Prepared for:

TC Energy

Ontario Pumped Storage Project

Regional Economic Study for Proposed
TC Energy Ontario Pumped Storage Project

27 April 2020

Project No.: 0510672

The business of sustainability

ERM

27 April 2020

Ontario Pumped Storage Project

Regional Economic Study for Proposed TC Energy Ontario Pumped Storage Project

ERM Consultants Canada Ltd.

120 Adelaide Street West, Suite 2010
Toronto, ON
Canada M5H 1T1

T: +1 416 646 3608
F: +1 416 642 1269

EXECUTIVE SUMMARY
Regional Economic Study
Ontario Pumped Storage Project

The Project

TC Energy is proposing the development of a large-scale hydroelectric pumped storage power project (the Project) that would be located within the Department of National Defence (DND) Canadian Force's 4th Canadian Division Training Center north of Meaford, Ontario; due to its designation, this land is inaccessible to the public. Pumped hydro storage (pumped storage) is a proven technology that pumps water from a low-lying reservoir during periods of low demand for electricity, typically at night, to a higher-elevation reservoir. During periods of high demand, water is released back to the lower reservoir, spinning turbines to produce electricity (TC Energy 2020).

The Independent Electricity System Operator (IESO) has forecasted a need for approximately 2,000 additional megawatts (MW) of electrical supply. The shortfall is expected to start in 2023 and grow slowly through 2040 (IESO 2020b). TC Energy identified the Project as an economic and environmental solution to meet this need, using a proven technology to optimize Ontario's existing electricity generating resources, and reduce greenhouse gas emissions from the system.

The Project is designed to store up to 8,000 megawatt-hours (MWh) of emission-free energy and would provide that energy to Ontarians when demand is high. Key outcomes are summarized in **Figure 1** below.

The Project would provide 1,000 MW of generation capacity for up to 8 hours, equivalent to 8,000 MWh.

Balance electricity supply and demand and manage the fluctuations caused by the integration of intermittent solar and wind generation into Ontario's electricity system.

Reduce greenhouse gas emissions by 490,000 tonnes per year, equivalent to taking 150,000 cars off the road (Navigant 2020).

Build resilience into Ontario's electrical system to respond quickly to changing system conditions; providing more stability and backup power to Ontario's network.

Reduce the wastage of electricity that has already been generated, as well as its export at a loss to other markets, thereby saving Ontario ratepayers more than $12 billion over 40 years or $250 million in savings per year (Navigant 2020).

Figure 1: Project Outcomes

Purpose & Method

TC Energy retained ERM Consultants Canada Ltd. to investigate the potential economic effects, both beneficial and adverse, from construction and operation of the Project as understood at this early planning stage. The results of this study are meant to inform interested stakeholders and Indigenous groups early in the planning phase so there is sufficient time to plan how to maximize the economic benefits and mitigate the potential adverse effects ahead of the start of construction. Further socio-economic study for the Project will be completed as part of the anticipated combined federal Impact Assessment and provincial Individual Environmental Assessment process.

The study team used several methods for information gathering and analysis including:

Background Research

Data was reviewed from various sources in order to characterize the current socio-economic setting.

Interviews

Key stakeholders were interviewed to supplement the background research and collect new data. Interviews focused on stakeholders who understand the local economic context including elected municipal officials (mayors), municipal staff (chief administrative officers, city managers, planning staff, economic development officers), representatives from the real-estate industry, accommodation operators and other business owners.

Economic Modelling

An economic impact model was developed to estimate the direct, indirect and induced economic effects of the Project. The model measures the effects of the Project on GDP, employment and tax revenue based on the proven and industry accepted Statistics Canada Input-Output Model Simulation (Statistics Canada 2019).

The Project's estimated impact on expenditures, GDP and tax revenue are primarily based on outputs from the economic model, and are provided in constant 2019 Canadian dollars. The model relies on the Statistics Canada 2015 dataset, as well as the projected Project inputs which include preliminary estimates of capital expenditures (CAPEX), operation expenditures (OPEX), and employment as described below[1]:

- **Total CAPEX** for the preconstruction and construction phases (2017-2027) are conservatively estimated at $2,965 million, with $2,458 million spent in Canada.
- **Annual OPEX** for the Project during the operation phase (starting in 2028) is estimated at $19.0 million, including $2.6 million per year for environmental protection measures for a total OPEX of $949.3 million for the operation phase (50 years).
- **Employment** is estimated at up to 1,033 jobs during peak construction activities. Once in operation, the Project would provide 20 direct on-site and 3 direct off-site jobs.

The economic study area includes three counties located in Southern Ontario: Bruce County, Grey County, and Simcoe County, collectively referred to as the Regional Study Area (RSA) - see **Figure 2**.

