (\$181,091) | \$35 | \$0 | \$117 | \$922 | \$0 | \$0 | \$0 | \$58 | \$1,132 |
| Direct employment | 193 | 0 | 645 | 5,092 | 0 | 0 | 0 | 322 | 6,252 |
| Direct labour income | \$27 | \$0 | \$89 | \$701 | \$0 | \$0 | \$0 | \$44 | \$860 |
| Combined Phase 2 Capex | | | | | | | | | |
| Labour cost | \$1,160 | \$425 | \$201 | \$1,011 | \$58 | \$58 | \$9 | \$114 | \$2,611 |
| Direct employment | 7,166 | 2,631 | 1,166 | 5,643 | 359 | 359 | 53 | 667 | 15,412 |
| Direct labour income | \$882 | \$323 | \$153 | \$768 | \$44 | \$44 | <mark>\$6</mark> | \$87 | \$1,984 |
| | | Pha | se 1 & 2 (2 | 2010-21) | | | | | |
| Total Capex | | | | | | | | | |
| Labour cost | \$2,236 | \$793 | \$286 | \$1,099 | \$178 | \$119 | \$16 | \$160 | \$4,095 |
| Direct employment | 13,432 | 4,784 | 1,661 | 6,157 | 1,042 | 713 | 95 | 935 | 24,035 |
| Direct labour income | \$1,731 | \$635 | \$217 | \$835 | \$136 | \$90 | \$12 | \$122 | \$3,144 |
| 1 Labrador is a subset | of NL | | | | | | | | |

Labrador is a subset of NL



Figure 2: Phase 1 Capital Expenditure Direct Employment by Region

Figure 3: Phase 2 Capital Expenditure Direct Employment by Region



In addition to the employment and income impacts from construction, another 4,700 direct person years of employment and \$404 million of direct labour income are expected to be generated during operations between 2018 and 2049, with approximately 75% of employment taking place in NL and an equivalent share of income accruing to workers from Newfoundland and Labrador. The direct impacts from operational expenditures are illustrated in Table 6 below.

| Functional Category | NL | LAB | ON | 00 | NS | NB | PEI | ROC | CAN |
|-------------------------|-------|-------------|---------------------------|----------|-------------|-------------|-----|-----|-------|
| | Оре | rations Exp | enditure - | Phase 1 | (2018-2049) |) | | | |
| Muskrat Falls | | | | | | | | | |
| Labour cost (\$117,000) | \$174 | \$69 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$174 |
| Direct employment | 1,484 | 594 | 0 | 0 | 0 | 0 | 0 | 0 | 1,484 |
| Direct labour income | \$132 | \$53 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$132 |
| Island Link | | | | | | | | | |
| Labour cost (\$107,143) | \$99 | \$55 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$99 |
| Direct employment | 927 | 510 | 0 | 0 | 0 | 0 | 0 | 0 | 927 |
| Direct labour income | \$75 | \$42 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$75 |
| Maritime Link | | | | | | | | | |
| Labour cost (\$100,528) | \$9 | \$0 | \$0 | \$0 | \$27 | \$0 | \$0 | \$0 | \$36 |
| Direct employment | 91 | 0 | 0 | 0 | 272 | 0 | 0 | 0 | 363 |
| Direct labour income | \$7 | \$0 | \$0 | \$0 | \$21 | \$0 | \$0 | \$0 | \$28 |
| Combined Phase 1 Opex | | | | | | | | | |
| Labour cost | \$282 | \$124 | \$0 | \$0 | \$27 | \$0 | \$0 | \$0 | \$309 |
| Direct employment | 2,502 | 1,104 | 0 | 0 | 272 | 0 | 0 | 0 | 2,774 |
| Direct labour income | \$214 | \$94 | \$0 | \$0 | \$21 | \$0 | \$0 | \$0 | \$235 |
| | Оре | rations Exp | enditure - | Phase 2 | (2021-2049) |) | | | |
| Gull Island | | | | | | | | | |
| Labour cost (\$117,000) | \$117 | \$47 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$117 |
| Direct employment | 999 | 400 | 0 | 0 | 0 | 0 | 0 | 0 | 999 |
| Direct labour income | \$89 | \$36 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$89 |
| HQ Upgrades | | | | | | | | | |
| Labour cost (\$107,143) | \$0 | \$0 | \$0 | \$105 | \$0 | \$0 | \$0 | \$0 | \$105 |
| Direct employment | 0 | 0 | 0 | 965 | 0 | 0 | 0 | 0 | 965 |
| Direct labour income | \$0 | \$0 | \$0 | \$80 | \$0 | \$0 | \$0 | \$0 | \$80 |
| Combined Phase 2 Opex | | | | | | | | | |
| Labour cost | \$117 | \$47 | \$0 | \$105 | \$0 | \$0 | \$0 | \$0 | \$222 |
| Direct employment | 999 | 400 | 0 | 965 | 0 | 0 | 0 | 0 | 1,964 |
| Direct labour income | \$89 | \$36 | \$0 | \$80 | \$0 | \$0 | \$0 | \$0 | \$169 |
| | Opera | tions Exper | <mark>iditure - Pl</mark> | nase 1 & | 2 (2018-204 | 19) | | | _ |
| Total Opex | | | | | | | | | |
| Labour cost | \$399 | \$171 | \$0 | \$105 | \$27 | \$0 | \$0 | \$0 | \$532 |
| Direct employment | 3,501 | 1,503 | 0 | 965 | 272 | 0 | 0 | 0 | 4,738 |
| Direct labour income | \$303 | \$130 | \$0 | \$80 | \$21 | \$0 | \$0 | \$0 | \$404 |

Table 6: Direct Income and Employment by Project Category, Area and Region: Operations (2010\$ CDN and Person Years)

Notes:

1. A standardized person year of employment is taken to be 2,080 hours per year (52 weeks * 40 hours).

2. Direct labour income is estimated at 75% of total labour costs.

3.5 Indirect Income and Employment

For the non-labour components of project expenditures, the amount supplied by firms in each region (i.e., the capture rate or supply factor) and the expected value-added component (i.e.,

net of imports) were estimated. As an additional check, a hypothetical, but representative, expenditure profile was analyzed utilizing an input-output model for Canada. This supplementary analysis allowed SCI to confirm that the assumed capture rates and value-added factors were consistent with the range of known inter-firm linkages established within this input-output framework. The capture rate or supply factors are provided in Table 7, while the value added factors or import-adjusted parameters are provided in Table 8.

| | | | Supply Factors | | | | | | | | |
|-----------------------------|---------|-----------|----------------|----------|---------|------|-----|----|-----|-------|-----|
| | Cost | Breakdown | NL | LAB | ON | QC | NS | NB | PEI | ROC | CAN |
| | | Capita | al Exper | ditures | - Phase | 1 | | | | | |
| Muskrat Falls | \$2,514 | 100% | 36% | 18% | 12% | 12% | 2% | 2% | 0% | 3% | 67% |
| Labour | \$930 | 37% | 65% | 25% | 5% | 5% | 3% | 3% | 1% | 3% | 86% |
| Materials | \$1,368 | 54% | 18% | 15% | 16% | 17% | 1% | 1% | 1% | 3% | 56% |
| Equipment | \$216 | 9% | 20% | 9% | 13% | 11% | 0% | 0% | 0% | 11% | 55% |
| Services | \$0 | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| Island Link | \$1,810 | 100% | 36% | 17% | 4% | 15% | 1% | 1% | 0% | 4% | 63% |
| Labour | \$556 | 31% | 72% | 25% | 5% | 5% | 3% | 3% | 0% | 3% | 91% |
| Materials | \$869 | 48% | 8% | 15% | 4% | 17% | 1% | 1% | 1% | 4% | 36% |
| Equipment | \$386 | 21% | 48% | 9% | 5% | 26% | 0% | 0% | 0% | 4% | 82% |
| Services | \$0 | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| Maritime Link | \$1,029 | 100% | 12% | 0% | 6% | 14% | 9% | 2% | 0% | 9% | 52% |
| Labour | \$239 | 23% | 30% | 0% | 5% | 5% | 30% | 5% | 0% | 1% | 76% |
| Materials | \$519 | 50% | 6% | 0% | 7% | 16% | 5% | 1% | 1% | 3% | 39% |
| Equipment | \$272 | 26% | 8% | 0% | 5% | 17% | 0% | 0% | 0% | 27% | 57% |
| Services | \$0 | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| | | Capit | al Exper | nditures | - Phase | 2 | | | | · · · | |
| Gull Island | \$3,880 | 100% | 38% | 18% | 11% | 11% | 2% | 2% | 0% | 4% | 68% |
| Labour | \$1,599 | 41% | 65% | 25% | 5% | 5% | 3% | 3% | 1% | 3% | 86% |
| Materials | \$1,544 | 40% | 18% | 15% | 16% | 17% | 1% | 1% | 1% | 3% | 56% |
| Equipment | \$737 | 19% | 20% | 9% | 13% | 11% | 0% | 0% | 0% | 11% | 55% |
| Services | \$0 | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| Gull Island - Romaine TX | \$262 | 100% | 38% | 18% | 4% | 11% | 2% | 2% | 0% | 4% | 62% |
| Labour | \$115 | 44% | 72% | 25% | 5% | 5% | 3% | 3% | 0% | 7% | 95% |
| Materials | \$115 | 44% | 10% | 15% | 4% | 17% | 2% | 2% | 0% | 2% | 37% |
| Equipment | \$13 | 5% | 44% | 9% | 5% | 24% | 1% | 1% | 0% | 2% | 77% |
| Services | \$18 | 7% | 0% | 5% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| HQ Upgrades | \$3,335 | 100% | 1% | 0% | 13% | 70% | 0% | 0% | 0% | 5% | 89% |
| Labour | \$1,167 | 35% | 3% | 0% | 10% | 79% | 0% | 0% | 0% | 5% | 97% |
| Materials | \$1,534 | 46% | 0% | 0% | 15% | 65% | 0% | 0% | 0% | 5% | 85% |
| Equipment | \$634 | 19% | 0% | 0% | 15% | 65% | 0% | 0% | 0% | 5% | 85% |
| Services | \$0 | 0% | 0% | 0% | 15% | 65% | 0% | 0% | 0% | 5% | 85% |
| | Cost | Breakdown | NL | LAB | ON | QC | NS | NB | PEI | ROC | CAN |
| | | Operat | ing Exp | enditure | s - Pha | se 1 | | | | | |

| Table 7: (| Capture | Rates/Supp | ly | Factors |
|------------|---------|------------|----|----------------|
|------------|---------|------------|----|----------------|

| Economic Impact Analysis of Nalcor Energy's Lower Churchill Project |
|---|
|---|