Figure 2: The Regional Study Area

1 Project inputs and schedule are preliminary estimates provided by TC Energy in July 2019. Total CAPEX, annual OPEX and employment estimates will be frequently updated during the feasibility and planning phases of the Project.

Potential Economic Benefits

The economic modelling based on preliminary Project assumptions predicts construction and operation of the Project would have a number of beneficial effects on the regional, provincial and national economy as summarized in **Figures 3 and 4** on the next page.

Economic Effects during Preconstruction and Construction

Highlights during Project preconstruction and construction in the RSA include the following estimated benefits:

- **Up to 141 direct jobs** during peak construction activities;
- **Up to 482 indirect and induced jobs** during peak construction activities;
- **$186 million paid** to workers during preconstruction and construction;
- **$750 million** spent on labour, equipment and material;
- **$152 million in provincial tax revenue** for Ontario; and
- **$299 million in GDP**.

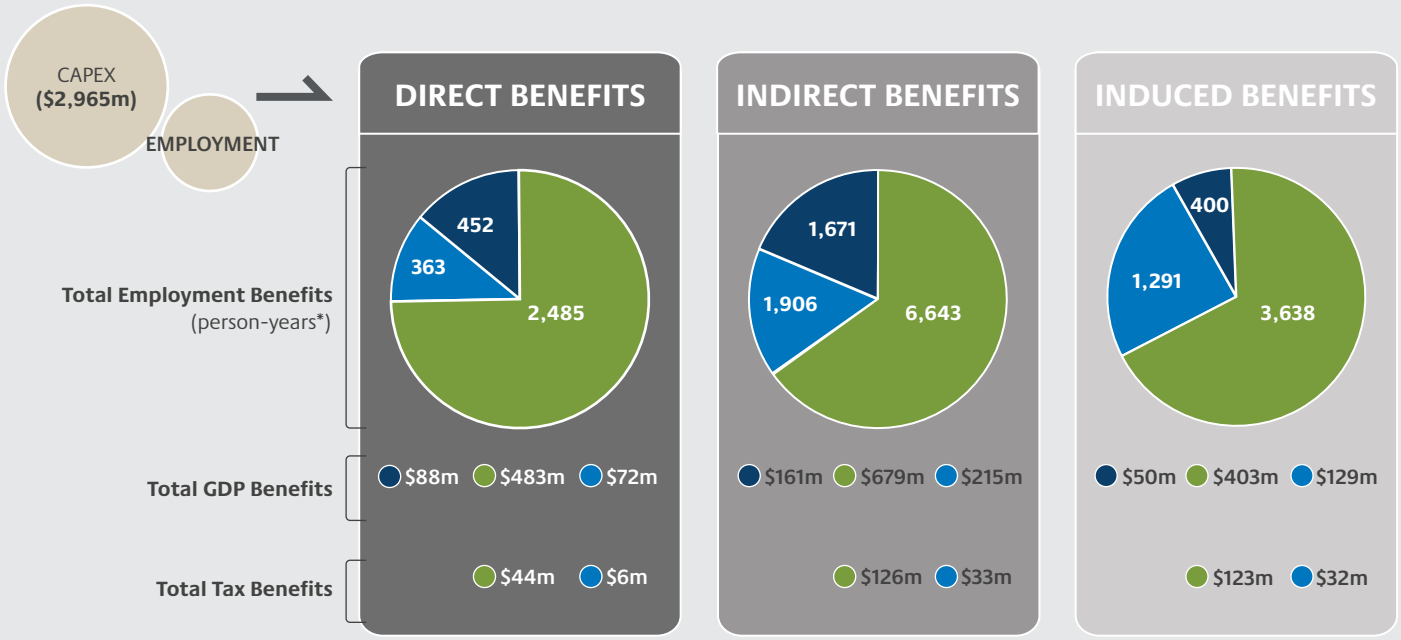
Economic Effects during Operation

During operations, the model predicts the facility would have the following economic benefits in the RSA:

- **20 full-time positions** created on-site and **3 full-time positions** created off-site;
- **52 indirect and induced** jobs;
- **$19 million per year in direct spending** on labour, maintenance and materials;
- **$8.5 million per year in GDP**; and
- **$1.9 million per year in provincial tax revenue** for Ontario.