| | | | | | | Supp | ly Fact | ors | | | |
|---------------|-------|-----------|----------|---------|-----------------------|-------|---------|-----|-----|-----|------|
| | Cost | Breakdown | NL | LAB | ON | QC | NS | NB | PEI | ROC | CAN |
| Muskrat Falls | \$543 | 100% | 100% | 30% | 0% | 0% | 0% | 0% | 0% | 0% | 100% |
| Labour | \$174 | 32% | 100% | 63% | 0% | 0% | 0% | 0% | 0% | 0% | 100% |
| Materials | \$136 | 25% | 100% | 18% | 0% | 0% | 0% | 0% | 0% | 0% | 100% |
| Equipment | \$71 | 13% | 100% | 12% | 0% | 0% | 0% | 0% | 0% | 0% | 100% |
| Services | \$163 | 30% | 100% | 12% | 0% | 0% | 0% | 0% | 0% | 0% | 100% |
| Island Link | \$432 | 100% | 100% | 17% | 0% | 0% | 0% | 0% | 0% | 0% | 100% |
| Labour | \$99 | 23% | 100% | 55% | 0% | 0% | 0% | 0% | 0% | 0% | 100% |
| Materials | \$91 | 21% | 100% | 5% | 0% | 0% | 0% | 0% | 0% | 0% | 100% |
| Equipment | \$60 | 14% | 100% | 6% | 0% | 0% | 0% | 0% | 0% | 0% | 100% |
| Services | \$181 | 42% | 100% | 6% | 0% | 0% | 0% | 0% | 0% | 0% | 100% |
| Maritime Link | \$405 | 100% | 25% | 0% | 0% | 0% | 75% | 0% | 0% | 0% | 100% |
| Labour | \$36 | 9% | 25% | 0% | 0% | 0% | 75% | 0% | 0% | 0% | 100% |
| Materials | \$61 | 15% | 25% | 0% | 0% | 0% | 75% | 0% | 0% | 0% | 100% |
| Equipment | \$24 | 6% | 25% | 0% | 0% | 0% | 75% | 0% | 0% | 0% | 100% |
| Services | \$283 | 70% | 25% | 0% | 0% | 0% | 75% | 0% | 0% | 0% | 100% |
| | | Operat | ing Expe | nditure | <mark>s - Ph</mark> a | ise 2 | | | | | |
| Gull Island | \$403 | 100% | 100% | 30% | 0% | 0% | 0% | 0% | 0% | 0% | 100% |
| Labour | \$117 | 29% | 100% | 69% | 0% | 0% | 0% | 0% | 0% | 0% | 100% |
| Materials | \$107 | 27% | 100% | 18% | 0% | 0% | 0% | 0% | 0% | 0% | 100% |
| Equipment | \$66 | 16% | 100% | 12% | 0% | 0% | 0% | 0% | 0% | 0% | 100% |
| Services | \$114 | 28% | 100% | 12% | 0% | 0% | 0% | 0% | 0% | 0% | 100% |
| HQ Upgrades | \$352 | 100% | 0% | 0% | 0% | 100% | 0% | 0% | 0% | 0% | 100% |
| Labour | \$105 | 30% | 0% | 0% | 0% | 100% | 0% | 0% | 0% | 0% | 100% |
| Materials | \$88 | 25% | 0% | 0% | 0% | 100% | 0% | 0% | 0% | 0% | 100% |
| Equipment | \$74 | 21% | 0% | 0% | 0% | 100% | 0% | 0% | 0% | 0% | 100% |
| Services | \$84 | 24% | 0% | 0% | 0% | 100% | 0% | 0% | 0% | 0% | 100% |

Table 8: Value Added Factors

| · | | | | | | Value | Added F | actors | | | |
|---------------|---------|-----------|-----------|---------|-----------|-------|---------|--------|------|------|------|
| | Cost | Breakdown | NL | LAB | ON | QC | NS | NB | PEI | ROC | CAN |
| | | Ca | apital Ex | penditu | res - Pha | se 1 | | | | | |
| Muskrat Falls | \$2,514 | 100% | 66% | 53% | 63% | 62% | 59% | 58% | 62% | 69% | 80% |
| Labour | \$930 | 37% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| Materials | \$1,368 | 54% | 50% | 25% | 40% | 42% | 37% | 36% | 44% | 53% | 69% |
| Equipment | \$216 | 9% | 25% | 25% | 41% | 29% | 20% | 20% | 20% | 37% | 66% |
| Services | \$0 | 0% | 0% | 25% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| Island Link | \$1,810 | 100% | 62% | 48% | 59% | 60% | 54% | 54% | 56% | 63% | 76% |
| Labour | \$556 | 31% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| Materials | \$869 | 48% | 50% | 25% | 42% | 45% | 40% | 39% | 44% | 52% | 72% |
| Equipment | \$386 | 21% | 35% | 25% | 40% | 35% | 20% | 20% | 20% | 35% | 52% |
| Services | \$0 | 0% | 0% | 25% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| Maritime Link | \$1,029 | 100% | 60% | 42% | 54% | 55% | 49% | 49% | 49% | 60% | 67% |
| Labour | \$239 | 23% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |

| | | - | Value Added Factors | | | | | | | | |
|-----------------------------|---------|-----------|---------------------|----------|-----------|--------|------|------|------|------|------|
| ····· | Cost | Breakdown | NL | LAB | ON | QC | NS | NB | PEI | ROC | CAN |
| Materials | \$519 | 50% | 59% | 25% | 40% | 44% | 40% | 40% | 40% | 54% | 60% |
| Equipment | \$272 | 26% | 25% | 25% | 40% | 35% | 20% | 20% | 20% | 35% | 50% |
| Services | \$0 | 0% | 0% | 25% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| | | Ca | pital Ex | penditu | res - Pha | se 2 | | | | | |
| Gull Island | \$3,880 | 100% | 68% | 56% | 65% | 66% | 61% | 60% | 62% | 69% | 80% |
| Labour | \$1,599 | 41% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| Materials | \$1,544 | 40% | 50% | 25% | 42% | 45% | 40% | 39% | 44% | 52% | 72% |
| Equipment | \$737 | 19% | 35% | 25% | 40% | 35% | 20% | 20% | 20% | 35% | 52% |
| Services | \$0 | 0% | 0% | 25% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| Gull Island - Romaine TX | \$262 | 100% | 68% | 58% | 64% | 66% | 63% | 62% | 64% | 69% | 78% |
| Labour | \$115 | 44% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| Materials | \$115 | 44% | 50% | 25% | 42% | 45% | 40% | 39% | 44% | 52% | 72% |
| Equipment | \$13 | 5% | 35% | 25% | 40% | 35% | 20% | 20% | 20% | 35% | 52% |
| Services | \$18 | 7% | 0% | 25% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| HQ Upgrades | \$3,335 | 100% | 63% | 51% | 61% | 62% | 57% | 57% | 57% | 65% | 67% |
| Labour | \$1,167 | 35% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| Materials | \$1,534 | 46% | 50% | 25% | 40% | 43% | 40% | 40% | 40% | 51% | 52% |
| Equipment | \$634 | 19% | 25% | 25% | 40% | 40% | 20% | 20% | 20% | 35% | 45% |
| Services | \$0 | 0% | 0% | 25% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| | | Оре | erating E | Expendit | ures - Ph | ase 1 | | | | | |
| Muskrat Falls | \$543 | 100% | 58% | 49% | 65% | 65% | 65% | 65% | 65% | 57% | 75% |
| Labour | \$174 | 32% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| Materials | \$136 | 25% | 50% | 25% | 49% | 49% | 49% | 49% | 49% | 37% | 80% |
| Equipment | \$71 | 13% | 25% | 25% | 49% | 49% | 49% | 49% | 49% | 37% | 65% |
| Services | \$163 | 30% | 35% | 25% | 49% | 49% | 49% | 49% | 49% | 37% | 50% |
| Island Link | \$432 | 100% | 52% | 42% | 61% | 61% | 61% | 61% | 61% | 51% | 70% |
| Labour | \$99 | 23% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| Materials | \$91 | 21% | 50% | 25% | 49% | 49% | 49% | 49% | 49% | 37% | 80% |
| Equipment | \$60 | 14% | 25% | 25% | 49% | 49% | 49% | 49% | 49% | 37% | 65% |
| Services | \$181 | 42% | 35% | 25% | 49% | 49% | 49% | 49% | 49% | 37% | 50% |
| Maritime Link | \$405 | 100% | 43% | 32% | 54% | 54% | 54% | 54% | 54% | 76% | 60% |
| Labour | \$36 | 9% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| Materials | \$61 | 15% | 50% | 25% | 49% | 49% | 49% | 49% | 49% | 60% | 80% |
| Equipment | \$24 | 6% | 25% | 25% | 49% | 49% | 49% | 49% | 49% | 37% | 65% |
| Services | \$283 | 70% | 35% | 25% | 49% | 49% | 49% | 49% | 49% | 80% | 50% |
| | | Ор | erating H | Expendit | ures - Pl | nase 2 | | | | | |
| Gull Island | \$403 | 100% | 56% | 47% | 64% | 64% | 64% | 64% | 6% | 55% | 75% |
| Labour | \$117 | 29% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| Materials | \$107 | 27% | 50% | 25% | 49% | 49% | 49% | 49% | 49% | 37% | 80% |
| Equipment | \$66 | 16% | 25% | 25% | 49% | 49% | 49% | 49% | 49% | 37% | 65% |
| Services | \$114 | 28% | 35% | 25% | 49% | 49% | 49% | 49% | 49% | 37% | 50% |
| HQ Upgrades | \$352 | 100% | 0% | 0% | 41% | 66% | 36% | 36% | 36% | 47% | 68% |
| Labour | \$105 | 30% | 0% | 0% | 73% | 100% | 73% | 73% | 73% | 100% | 73% |

| | | ···- | | | | Value | Added F | actors | | | |
|-----------|------|-----------|----|-----|-----|-------|---------|--------|-----|-----|-----|
| | Cost | Breakdown | NL | LAB | ON | QC | NS | NB | PEI | ROC | CAN |
| Materials | \$88 | 25% | 0% | 0% | 42% | 70% | 40% | 39% | 44% | 37% | 80% |
| Equipment | \$74 | 21% | 0% | 0% | 40% | 32% | 20% | 20% | 20% | 37% | 65% |
| Services | \$84 | 24% | 0% | 0% | 0% | 49% | 0% | 0% | 0% | 0% | 50% |

The results of the indirect employment and income estimates are summarized below in Table 9 and Table 10, respectively. As well, the results for Phase 1 and Phase 2 capital employment by jurisdiction are presented in Figure 4 and Figure 5 The results clearly indicate that ON and QC are the greatest recipient of indirect benefits from Nalcor Energy's capital expenditures, with a combined total of almost 13,900 and 17,400 indirect person years of employment, respectively for Phases 1 and 2. These results illustrate the significant level of benefits that would be expected accrue to ON and QC as the main suppliers of many of the non-labour inputs required by Nalcor Energy given their respective industrial economic bases. NL is also a significant beneficiary with 13,900 indirect person years of employment.

| | NL | LAB | ON | QC | NS | NB | PEI | ROC | CAN | | | |
|--|--------|-----------|----------------|----------------------------|------------|--------|-----|---------|--------|--|--|--|
| | | Ca | oital Expendit | tures - Phas | ie 1 | | | | | | | |
| Muskrat Falls | 2.177 | 780 | 2,652 | 2,268 | 99 | 136 | 45 | 807 | 8,183 | | | |
| Island Link | 1,574 | 537 | 985 | 1,935 | 64 | 82 | 28 | 557 | 5,225 | | | |
| Maritime Link | 436 | 0 | 695 | 636 | 218 | 64 | 17 | 588 | 2.655 | | | |
| Total Phase 1 Capex | 4,187 | 1,353 | 4,332 | 4,840 | 381 | 282 | 90 | 1,952 | 16,063 | | | |
| | | Ca | oital Expendit | t <mark>ures - Phas</mark> | e 2 | | | | | | | |
| Gull Island | 3,068 | 1,034 | 4,411 | 2,217 | 137 | 211 | 55 | 1,542 | 11,639 | | | |
| Gull Island - Romaine TX | 131 | 67 | 121 | 149 | 15 | 17 | 0 | 49 | 482 | | | |
| HQ Upgrades | 261 | 0 | 2.834 | 8,122 | 25 | 55 | 4 | 1.029PY | 12,330 | | | |
| Total Phase 2 Capex | 3,460 | 1,102 | 7,366 | 10,488 | 177 | 283 | 59 | 2,619 | 24,451 | | | |
| Total Capital Expenditures - Phase 1 & 2 | | | | | | | | | | | | |
| Total Capex | 7,647 | 2,455 | 11,698 | 15,327 | 557 | 565 | 148 | 4.571 | 40,514 | | | |
| | | Oper | ating Expend | litures - Ph | ase I | | - | | | | | |
| Muskrat Falls | 2,140 | 219 | 642 | 106 | 15 | 34 | 2 | 218 | 3,159 | | | |
| Island Link | 1,857 | 80 | 540 | 89 | 13 | 29 | 2 | 184 | 2,713 | | | |
| Maritime Link | 536 | 0 | 259 | 43 | 1.820 | 14 | | 88 | 2.761 | | | |
| Total Phase 1 Opex | 4,533 | 299 | 1,441 | 238 | 1,848 | 77 | 5 | 490 | 8,634 | | | |
| | | Оре | rating Expend | litures - Ph | ase 2 | | | | | | | |
| Gull Island | 1,653 | 172 | 520 | 86 | 12 | 28 | 2 | 177 | 2,478 | | | |
| HQ Upgrades | -41 | 0 | 248 | 1.757 | 6 | 13 | I | 84 | 2.150 | | | |
| Total Phase 2 Opex | 1,694 | 172 | 768 | 1,843 | 18 | - 41 - | 3 | 261 | 4,628 | | | |
| | | Total Ope | rating Expen | ditures - Pl | nase 1 & 2 | | | | | | | |
| Total Opex | 6,228 | 471 | 2,209 | 2,082 | 1,867 | 118 | 8 | 751 | 13,262 | | | |
| | | Total Pr | oject Expend | itures - Pha | ise 1 & 2 | | | | | | | |
| Total Project | 13,875 | 2,926 | 13,906 | 17,409 | 2,424 | 683 | 157 | 5,322 | 53,776 | | | |

 Table 9: Total Indirect Employment by Project Category and Region (Person Years)



Figure 4: Phase 1 Capital Expenditure Indirect Employment by Region

Figure 5: Phase 2 Capital Expenditure Indirect Employment by Region



Table 10: Total Indirect Income by Project Category and Region (\$M)

| | NL | LAB | ON | QC | NS | NB | PEI | ROC | CAN |
|--------------------------|-------|--------------|-------------|-------------|------------|------|-----|-------|---------|
| | | | Capital Exp | enditures - | Phase 1 | | | | |
| Muskrat Falls | \$158 | \$56 | \$201 | \$170 | \$7 | \$10 | \$3 | \$61 | \$611 |
| Island Link | \$114 | \$41 | \$76 | \$145 | \$5 | \$6 | \$2 | \$42 | \$390 |
| Maritime Link | \$32 | \$0 | \$52 | \$48 | \$16 | \$5 | \$1 | \$44 | \$198 |
| Total Phase 1 Capex | \$304 | \$ 97 | \$328 | \$362 | \$29 | \$21 | \$7 | \$147 | \$1.199 |
| | | | Capital Exp | enditures - | Phase 2 | | | | |
| Gull Island | \$223 | \$74 | \$333 | \$166 | \$10 | \$16 | \$4 | \$116 | \$869 |
| Gull Island - Romaine TX | \$10 | \$5 | \$9 | \$11 | S 1 | \$1 | \$0 | 54 | \$36 |

| | NL | LAB | ON | QC | NS | NB | PEI | ROC | CAN | |
|--|---------|-------|-------------|---------------|-----------|------|-------------|-------|---------|--|
| HQ Upgrades | \$19 | \$0 | \$212 | \$606 | \$2 | \$4 | \$0 | \$77 | \$920 | |
| Total Phase 2 Capex | \$253 | \$79 | \$553 | \$7 83 | \$13 | \$21 | \$4 | \$197 | \$1,825 | |
| Total Capex | \$557 | \$177 | \$882 | \$1,146 | \$42 | \$43 | \$11 | \$344 | \$3.024 | |
| Operating Expenditures - Phase 1 | | | | | | | | | | |
| Muskrat Falls | \$155 | \$16 | \$51 | \$8 | \$1 | \$3 | \$0 | \$17 | \$236 | |
| Island Link | \$135 | \$6 | \$43 | \$7 | \$1 | \$2 | \$ 0 | \$15 | \$203 | |
| Maritime Link | \$39 | \$0 | \$20 | \$3 | \$136 | \$1 | \$0 | \$7 | \$206 | |
| Total Phase 1 Opex | \$329 | \$22 | \$114 | \$19 | \$138 | \$6 | \$0 | \$39 | \$6-1-1 | |
| | | O | perating Ex | penditures | - Phase 2 | | | | | |
| Gull Island | \$120 | \$12 | \$41 | \$7 | \$1 | \$2 | \$0 | \$14 | \$185 | |
| HQ Upgrades | \$5 | \$0 | \$18 | \$130 | \$0 | \$1 | \$0 | \$6 | \$161 | |
| Total Phase 2 Opex | \$125 | \$12 | \$59 | \$136 | \$1 | \$3 | \$0 | \$20 | \$345 | |
| Total Opex | \$454 | \$34 | \$173 | \$155 | \$140 | \$9 | \$1 | \$59 | \$990 | |
| Total Project | \$1.010 | \$211 | \$1.055 | \$1.301 | \$181 | \$52 | \$12 | \$403 | \$4,014 | |
| Note: Indirect incomes estimates are \$72,000/PY for NL and \$75,000/PY for ON/QC/NS/NB/PEI/ROC/Can. | | | | | | | | | | |

3.6 Induced Income and Employment

Induced income was calculated by applying an income multiplier to the direct and indirect incomes generated by the company's capital and operating expenditures. Income multipliers are derived by estimating, via ordinary least squares, the marginal propensities to consume, to tax and to import within each jurisdiction from data available in the most recent Provincial Economic Accounts. Induced employment was then calculated from the induced income by applying an average income per induced person year of employment (ranging from \$49,800 to \$51,600, depending on geographic location).⁵

Table 11 below presents the induced income multipliers and applicable incomes used to derive the induced economic impacts for the project.

| | NL | LAB | NS | NB | PEI | ON | QC | ROC | CAN |
|---|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Induced Income per PY | \$49,762 | \$49,762 | \$51,581 | \$51,581 | \$51,581 | \$51,581 | \$51,581 | \$51,581 | \$51,581 |
| Induced Income Multiplier | 1.24 | 1.10 | 1.36 | 1.28 | 1.25 | 1.5 | 1.38 | 1.37 | 1.48 |
| Induced Income as a % of Indirect Income | 69.1% | 69.1% | 69.1% | 69.1% | 69.1% | 69.1% | 69.1% | 69.1% | 69.1% |

 Table 11: Induced Income and Employment Parameters

The calculation of induced employment is not done through the use of an explicit employment multiplier in the SCI model. Rather, induced employment was calculated after dividing induced income by using the average cost per person year of employment in the broader economy. Following the calculation of induced income and employment, it is then possible to calculate the implied employment multiplier for each jurisdiction by taking the ratio of total

⁵ The induced income parameters were estimated from the most recent Statistics Canada data on service sector wage rates in each jurisdiction. Each wage rate wage rate was adjusted for non-wage costs and profits and overhead to derive the value utilized in this analysis.

employment to direct employment. That is, the employment multiplier was solved implicitly as a benchmark indicator of the reasonableness of the modeling approach, but it was not utilized explicitly in any of the calculations that generated economic impacts within the model. The implicit employment multiplier calculated for the project was 2.7 for Newfoundland and Labrador and 5.3 for Canada.