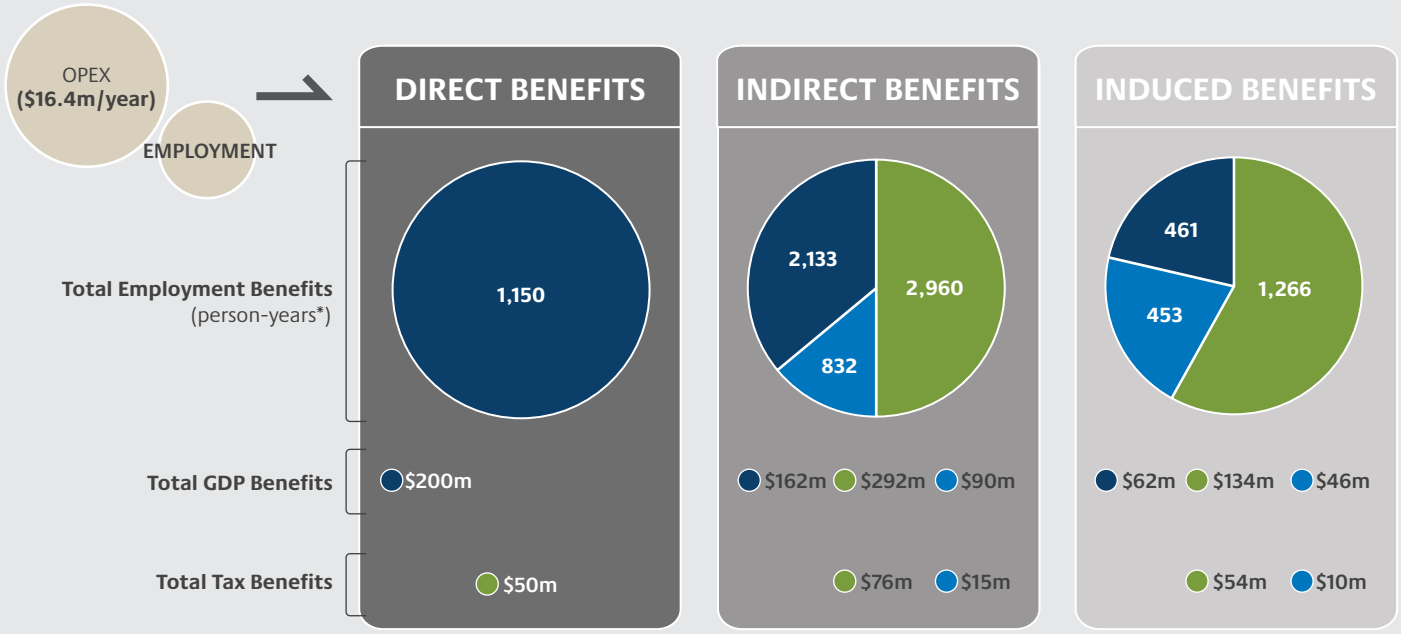
The Project would pay DND's costs related to site controls and management of the Project during preconstruction and construction phases estimated at $13 million. A long-term access agreement or lease is anticipated to support the operation phase of the Project and payments to DND would be expected under this agreement for the term of the Dominion Water Power Act final licence period of 50 years. Other taxes and payments would include: annual taxes on electricity generated to Ontario (estimated at $9.9 million per year), and fees to the Federal Government as specified under the Dominion Water Power Act (estimated at $2.2 million per year).

Figure 3: Summary of Economic Benefits During Preconstruction & Construction



TOTAL ECONOMIC BENEFITS (during preconstruction & construction, approximately 10 years)	18,849 person-years* of employment	$2,280 million of GDP

Figure 4: Summary of Economic Benefits During Operation



TOTAL ECONOMIC BENEFITS (during operation, 50 years)	9,254 person-years* of employment	$984 million of GDP

Regional Study Area Rest of Ontario Rest of Canada

*Person-year is used as a measurement of workforce effort where one person-year is equivalent to 2,080 hours of work worked by one or more workers.

Potential Adverse Effects

Assessment of data collected through publicly available sources and interviews resulted in the identification of the following potential adverse effects during the construction phase:

- Temporary increase in demand for skilled labour in communities closest to the Project where demand is currently high;
- Temporary increase in demand for housing and accommodations in communities closest to the Project; and
- Temporary increase in use of infrastructure and services, including roads and highways, utilities, water, waste disposal, medical and emergency services.

Potential adverse effects on employment and economy, and infrastructure and services, are limited to the construction phase, given that during operation the Project would hire 23 on-site and 3 off-site workers, with spending in the RSA directed at wages and maintaining day-to-day operations.

Potential adverse effects may be mitigated by complying with all permits, approvals and authorizations and by implementing the following:

Mitigation Measures

01 **Engage and communicate with stakeholders and Indigenous groups**, including municipalities, businesses, residents and others in the RSA to share information about Project timelines and work schedules, and gather feedback and input to inform development of mitigation measures.