3.7 Total Project Income and Employment Impacts

The total direct, indirect, and induced income and employment impacts for each phase are summarized in Table 12 below.

| | NL | LAB | QC | ON | NS | NB | PEI | ROC | CAN |
|---|-------------|--------------|-------------|-------------|-----------|------------|------|-------|--------------|
| Inco | me Associa | ated with P. | hase 1 Capi | ital Expend | litures | | | | |
| Direct Income | \$850 | \$312 | \$67 | \$65 | \$92 | \$46 | \$5 | \$35 | \$1,160 |
| Indirect Income | \$304 | \$97 | \$362 | \$328 | \$29 | \$21 | \$7 | \$147 | \$1.199 |
| Induced Income | \$277 | \$41 | \$326 | \$360 | \$43 | \$19 | \$3 | \$104 | \$1,132 |
| Total Income from Phase 1 Capital | \$1,431 | \$450 | \$756 | \$753 | \$164 | \$87 | \$15 | \$286 | \$3,491 |
| Inco | me Associa | ated with P | hase 2 Cap | ital Expend | litures | | | | |
| Direct Income | \$882 | \$322 | \$768 | \$153 | \$44 | \$44 | \$6 | \$87 | \$1,984 |
| Indirect Income | \$253 | \$79 | \$783 | \$553 | \$13 | \$21 | \$4 | \$197 | \$1.825 |
| Induced Income | \$272 | \$40 | \$800 | \$563 | \$21 | \$18 | \$3 | \$152 | \$1,828 |
| Total Income from Phase 2 Capital | \$1,407 | \$442 | \$2,352 | \$1,269 | \$78 | \$84 | \$14 | \$435 | \$5,638 |
| Income | Associated | l with Phas | e 1 and 2 C | Capital Exp | enditures | | | | |
| Direct Income | \$1,731 | \$634 | \$835 | \$217 | \$136 | \$90 | \$12 | \$122 | \$3,144 |
| Indirect Income | \$557 | \$177 | \$1,146 | \$882 | \$42 | \$43 | \$11 | \$344 | \$3.024 |
| Induced Income | \$549 | \$81 | \$1,126 | \$923 | \$64 | \$37 | \$6 | \$255 | \$2,961 |
| Total Income from Phase 1 and 2 Capital | \$2,838 | \$892 | \$3,107 | \$2,022 | \$241 | \$170 | \$29 | \$721 | \$9,129 |
| Incon | ne Associat | ed with Ph | ase 1 Opera | ating Expen | nditures | | | | |
| Direct Income | \$214 | \$125 | \$0 | \$0 | \$21 | \$0 | \$0 | \$0 | \$235 |
| Indirect Income | \$329 | \$22 | \$19 | \$114 | \$138 | \$6 | \$0 | \$39 | \$644 |
| Induced Income | \$130 | \$15 | \$77 | \$126 | \$57 | \$2 | \$0 | \$30 | \$422 |
| Total Income from Phase 1 Operating | \$674 | \$161 | \$96 | \$240 | \$216 | \$8 | \$1 | \$68 | \$1,302 |
| Incon | ne Associat | ed with Ph | ase 2 Opera | ating Expe | nditures | | | | |
| Direct Income | \$89 | \$61 | \$80 | \$0 | \$0 | \$0 | \$0 | \$0 | \$169 |
| Indirect Income | \$125 | \$12 | \$136 | \$59 | \$1 | \$3 | \$0 | \$20 | \$345 |
| Induced Income | \$51 | \$7 | \$116 | \$63 | \$1 | <u>\$I</u> | \$0 | \$15 | \$247 |
| Total Income from Phase Operating | \$265 | \$81 | \$332 | \$123 | \$2 | \$4 | \$0 | \$35 | <u>\$761</u> |
| Income A | Associated | with Phase | 1 and 2 Op | perating Ex | penditur | es | | | |
| Direct Income | \$303 | \$186 | \$80 | \$0 | \$21 | \$0 | \$0 | \$0 | \$404 |
| Indirect Income | \$454 | \$34 | \$155 | \$173 | \$1.40 | \$9 | \$1 | \$59 | \$990 |
| Induced Income | \$182 | \$22 | \$193 | \$190 | \$58 | \$3 | \$0 | \$45 | \$669 |
| Total Income from Phase 1 and 2 | \$938 | \$242 | \$428 | \$363 | \$218 | \$12 | \$1 | \$104 | \$2,063 |
| Income Associa | ted with P | hase 1 and | 2 Operatio | ns and Cap | ital Expe | nditures | | | |
| Direct Income | \$2,035 | \$820 | \$916 | \$217 | \$156 | \$90 | \$12 | \$122 | \$3,548 |

Table 12: Direct, Indirect and Induced Income Summary

| | NL | LAB | QC | ON | NS | NB | PEI | ROC | CAN |
|----------------------|---------------|---------|---------|---------|-------|-------|------|-------|----------|
| Indirect Income | \$1.010 | \$211 | \$1.301 | \$1.055 | \$181 | \$52 | \$12 | \$403 | \$4.014 |
| Induced Income | <u>\$</u> 731 | \$103 | \$1,319 | \$1.113 | \$122 | \$40 | \$6 | \$300 | \$3,630 |
| Total Project Income | \$3,776 | \$1,134 | \$3,535 | \$2,385 | \$459 | \$182 | \$30 | \$825 | \$11,192 |

Total income to persons and businesses in Canada arising from the construction and operation of the Lower Churchill project is estimated to be \$11.2 billion. Regionally, NL labour and businesses will receive approximately 1/3 of the estimated income benefits, while other Canadian jurisdictions will receive the remaining two thirds of the Project's income benefits. This distribution of benefits reflects the significant indirect and induced economic impacts accruing to the provinces in the rest of Canada that have more diversified economic bases and are characterized by lower import leakages than that experienced in NL. Figures 6 and 7 below illustrate the income by region generated by the capital expenditures for Phases 1 and 2.



Figure 6: Lower Churchill Phase 1 Income Benefits for the Canadian Economy (2010\$, Millions)

Figure 7: Lower Churchill Phase 2 Income Benefits for the Canadian Economy (2010\$, Millions)



Total employment arising from the construction and operation of the Lower Churchill project is estimated to be almost 153,000 full-time equivalent jobs across Canada, nearly 46,000 person years of which are expected to be filled by residents of NL. Thirty percent of the NL based employment occurs during the operating phase and the remaining 70% is accounted for by construction activity. The corresponding numbers for Canada are 20% of the employment

occurs during ongoing operations and the remaining 80% is accounted for by the construction activities associated with Phase 1 and Phase 2.

| | NL | LAB | QC | ON | NS | NB | PEI | ROC | CAN |
|---|-------------|------------|-----------------------|------------|------------|-----------|-----|--------|---------|
| Employme | nt Associa | ted with P | hase 1 Ca | apital Exp | oenditures | i | | | |
| Direct Employment | 6,266 | 2,155 | 514 | 495 | 683 | 354 | 42 | 269 | 8,623 |
| Indirect Employment | 4,187 | 1,353 | 4,840 | 4,332 | 381 | 282 | 90 | 1,952 | 16,063 |
| Induced Employment | 5,566 | 822 | 6,240 | 6,889 | 839 | 368 | 59 | 1,992 | 21,952 |
| Total Phase 1 and 2 Capital Employment | 16,019 | 4,330 | 11,593 | 11,716 | 1,903 | 1,004 | 191 | 4,212 | 46,639 |
| Employme | nt Associa | ted with P | hase 2 Ca | apital Exp | oenditures | 6 | | | |
| Direct Employment | 7.166 | 2,630 | 5,643 | 1,166 | 359 | 359 | 53 | 667 | 15,412 |
| Indirect Employment | 3,460 | 1,102 | 10,488 | 7,366 | 177 | 283 | 59 | 2,619 | 24,451 |
| Induced Employment | 5,471 | 807 | 15,419 | 10,831 | 399 | 354 | 53 | 2,921 | 35,448 |
| Total Phase 1 Capital Employment | 16,097 | 4,539 | 31,5 <mark>4</mark> 9 | 19,362 | 935 | 996 | 164 | 6,207 | 75,311 |
| Employment a | Associated | with Phas | e 1 and 2 | 2 Capital | Expenditu | ires | | | |
| Direct Employment | 13,432 | 4,785 | 6.157 | 1,661 | 1,042 | 713 | 95 | 935 | 24,035 |
| Indirect Employment | 7.647 | 2,455 | 15,327 | 11,698 | 557 | 565 | 148 | 4,571 | 40,514 |
| Induced Employment | 11,036 | 1,629 | 21,658 | 17,720 | 1,239 | 722 | 112 | 4,913 | 57,400 |
| Total Phase 2 Capital Employment | 32,115 | 8,869 | 43,143 | 31,079 | 2,838 | 2,000 | 355 | 10,419 | 121,949 |
| Employmen | t Associate | d with Ph | ase 1 Op | erating E | cpenditur | es | | | |
| Direct Employment | 2,502 | 1,445 | 0 | 0 | 272 | 0 | 0 | 0 | 2,774 |
| Indirect Employment | 4,533 | 299 | 238 | 1,441 | 1,848 | 77 | 5 | 490 | 8,634 |
| Induced Employment | 2,621 | 294 | 1,446 | 2,408 | 1,109 | 33 | 2 | 568 | 8,186 |
| Total Phase 1 Operating Employment | 9,656 | 2,038 | 1,684 | 3,849 | 3,229 | 110 | 7 | 1,058 | 19,594 |
| Employmen | t Associate | d with Ph | ase 2 Op | erating E | cpenditur | es | | | |
| Direct Employment | 999 | 689 | 965 | 0 | 0 | 0 | 0 | 0 | 1,964 |
| Indirect Employment | 1,716 | 172 | 1,822 | 768 | 18 | 41 | 3 | 261 | 4,628 |
| Induced Employment | 1,030 | 148 | 2,231 | 1,213 | 10 | 17 | 1 | 286 | 4,788 |
| Total Phase 2 Operating Employment | 3,744 | 1,009 | 5,018 | 1,980 | 28 | 58 | 4 | 547 | 11,381 |
| Employment A | ssociated v | vith Phase | 1 and 2 (| Operating | ; Expendi | tures | | | |
| Direct Employment | 3,501 | 2,135 | 965 | 0 | 272 | 0 | 0 | 0 | 4,738 |
| Indirect Employment | 6,249 | 471 | 2,060 | 2,209 | 1.867 | 118 | 8 | 751 | 13,262 |
| Induced Employment | 3,650 | 442 | 3,677 | 3,621 | 1,119 | 50 | 3 | 854 | 12,974 |
| Total Phase 1 and 2 Operating Employment | 13,401 | 3,047 | 6,703 | 5,829 | 3,258 | 168 | 11 | 1,605 | 30,974 |
| Employment Associat | ed with Ph | ase 1 and | 2 Operat | ting and (| Capital E | xpenditur | es | | |
| Direct Employment | 16,933 | 6,920 | 7,122 | 1,661 | 1,314 | 713 | 95 | 935 | 28,774 |
| Indirect Employment | 13,896 | 2,925 | 17,388 | 13,906 | 2,424 | 683 | 157 | 5,322 | 53,776 |
| Induced Employment | 14,687 | 2,071 | 25,336 | 21,341 | 2,357 | 772 | 115 | 5,767 | 70,374 |
| Total Project Employment | 45,516 | 11,916 | 49,845 | 36,908 | 6,096 | 2,168 | 367 | 12,024 | 152,924 |

3.8 Gross Domestic Product (GDP)

As noted previously, the scope of this economic impact analysis did not include the net valuation of output, and therefore incremental income arising from the construction and operation of the Lower Churchill project, as presented above, is synonymous with an impact on GDP. Thus, GDP was calculated as the value of any income (direct, indirect and induced as calculated previously) that accrued to provincial NL factors of production from those inputs. This exercise was also repeated for Canada as a whole and the rest of Canada.

Table 14 below illustrates the GDP impacts, which are the same as the income calculations presented in Table 10 above.

| | NL | QC | ON | NS | NB | PEI | ROC | CAN |
|-----------------------|---------|---------|---------|-------|-------|------|-------|----------|
| Direct Labour Income | \$2,035 | \$916 | \$217 | \$156 | \$90 | \$12 | \$122 | \$3,548 |
| Indirect Income | \$1,010 | \$1,301 | \$1,055 | \$181 | \$52 | \$12 | \$403 | \$4,014 |
| Induced Income | \$731 | \$1,319 | \$1,113 | \$122 | \$40 | \$6 | \$300 | \$3,630 |
| Total GDP from Income | \$3,776 | \$3,535 | \$2,385 | \$459 | \$182 | \$30 | \$825 | \$11,192 |

 Table 14: Phase 1 and 2 GDP from Capital and Operating Expenditures (M\$ 2010)

4.0 Direct, Indirect and Induced Taxes

Direct taxes include the payroll and personal income taxes paid to both levels of government by Nalcor Energy's direct employees during construction and operations. The tax parameter data was gathered from a number of sources including Statistics Canada, Customs Canada and Revenue Agency, various provincial Departments of Finance, other government departments and agencies and from economic impact assessments on other projects in Newfoundland and Labrador. Indirect taxes were calculated by first breaking indirect and induced income into labour and business income and then by taking the share of personal income tax and corporate income tax that stems from this income. Induced taxes were derived by applying tax parameters to induced income. The induced and indirect tax parameters are based on econometric analysis of the broader economy.

Table 15 below summarizes the tax parameter inputs that were used in this analysis.

| Direct Tax Impact Parameters | Share | NL | QC | ON | NS | NB | PEI | ROC | CAN |
|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Direct PIT (as a % of Total Direct Income) | | 29.5% | 31.2% | 28.0% | 27.9% | 28.5% | 26.4% | 25.0% | |
| Share of total PIT (as a % of total PIT) | | 38.6% | 44.8% | 37.6% | 42.5% | 40.7% | 41.5% | 34.6% | |
| CAN share of total PIT (as a % of total PIT) | | 61.4% | 55.2% | 62.4% | 57.5% | 59.3% | 58.5% | 65.4% | |
| Payroll Taxes (as a % of Total Direct Income) | | 2.0% | | | | | | | |
| Indirect Tax Impact Parameters | | NL | QC | ON | NS | NB | PEI | ROC | CAN |
| Profits (as a % of Indirect GDP) | 14.6% | | | | | | | | |
| CIT rate (as a % of Indirect profits) | | 14.0% | 11.9% | 10.0% | 16.0% | 8.0% | 16.0% | 11.0% | 15.0% |
| Wages (as a % of Indirect GDP) | 66.9% | | | | | | | | |
| Indirect PIT (as a % of Total Indirect Income) | | 17.2% | 20.1% | 13.9% | 17.5% | 17.7% | 18.3% | 15.7% | |
| Provincial Share of total PIT (as a % of total PIT) | | 41.9% | 49.8% | 36.2% | 44.5% | 44.1% | 43.6% | 35.1% | |
| Federal Share of total PIT (as a % of total PIT) | | 58.1% | 50.2% | 63.8% | 55.5% | 55.9% | 56.4% | 64.9% | |

Table 15: Tax Parameter Input Summary

| Payroll/Health taxes (as a % of Total Indirect Income) | | 1.50% | | | | | | | |
|--|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Induced Tax Impact Parameters | | NL | QC | ON | NS | NB | PEI | ROC | CAN |
| Wages (as a % of Induced GDP) | 66.9% | | | 4.6% | 4.6% | 4.6% | 4 6% | 4.6% | |
| CIT Parameter (as a % of Induced GDP) | | 4.0% | 5.2% | 13.5% | 13.5% | 13.5% | 13.5% | 13.5% | 4.0% |
| PIT Parameter (as a % of Induced GDP) | | 14.0% | 14.2% | 8.0% | 8.0% | 8.0% | 10.0% | 4.8% | 12.4% |
| Consumption Tax Parameter (as a % of Induced GDP) | | 8.0% | 7.5% | | | | | | 5.0% |
| NF Payroll Tax Parameter | | 1.0% | | | | | | | |

The direct taxes, indirect taxes and induced taxes for each jurisdiction analyzed are presented in Table 16 below. The project generates close to \$550 million in direct, indirect and induced taxes for the Government of Newfoundland and Labrador. The Federal Government receives close to \$1.8 billion in direct, indirect and induced taxes.

Table 16: Direct, Indirect and Induced Taxes – Total Project

| Phase 1 Capex (\$M) | NL | PEI | NS | NB | QC | ON | ROC | FED |
|-----------------------------------|-------|------|-------------|------|-------|-------|------|---------|
| Direct Taxes | \$114 | \$1 | \$11 | \$5 | \$12 | \$9 | \$4 | \$206 |
| Indirect Taxes | \$24 | SL. | \$2 | \$2 | \$46 | \$32 | \$8 | \$104 |
| Induced Taxes | \$74 | \$4 | \$11 | \$5 | \$58 | \$58 | \$15 | \$242 |
| Total Taxes (Phase 1 Capex) | \$212 | \$6 | \$24 | \$12 | \$117 | \$100 | \$28 | \$552 |
| Phase 2 Capex (\$M) | NL | PEI | NS | NB | QC | ON | ROC | FED |
| Direct Taxes | \$118 | 51 | \$5 | \$5 | \$140 | \$22 | \$11 | \$348 |
| Indirect Taxes | \$20 | \$1 | \$1 | \$1 | \$99 | \$54 | \$10 | \$159 |
| Induced Taxes | \$73 | \$4 | \$ 5 | \$5 | \$153 | \$104 | \$24 | \$391 |
| Total Taxes (Phase 2 Capex) | \$211 | \$6 | \$11 | \$11 | \$393 | \$181 | \$45 | \$898 |
| Phase 1 and 2 Capex (\$M) | NL | PEI | NS | NB | QC | ON | ROC | FED |
| Direct Taxes | \$232 | \$1 | \$16 | \$10 | \$152 | \$32 | \$15 | \$554 |
| Indirect Taxes | \$44 | \$2 | \$3 | \$3 | \$145 | \$87 | \$18 | \$263 |
| Induced Taxes | \$146 | \$8 | \$17 | \$10 | \$211 | \$162 | \$39 | \$634 |
| Total Taxes (Phase 1 and 2 Capex) | \$422 | \$12 | \$36 | \$23 | \$509 | \$280 | \$73 | \$1,451 |
| Phase 1 Opex (\$M) | NL | PEI | NS | NB | QC | ON | ROC | FED |
| Direct Taxes | \$31 | \$0 | \$2 | \$0 | \$0 | \$0 | \$0 | \$45 |
| Indirect Taxes | \$23 | \$0 | \$9 | \$9 | \$2 | \$10 | \$2 | \$52 |
| Induced Taxes | \$34 | \$0 | \$15 | \$0 | \$8 | \$15 | \$3 | \$87 |
| Total Taxes (Phase 1 Opex) | \$88 | \$1 | \$27 | \$10 | \$10 | \$25 | \$5 | \$184 |
| Phase 2 Opex (\$M) | NL | PEI | NS | NB | QC | ON | ROC | FED |
| Direct Taxes | \$16 | \$0 | \$0 | \$0 | \$15 | \$0 | \$0 | \$35 |
| Indirect Taxes | \$13 | \$0 | \$0 | \$0 | \$18 | \$7 | \$1 | \$35 |
| Induced Taxes | \$18 | \$0 | \$0 | \$0 | \$24 | \$11 | \$2 | \$62 |
| Total Taxes (Phase 2 Opex) | \$46 | \$0 | \$0 | \$0 | \$57 | \$18 | \$3 | \$132 |
| Phase 1 and 2 Opex (\$M) | NL | PEI | NS | NB | QC | ON | ROC | FED |
| Direct Taxes | \$47 | \$0 | \$2 | \$0 | \$15 | \$0 | \$0 | \$80 |
| Indirect Taxes | \$36 | \$1 | \$9 | \$9 | \$20 | \$17 | \$3 | \$87 |
| Induced Taxes | \$52 | \$1 | \$15 | \$1 | \$32 | \$26 | \$5 | \$148 |
| Total Taxes (Phase 1 and 2 Opex) | \$134 | \$1 | \$27 | \$10 | \$67 | \$43 | \$8 | \$316 |

| Project (\$M) | NL | PEI | NS | NB | QC | ON | ROC | FED |
|-----------------------|-------|------|------|------|-------|-------|------|---------|
| Direct Taxes | \$272 | \$1 | \$19 | \$10 | \$167 | \$32 | \$15 | \$626 |
| Indirect Taxes | \$80 | \$3 | \$12 | \$12 | \$165 | \$104 | \$21 | \$349 |
| Induced Taxes | \$195 | \$9 | \$32 | \$10 | \$243 | \$187 | \$44 | \$777 |
| Total Taxes (Project) | \$547 | \$13 | \$62 | \$33 | \$575 | \$323 | \$81 | \$1,752 |

5.0 Newfoundland and Labrador Direct Impacts: Residency versus Location

The regional employment and income impacts presented in the report have been broken down as estimates of the residency of the workers and thus the geographic location of the income based on the residency of the workers. In addition to this method of presenting the data, the SCI model also incorporates an analysis of employment and income impacts by the location of the work activity. This distinction is relevant primarily when discussing impacts on Labrador and the island portion of the province because of the fly-in nature of the construction camp.

This analysis is useful for determining the potential socio-economic impacts as well as impacts on the community infrastructure as a result of the location of the work, particularly in the Upper Lake Melville (ULM) region. Table 17 below compares the impacts on Labrador and the Island of NL from the perspective of location of work versus the residency of the workers.

| | Project | Labra | idor | Isla | nd |
|--------------------------|---------|-----------|----------|-----------|----------|
| | | Residency | Location | Residency | Location |
| Employment | | | | | |
| Phase 1 – Capex | 10,025 | 2,155 | 5,359 | 6,266 | 3.259 |
| Phase 2 – Capex | 17,073 | 2,630 | 8,103 | 7,166 | 1,562 |
| Total Employment – Capex | 27,098 | 4,785 | 13,462 | 13,432 | 4,821 |

Table 17: Employment – Resident and Location (person years)

The economic impacts related to the both the residents of Newfoundland and Labrador and the economies Newfoundland and Labrador are presented below in Table 17. The project is expected to create 31,837 person years of direct employment, of which 6,188 person years of direct employment are located on the island of Newfoundland and 15,596 person years of direct employment are located in Labrador. Residents of the island have 16,933 person years of direct employment and residents of Labrador have 6,920 person years of direct employment over the life of the project.

During the operations phase, there are 4,738 person years of employment created, 1,367 person years of which will be located on the island and 2,135 are located in Labrador. The 2,135 person years located in Labrador are assumed to be filled by residents of Labrador, leaving 1,367 person years of operations employment accruing to residents of the island during the operation phase.

The corresponding employment on the island and in Labrador during the construction phase is shown in Table 17. The total direct project employment during construction is 27,098 person years, 4,821 person years will be located on the island, 13,462 will be located in Labrador and 8,815 person years occur outside of NL (e.g., in NS, QC or internationally). Residents of Labrador are expected to receive 4,785 person years of employment created during the construction period and residents of the island are expected to receive 13,432 person years of direct employment.

The project creates \$3.9 billion of direct labour income, of which \$750 million accrue to business and labour located on Newfoundland and \$1.9 billion is received by labour and businesses working in Labrador. Residents of the island receive \$2 billion and residents of Labrador receive \$820 million over the life of the project.

6.0 Conclusion

The Lower Churchill Project has an estimated cost of \$15.0 billion to construct and operate, with a total of \$12.8 billion in capital expenditures and \$2.1 billion in operating expenditures. Phase 1 consists of \$2.5 billion in capital expenditures for Muskrat Falls, with an additional \$1.8 billion being consumed by the Island Link and the remaining \$1.0 billion is required for the Maritime Link for a total Phase 1 capital expenditure of \$5.4 billion. Phase 2 consists of \$3.9 billion in capital expenditures for Gull Island, plus \$3.3 billion for the HQ Upgrades and the remaining \$0.3 billion being spent on the Gull Island-Romaine transmission line for a total Phase 2 capital expenditure of \$7.5 billion. Approximately, 65% of the operating costs (\$1.4 billion) are accounted for by Phase 1 operations and the remaining 35% (\$0.8 billion) of operating costs are associated with Phase 2 operations.

The Lower Churchill project is expected to create approximately 27,000 person years of direct employment generating more than \$3.5 billion in incomes to direct labour. Approximately 50% of the direct employment (13,400 person years) and almost 50% of the direct labour income (\$1.7 billion) generated by the expenditures is expected to accrue to Newfoundlanders and Labradorians. Another 4,700 direct person years of employment and \$530 million of direct labour income is expected to be generated during operations, with approximately 75% of employment taking place in Newfoundland and Labrador and an equivalent share of income accruing to local workers.

The results of the indirect income and employment estimates are summarized below in Table 6 and Table 7. As clearly indicated, Ontario and Quebec are the greatest recipient of indirect benefits from Nalcor Energy's capital expenditures, with a combined total of almost 13,900 and 17,400 indirect person years of employment, respectively. These results illustrate the significant level of benefits that would be expected accrue to Ontario and Quebec as the main suppliers of many of the non-labour inputs required by Nalcor Energy given their respective industrial economic bases. Newfoundland and Labrador is also a significant beneficiary with 13,900 indirect person years of employment.

Total income to persons and businesses in Canada arising from the construction and operation of the Lower Churchill project is estimated to be \$11.2 billion. Regionally, NL labour and businesses will receive approximately 1/3 of the estimated income benefits, while other Canadian jurisdictions will receive 2/3 of the project's income benefits. This distribution of benefits reflects the significant indirect and induced economic impacts accruing to the provinces that have more diversified economic bases in the rest of Canada and are characterized by lower import leakages than experienced in NL. Looked at from a different perspective, approximately 82% of the income benefits result from the capital phase of the project, with the remaining 18% coming thought ongoing operations.

Total employment arising from the construction and operation of the Lower Churchill project is estimated to be almost 153,000 full-time equivalent jobs across Canada, nearly 46,000 person years of which are expected to be created within NL. Thirty percent of the NL based employment occurs during the operating phase and the remaining 70% is accounted for by construction activity. The corresponding numbers for Canada are 20% of the employment occurs during ongoing operations and the remaining 80% is accounted for by the construction activities associated with Phase 1 and Phase 2.

The direct taxes, indirect taxes and induced taxes for each jurisdiction analyzed are presented in Table 15 below. The project generates close to \$550 million in direct, indirect and induced taxes for the Government of Newfoundland and Labrador. The Federal Government receives close to \$1.8 billion in direct, indirect and induced taxes.

The project is anticipated to create 31,837 person years of direct employment, of which 6,188 person years of direct employment are expected to be located on the island of Newfoundland and 15,596 person years of direct employment are estimated to be located in Labrador. Residents of the island estimated to receive 16,933 person years of direct employment and residents of Labrador are expected to have 6,920 person years of direct employment over the life of the project.

The project is estimated to generate \$3.9 billion of direct labour income, of which \$750 million is anticipated to accrue to business and labour located on Newfoundland and \$1.9 billion is expected to go to labour and businesses working in Labrador. Residents of the island estimated to receive \$2 billion and residents of Labrador should expect \$820 million over the life of the project.

Appendix A: Detailed Tables

Economic Impact Analysis of Nalcor Energy's Lower Churchill Project

| | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | Tetals |
|--|------|------|-------|-----------|---------|--------------|------|------|------|-------------|----------------|----------------|----------|
| Muskrat Falls - Capex | | | | | | | | | | | | | |
| Project Direct employment | 31 | 243 | 846 | 1.664 | 1.441 | 783 | 462 | 155 | 14 | - | | ~ | |
| NL Direct employment - Location Island | 5 | 37 | 127 | 250 | 216 | 118 | 69 | 23 | 2 | | | | |
| NL Direct employment - Resident | 20 | 159 | 551 | 1.085 | 939 | 511 | 301 | 101 | 9 | | | | |
| NL Indirect employment - Resident | 13 | 94 | 326 | 642 | 556 | 302 | 178 | 60 | 5 | | | | |
| NL Induced employment - Resident | 17 | 135 | 474 | 908 | 790 | 442 | 273 | 96 | 7 | 2 | | 1 | 2 |
| NL Total employment - Resident | 50 | 388 | 1.352 | 2,634 | 2,285 | 1,255 | 752 | 257 | 22 | 1 | | | S |
| LAB Direct employment - Location LAB | 24 | 185 | 643 | 1,264 | 1,095 | 595 | 351 | 118 | 11 | | 1 | 1 | 3 |
| LAB Direct employment - Resident | 8 | 60 | 209 | 412 | 357 | 194 | 114 | 38 | 3 | 1 | 100 | - 62 | S2 - |
| LAB Indirect employment - Resident | -4 | 34 | 117 | 230 | 199 | 108 | 64 | 21 | 2 | 22 | 12 | (22) | E. |
| LAB Induced employment - Resident | 3 | 23 | 80 | 148 | 130 | 76 | 50 | 19 | I | 543 | 144 | | 12 |
| LAB Total employment - Resident | 15 | 117 | 407 | 790 | 686 | 378 | 228 | 78 | 7 | 5 | 1912) 1912) | 31 | |
| Island Link – Capex | | | | | | | | | | | | | |
| Project Direct employment | 28 | 116 | 345 | 775 | 826 | 623 | 356 | (ii) | 2 | 243 | 823 | 343 | 5 a - |
| NL Direct employment - Location Island | 16 | 64 | 190 | 426 | 454 | 342 | 196 | (A) | | 543 | | 24 | 34 - |
| NL Direct employment - Resident | 20 | 83 | 246 | 554 | 590 | 445 | 254 | 93 | 10 | 1940 | | 1967) 1967) | 12 |
| NL Indirect employment - Resident | 15 | 60 | 177 | 398 | 423 | 319 | 182 | 12 | ÷3 | | (*) | 1645 | (2) |
| NL Induced employment - Resident | 19_ | 76 | 226 | 507 | 540 | 407 | 233 | 20 | 1 | 0.4.2 | 1 | G | 19. j |
| NI, Total employment - Resident | 54 | 219 | 649 | 1.459 | 1,554 | 1,172 | 670 | 45 | | 28.8 | 240 | 14 | |
| LAB Direct employment - Location LAB | 10 | 41 | 121 | 271 | 289 | 218 | 125 | | (c) | 1975 | | 24 | <u>_</u> |
| LAB Direct employment - Resident | 7 | 29 | 85 | 192 | 204 | 154 | 88 | ~ | | S 43 | 5.40 | 1.0 | 5. |
| LAB Indirect employment - Resident | 5 | 22 | 64 | 145 | 154 | 116 | 66 | | +3 | 5.43 | 240 | | |
| LAB Induced employment - Resident | 3 | 11 | 33 | 74 | 79 | 59 | 34 | | | 100 | 1.42 | 28 | 19 A |
| LAB Total employment - Resident | 15 | 62 | 183 | 411 | 437 | 330 | 189 | | | 200 | 1345 | p.34 | 14 |
| Maritime Link - Capex | | | | | | | | | | | | | |
| Project Direct employment | 3 | 41 | 29 | 130 | 311 | 360 | 433 | 10 | - | 1,200 | 2.43 | 1.2 | × . |
| NL Direct employment - Location Island | 2 | 22 | 16 | 71 | 171 | 198 | 238 | 6 | *); | 1.00 | S*0 | 1.8 | |
| NL Direct employment - Resident | L | 12 | 9 | 39 | 93 | 108 | 130 | 3 | - 1 | 2000 | 12.00 | | 24 |
| NL Indirect employment - Resident | 1 | 13 | 10 | 43 | 103 | 119 | 143 | 3 | | 38 - | 0.45 | 17 | |
| NL Induced employment - Resident | 1 | 13 | 9 | 41 | 98 | 114 | 137 | 3 | + | | 1771 | | 22 |
| NL Total employment - Resident | 3 | 38 | 28 | 123 | 295 | 341 | 410 | 10 | | | 0.00 | | |
| 1.AB Direct employment - Location LAB | 23 | | | <u>1</u> | <u></u> | 4 | - | - | - | | 171 | | - |
| LAB Direct employment - Resident | 2 | | | 8 | | 2 | 2 | 2 | | | 14. | - | ~ |
| LAB Indirect employment - Resident | | | · | 3 | 1 | 1 | 2 | 5 | 2 | (÷) | | | - |
| LAB Induced employment - Resident | 22 | 1.22 | 223 | <u>92</u> | 12 - E | 3 <u>5</u> . | 1 | 1 | | | | S | 14 |
| LAB Total employment - Resident | 20 | 10 | 1633 | 22 | 22 | 12 | 3 | 33 | 123 | 1983 (M | 1 | 2 | |

Table A 1: Annual Employment – Phase 1 CAPEX (2010-2023)

Economic Impact Analysis of Nalcor Energy's Lower Churchill Project

| | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | Totals |
|--|------|-------|----------------|------|------------|-------|------------|-------|-------|---------------|-------|------|---|
| Gull Island - Capex | | | | | | | | | | | | | |
| Project Direct employment | 45 | 17 | 64 | 375 | 399 | 1.509 | 1.857 | 1.847 | 1.449 | 1.363 | 759 | 308 | - |
| NL Direct employment - Location Island | 7 | 2 | 10 | 56 | 60 | 226 | 279 | 277 | 217 | 204 | 114 | 46 | 2 |
| NL Direct employment - Resident | 29 | | 42 | 245 | 260 | 984 | 1.211 | 1,204 | 945 | 888 | 495 | 201 | <u> </u> |
| NL Indirect employment - Resident | 14 | 5 | 20 | 115 | 123 | 463 | 570 | 567 | 445 | 418 | 233 | 94 | |
| NL Induced employment - Resident | 22 | 8 | 32 | 184 | 196 | 740 | 910 | 906 | 710 | 668 | 372 | 151 | |
| NL Total employment - Resident | 65 | 24 | 93 | 544 | 578 | 2.187 | 2,691 | 2,677 | 2,100 | 1,975 | 1,100 | 446 | |
| LAB Direct employment - Location LAB | 34 | 13 | -49 | 285 | 303 | 1,147 | 4,411 | 1,404 | 1,101 | 1,036 | 577 | 234 | S . |
| LAB Direct employment - Resident | ш | 4 | 16 | 93 | 99 | 373 | 460 | 457 | 359 | 337 | 188 | 76 | <u></u> |
| LAB Indirect employment - Resident | 5 | 2 | 7 | 39 | 41 | 156 | 192 | 191 | 150 | 141 | 79 | 32 | (a) |
| LAB Induced employment - Resident | 3 | 1 | 5 | | | 114 | 140 | 139 | 109 | 103 | 57 | 23 | |
| LAB Total employment - Resident | 19 | 7 | 27 | 160 | 170 | 643 | 792 | 788 | 618 | 581 | 324 | 131 | |
| HQ Upgrades - Capex | | | | | | | | | | | | | |
| Project Direct employment | - | - | | | | 322 | 967 | 1,289 | 1,289 | 1,289 | 967 | 322 | (a) |
| NL Direct employment - Location Island | - | | - | - | 2 | | × | 5 | - | (a.) | (m) | | Sec. |
| NL Direct employment - Resident | | | | - | (x) | 10 | 29 | 39 | 39 | 39 | 29 | 10 | |
| NL Indirect employment - Resident | - | - | | • | | 13 | 39 | 52 | 52 | 52 | 39 | 13 | |
| NL Induced employment - Resident | - | | - | - | ~ ~ | | 33 | -44 | 44 | 44 | 33 | 11 | 100 |
| NL Total employment - Resident | - | - | | - | 2.4 | 34 | 101 | 135 | 135 | 135 | 101 | 34 | 2.4 |
| LAB Direct employment - Location LAB | - | - | | - | - | 1.0 | <u>a</u> | | *1 | 3.40 | (4) | | 3 |
| LAB Direct employment - Resident | - | - | | | | | | | | 10e) | 3,870 | | |
| LAB Indirect employment - Resident | | ÷.0 | 6.233 | 53 | $\pm \tau$ | | <i>c</i> (| | | 10 - 5 | 2.53 | S.2 | 27 |
| LAB Induced employment - Resident | 5.1 | 0.75 | | ~ | | | | | ÷.: | | 200 | | |
| LAB Total employment - Resident | - | | 0.43 | | | | | | | | | | |
| GI-ROM TX - Capex | | | | | | | | | | | | | |
| Project Direct employment | - | - | - | 6 | 18 | 9 | 7 | 113 | 212 | 130 | 131 | 12 | 17. |
| NL Direct employment - Location Island | | | | | 2 | 1 | 1 | | 21 | 13 | 13 | 1 | ų. |
| NL Direct employment - Resident | - | - | - | 4 | 13 | 7 | 5 | 82 | 153 | 94 | 94 | 8 | 1 |
| NL Indirect employment - Resident | | • | | L | 4 | 2 | I | 23 | 44 | 27 | 27 | 2 | <u>i</u> |
| NL Induced employment - Resident | - | - | - | 3 | 10 | 5 | 4 | 62 | 117 | 72 | 72 | 6 | 2 |
| NL Total employment - Resident | | | | 8 | 26 | 14 | 10 | 167 | 313 | 192 | 193 | 17 | <u>i</u> |
| LAB Direct employment - Location LAB | - | - | - | 5 | 14 | 7 | 5 | 91 | 169 | 104 | 105 | 9 | 25 |
| LAB Direct employment - Resident | | | | 1 | 4 | 2 | 2 | 28 | 52 | 32 | 32 | 3 | 2 |
| LAB Indirect employment - Resident | | | 1942) 1942) | 1 | 2 | L | L | 12 | 22 | [4] | 14 | 1 | 14 - 14 - 14 - 14 - 14 - 14 - 14 - 14 - |
| LAB Induced employment - Resident | 2. | 563 | 12 | 0 | 1 | 1 | 1 | 9 | 18 | 11 | П | I | 1 |
| LAB Total employment - Resident | 26 | 1. an | 140 | 2 | 8 | 4 | 3 | 50 | 93 | 57 | 57 | 5 | 92. - |

Table A 2: Annual Employment – Phase 2 CAPEX (2010-2023)

Economic Impact Analysis of Nalcor Energy's Lower Churchill Project

| | | | | | | | - | | - | | | | |
|---|---------------|------------|--------------|------------|------------|------------|------------|---------------|------------|-------------|-------------|-------------|------------|
| | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | Totals |
| Muskrat Falls – Capex | | | | | | | | | | | | | |
| Project Direct employment | \$3.9 | \$31.8 | \$111.4 | \$214.1 | \$186.2 | \$103.9 | \$63.7 | \$22.3 | \$1.8 | <u>\$-</u> | <u>s-</u> | <u>Ş.</u> | <u>S-</u> |
| NL Direct employment - Location Island | \$0.6 | \$4.8 | \$16.7 | \$32.1 | \$27.9 | \$15,6 | \$9.6 | \$3.3 | \$0.3 | \$- | <u> </u> | <u>Ş.</u> | <u>Ş-</u> |
| NL Direct employment - Resident | \$2.6 | \$21.2 | \$74.5 | \$141.5 | \$123.4 | \$69.7 | \$43.6 | \$15.6 | \$1.I | \$ - | \$- | S - | S - |
| NL Indirect employment - Resident | \$0.9 | \$6.8 | \$23.7 | \$46.7 | \$40.4 | \$22.0 | \$13.0 | \$4.3 | \$0.4 | <u>s.</u> | <u> </u> | <u> </u> | <u>Ş-</u> |
| NL Induced employment - Resident | \$0.8 | \$6.7 | \$23.6 | \$45.2 | \$39.3 | \$22.0 | \$13.6 | \$4.8 | \$0,4 | S - | \$- | \$- | <u>Ş.</u> |
| NL Total employment - Resident | \$4.3 | \$34.8 | \$121.8 | \$233.3 | \$203.1 | \$113.7 | \$70.1 | \$24.7 | \$1.9 | S - | S - | \$ - | <u>Ş-</u> |
| LAB Direct employment - Location LAB | \$3.0 | \$24.2 | \$84.7 | \$162.7 | \$141.5 | \$79.0 | \$48.4 | \$17.0 | \$1.3 | S - | S - | S - | S- |
| LAB Direct employment - Resident | \$1.0 | \$8.9 | \$31.6 | \$57.1 | \$50.3 | \$30.0 | \$20.1 | \$7.7 | \$0.4 | \$ - | \$- | S - | S- |
| LAB Indirect employment - Resident | \$0 .3 | \$2.4 | \$8.4 | \$16.6 | \$14.3 | \$7.8 | \$4.6 | \$1.5 | \$0.1 | S - | S - | S - | \$- |
| LAB Induced employment - Resident | \$0.1 | \$101 | \$4.0 | \$7.4 | \$6.5 | \$3.8 | \$2.5 | \$0.9 | \$0.1 | <u>Ş-</u> | S - | Ş - | <u>S-</u> |
| LAB Total employment - Resident | \$1,4 | \$12.4 | \$44.0 | \$81.0 | \$71.L | \$41.6 | \$27.2 | \$10.2 | \$0.6 | S- | S - | \$ - | <u>Ş.</u> |
| Island Link - Capex | | | | | | | | | | | | | |
| Project Direct employment | \$3.9 | \$16.0 | \$47.4 | \$106.7 | \$113.6 | \$85.7 | \$49.0 | S=) | S - | S - | S- | S - | \$ |
| N1- Direct employment - Location Island | \$2.1 | \$8.8 | \$26.1 | \$58.7 | \$62.5 | \$47.E | \$26.9 | <u>Ş.</u> | <u>Ş.</u> | <u> </u> | <u> </u> | <u>\$-</u> | <u>\$-</u> |
| N1- Direct employment - Resident | \$2.8 | \$11.5 | \$33.9 | \$76.3 | \$81.2 | \$61.3 | \$35.0 | S- 3 | S - | S - | S- | S - | S- |
| NI- Indirect employment - Resident | SI.I | \$4.3 | \$12.8 | \$28.9 | \$30.7 | \$23.2 | \$13.3 | S - | S- | S- | S - | S - | S - |
| NL-Induced employment - Resident | \$0.9 | \$3.8 | \$11.2 | \$25.2 | \$26.9 | \$20.3 | \$11.6 | Ş | <u>Ş.</u> | <u>Ş.</u> | S - | Ş . | S- |
| NI- Total employment - Resident | \$4.8 | \$19.6 | \$58.0 | \$130.4 | \$138.9 | \$104.7 | \$59.9 | \$- 2 | \$- :: | \$- | S- | S - | S - |
| LAB Direct employment - Elication LAB | \$1.4 | \$5.6 | \$16.6 | \$37.3 | \$39.8 | \$30.0 | \$17.1 | <u>Ş-</u> | <u>Ş.</u> | <u> </u> | \$ - | S - | S - |
| LAB Direct employment - Resident | \$1.0 | \$4.0 | \$11.7 | \$26.4 | \$28-1 | \$21.2 | \$12.1 | <u>Ş-</u> | <u>s.</u> | <u> </u> | S= | S . | S - |
| LAB Indirect employment - Resident | \$0.4 | \$1,6 | \$4.6 | \$10.4 | \$11-L | \$8.4 | \$4.8 | S - | \$ | \$ | S- | S - | S - |
| LAB Induced employment - Resident | \$0.1 | \$0.6 | \$1.6 | \$3.7 | \$3.9 | \$3.0 | \$1.7 | S - | Ş | Ş . | Ş - | S - | S- |
| LAB Total employment - Resident | \$1.5 | \$6.1 | \$18.0 | \$40.5 | \$43.1 | \$32.5 | \$18.6 | \$- | \$- | S- | S - | S - | S - |
| Maritime Link – Capex | | | | | | | | | | | | | |
| Project Direct employment | \$0.5 | \$5.6 | \$4.0 | \$17.9 | \$-12.8 | \$49.6 | \$59.6 | \$1,4 | Ş - | S - | <u>s</u> . | S - | S - |
| NL-Direct employment - Location Island | \$0.3 | \$3.1 | \$2.2 | \$9.8 | \$23.6 | \$27.3 | \$32.8 | \$0.8 | S - | S- | S - | S - | S- |
| NI- Direct employment - Resident | \$0.1 | \$L.7 | \$1.2 | \$5.4 | \$12.9 | \$14.9 | \$17.9 | \$ 0.4 | S - | s.2 | 5- | S - | S- |
| NL-Indirect employment - Resident | \$0.1 | \$1.0 | \$0.7 | \$3.1 | \$7.5 | \$8.7 | \$10.5 | \$0.3 | Ş. | \$- | S - | S- | S - |
| NL-Induced employment - Resident | \$0.1 | \$0.6 | \$0.5 | \$2.0 | \$4.9 | \$5.7 | \$6.8 | \$0.2 | S - | S- | S - | Ş - | S- |
| NL-Total employment - Resident | \$0.3 | \$3.3 | \$2,4 | \$10.5 | \$25.3 | \$29.2 | \$35.2 | \$0.8 | S - | S- | S- | S - | S - |
| LAB Direct employment - Location LAB | \$- | S - | <u>s</u> . | S- | Ş . | S- | S- | \$ - | S - | S- | S- | S - | S - |
| LAB Direct employment - Resident | S- | S- | S- | S- | S - | S - | S- | s - | S- | Ş- | S - | S- | S - |
| LAB Indirect employment - Resident | Ş - | S- | S - | S- | S- | S- | S - | S- | S- | S - | S- | S- | S- |
| LAB Induced employment - Resident | S - | S- | S- | S- | S - | S - | S - | <u>s</u> . | S - | S- | S - | S- | S- |
| LAB Total employment - Resident | S - | S - | S - | S - | S - | S- | S - | Ş . | S - | S- 1 | S- | S - | S- |

Table A 3: Annual Income – Phase 1 CAPEX (2010-2023)

Economic Impact Analysis of Nalcor Energy's Lower Churchill Project

Page 40

| Table A 4: Annual Income – Phase 2 CAPEX (2010-2023) |
|--|
|--|

| | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | Totals |
|--|------------|------------|------------|-------------|-------------|--------------|-------------|---------------|-------------|-------------|------------|------------|-------------|
| Guli Island - Capex | | | | | | | | | | | | | |
| Project Direct employment | \$5.4 | \$2.0 | \$7.8 | \$45.6 | \$48.5 | \$183.5 | \$225.8 | \$224_6 | \$176.2 | \$165,7 | \$92.3 | \$37,4 | \$- |
| NL Direct employment - Location Island | \$0.8 | \$0.3 | \$1.2 | \$6.8 | \$7.3 | \$27.5 | \$33.9 | \$33.7 | \$26.4 | \$24.9 | \$13.8 | \$5.6 | \$- |
| NI. Direct employment - Resident | \$3.5 | \$1.3 | \$5.1 | \$29.8 | \$31.6 | \$119.6 | \$147.2 | \$146.4 | \$114.9 | \$108.0 | \$60.2 | \$24.4 | S - |
| NL Indirect employment - Resident | \$1.0 | \$0.4 | \$1.4 | \$8.4 | \$8.9 | \$33,7 | \$41.5 | \$41.3 | \$32.4 | \$30.5 | \$17.0 | \$6.9 | S - |
| NL Induced employment - Resident | \$1.I | \$0.4 | \$1.6 | \$9.2 | \$9,7 | \$36.8 | \$45.3 | \$45.1 | \$35.3 | \$33.2 | \$18.5 | \$7.5 | S - |
| NL Total employment - Resident | \$5.6 | \$2.1 | \$8.1 | \$47,3 | \$50.3 | \$190.2 | \$234_1 | \$232.8 | \$182.6 | \$171.8 | \$95.7 | \$38.8 | S - |
| LAB Direct employment - Location LAB | S-1, I | \$1.5 | \$5.9 | \$34.7 | \$36.9 | \$139.4 | \$171.6 | \$170.7 | \$133.9 | \$125.9 | \$70.1 | \$28.4 | S - |
| LAB Direct employment - Resident | \$1.3 | \$0.5 | \$1.9 | \$11.3 | \$12.0 | \$45,4 | \$55.9 | \$55.6 | \$43.6 | \$41.0 | \$22.8 | \$9.3 | S - |
| LAB Indirect employment - Resident | \$0.3 | \$0.1 | \$0.5 | \$2.8 | \$3.0 | \$11.2 | \$13.8 | \$13.8 | \$10.8 | \$10.2 | \$5.7 | \$2.3 | S - |
| LAB Induced employment - Resident | \$0.2 | \$0.1 | \$0.2 | \$14 | \$1.5 | \$5.7 | \$7.0 | \$6.9 | \$5.4 | \$5:1 | \$2.9 | \$1.2 | S- |
| LAB Total employment - Resident | \$1.8 | \$0.7 | \$2.7 | \$15.5 | \$16.5 | \$62.3 | \$76.7 | \$76.3 | \$59.9 | \$56.3 | \$31.4 | \$12.7 | \$- |
| HQ Upgrades - Capex | | | | | | | | | | | | | |
| Project Direct employment | <u></u> | <u> </u> | <u> </u> | <u>s-</u> | <u>s.</u> | \$44.4 | \$133_1 | \$177.4 | \$177.4 | \$177.4 | \$133,1 | \$44,4 | <u> </u> |
| NL Direct employment - Location Island | S- | <u> </u> | <u> </u> | <u>\$-</u> | S - | <u>ş.</u> | <u>Ş-</u> | <u>Ş.</u> | S | \$- | S - | S | S - |
| NL Direct employment - Resident | <u>s-</u> | S - | S - | S - | <u>\$-</u> | \$1.3 | \$4.0 | \$5.3 | \$5.3 | \$5.3 | \$4.0 | \$1.3 | <u>S-</u> |
| NL Indirect employment - Resident | <u>s</u> . | <u> </u> | <u> </u> | S - | S- | \$1.0 | \$2.9 | \$3.9 | \$3.9 | \$3.9 | \$2.9 | \$1.0 | <u>\$-</u> |
| NL Induced employment - Resident | S - | S - | | <u> </u> | S - | \$0.6 | \$1.7 | \$2.2 | \$2,2 | \$2.2 | \$1.7 | \$0.6 | S - |
| NI. Total employment - Resident | S - | S - | S- | <u> </u> | <u>\$</u> - | \$2,9 | \$8.6 | <u>\$11.4</u> | \$11.4 | \$11.4 | \$8.6 | \$2.9 | S- |
| LAB Direct employment - Location LAB | S - | <u>\$-</u> | <u> </u> | Ş - | Ş | <u>ş.</u> | <u> </u> | S- | \$- | <u>\$-</u> | <u>ş.</u> | <u>Ş-</u> | <u>Ş.</u> |
| LAB Direct employment - Resident | \$- | S - | S - | <u>s</u> . | S - | \$- | \$- | S - | \$ - | <u>\$-</u> | <u>\$-</u> | <u>Ş.</u> | <u>s</u> - |
| LAB Indirect employment - Resident | S - | <u> </u> | <u> </u> | \$ - | S - | S - | <u>\$-</u> | <u> </u> | <u>\$-</u> | <u>\$-</u> | \$- | S. | \$- |
| LAB Induced employment - Resident | S - | S - | S - | <u> </u> | S - | S - | \$- | <u>\$-</u> | <u>\$-</u> | <u> </u> | <u> </u> | <u> </u> | <u> </u> |
| LAB Total employment - Resident | S - | S - | S - | <u>\$-</u> | <u>ş</u> . | S - | \$ - | \$- | \$- | \$ - | S - | S - | <u> </u> |
| GI-ROM TX - Capex | | | | | | | | | | | | | |
| Project Direct employment | <u>s-</u> | <u>\$-</u> | S - | \$0.8 | \$2.5 | <u>\$1.3</u> | \$0.9 | \$15.6 | \$29.2 | \$17.9 | \$18.0 | \$1.6 | \$- |
| NL Direct employment - Location Island | S- | <u>ş.</u> | <u>Ş.</u> | \$0.1 | \$0.2 | \$0.1 | \$0.1 | \$1.6 | \$2.9 | \$1.8 | \$1.8 | \$0.2 | \$ - |
| NL Direct employment - Resident | <u>S-</u> | S- | <u>s</u> . | \$0.6 | \$1.8 | \$0.9 | \$0.7 | \$11.2 | \$21.0 | \$12.9 | \$13.0 | \$1:1 | <u>Ş.</u> |
| NL Indirect employment - Resident | <u>s.</u> | <u>\$-</u> | <u>\$-</u> | \$0.1 | \$0.3 | \$0.1 | \$0.1 | \$1.7 | \$3.2 | \$1.9 | \$2.0 | \$0.2 | <u> </u> |
| NL Induced employment - Resident | <u> </u> | S- | \$- | \$0.2 | \$0.5 | \$0.3 | \$0.2 | \$3.1 | \$5.8 | \$3.6 | \$3.6 | \$0.3 | <u>\$-</u> |
| NL Total employment - Resident | <u>s-</u> | <u>s</u> . | <u>Ş-</u> | \$0.8 | \$2.5 | <u>\$1.3</u> | \$1.0 | \$16.0 | \$30.0 | \$18.4 | \$18.5 | \$1.6 | S- |
| LAB Direct employment - Location LAB | S- | S - | <u>Ş.</u> | \$0.6 | \$2.0 | \$1.0 | \$0.7 | \$12.5 | \$23.3 | \$14.3 | \$14.4 | \$1.3 | S- |
| LAB Direct employment - Resident | <u>s.</u> | S - | \$- | \$0.2 | \$0.6 | \$0.3 | \$0.2 | \$3.9 | \$7.2 | \$4.4 | \$4.5 | \$0.4 | <u> </u> |
| LAB Indirect employment - Resident | S - | <u>\$-</u> | \$- | \$0.0 | \$0.1 | \$0.1 | \$0,1 | \$0.9 | \$1.6 | \$1.0 | \$1.0 | \$0.E | S |
| LAB Induced employment - Resident | <u>S-</u> | S - | S - | \$0.0 | \$0.1 | \$0.0 | \$0.0 | \$0.5 | \$0.9 | \$0.5 | \$0.5 | \$0.0 | \$- |
| 1.AB Total employment - Resident | S - | Ş . | S- | \$0.3 | \$0.8 | \$0.4 | \$0.3 | \$5.2 | \$9.7 | \$6.0 | \$6.0 | \$0.5 | S - |