02 **Work with infrastructure and service owners and operators** (provincial, municipal, and private operators) to address increased demand for services, and obtain approvals as required.

03 **Prepare and apply Project-specific mitigation measures** to avoid or minimize potential effects, informed by engagement and implemented in collaboration with stakeholders and Indigenous groups in the RSA. Extensive planning would go into the development of mitigation plans and strategies required for a Project of this scale. Proposed plans and strategies should include: Human Resources Strategy, Labour Utilization Plan, Workforce Accommodations Plan, Traffic Management Plan, Waste Disposal Plan, Site Specific Safety Plan, Emergency Preparedness and Response Plan, Construction Management Plan, and Communication Plan.

04 **Work with the municipalities in the RSA** to alleviate the potential financial burden associated with the development and operation of the Project, in lieu of municipal tax.

05 **Monitor, evaluate and report on** the Project's effects and the effectiveness of the mitigation measures.

A number of enhancement measures could also be introduced to maximize the economic benefits of the Project. Such measures could include:

Enhancement Measures

I Where possible, utilize the pool of unemployed or recruit workers from diverse groups, including Indigenous communities, to fill available jobs in construction.

II Work with educational and training institutions in the RSA, with a specific focus on institutions in close proximity to the Project site, to design and implement programs that would support jobs in construction and help to address skilled labour shortages in the RSA.

III Communicate and promote employment opportunities at the Project well in advance of the commencement of the construction phase to encourage increased skill levels within the regional labour force to prepare workers for jobs.

IV Communicate procurement opportunities and processes to businesses in the RSA in advance of the construction phase to maximize the participation of RSA business in the Project and business revenue impacts in the RSA.

Construction and operation of the Project is an opportunity for significant economic benefits in the RSA, Ontario and Canada. Temporary adverse effects during construction can be mitigated by implementing the recommendations. The 1,000 MW proposed pumped storage project responds to the future power grid needs of Ontario, reduces greenhouse gas emissions from power generation, and provides economic benefit to local communities in the RSA, Ontario and Canada.

CONTENTS

List of Tables

List of Figures

1. INTRODUCTION

1.1 Project Overview

TransCanada Energy Ltd. (TC Energy) is proposing the development of a 1,000-megawatt (MW) utility scale hydroelectric pumped storage facility (the Project). The facility would be located within the Department of National Defence (DND) Canadian Forces 4th Canadian Division Training Centre (CDTC) in the Municipality of Meaford, Grey County, Ontario northwest of the Meaford townsite; due to its designation, this land is inaccessible to the public. The Project also includes a new 230 kilovolt (kV) transmission line to connect the facility to Ontario's power system.

Pumped storage is a proven clean-energy technology that pumps water from a lower reservoir during periods of low demand (and low cost) for electricity, typically at night, to a higher-elevation reservoir where it is stored. When electricity demand is greater (and higher cost), operators release water back to the lower reservoir through turbines to produce electricity (TC Energy 2020).

Pumped storage facilities are designed to switch from energy storage to generation several times per day as needed to meet the needs of the electrical grid. In 2016, the US had more than 30 pumped storage facilities in operation, with a combined capacity of 22 gigawatts (GW). Ontario is already home to Ontario Power Generation's 174 MW pumped storage facility, the Sir Adam Beck Pump Generating Station (CER 2016).

The Project would provide 1,000 MW of generation capacity for up to 8 hours, equivalent to 8,000 megawatt-hours (MWh) of energy storage. It is also designed to operate over a range of outputs with high ramp speeds and fast start-up capabilities and has an estimated 72% efficiency. As proposed by TC Energy, the Project would:

- Provide storage for Ontario's excess power supply;
- Provide needed power capacity to address future forecast capacity needs;
- Reduce electricity costs for consumers and businesses;
- Reduce greenhouse gas emissions by 490,000 tonnes/year; and
- Drive economic benefits and growth.

The Independent Electricity System Operator (IESO) has forecasted a need for approximately 2,000 additional MW of electrical supply. The shortfall is expected to start in 2023 and grow slowly through 2040 (IESO 2020b). TC Energy identified the Project as an economic and environmental solution to meet this need, using a proven technology to optimize Ontario's existing electricity generating resources, and reduce greenhouse gas emissions from the system.

Currently, there are times when Ontario's electricity system produces more power than it needs, resulting in wasted electricity and economic loss. The surplus electricity is predominantly renewable and emission-free nuclear energy generated at times of low demand (nights and weekends). Without the capability to store this surplus, electricity is either exported to adjacent markets (typically at a loss) or generation is curtailed, and therefore wasted. In 2016, Ontario exported 14.6 terawatt hours of clean energy at a loss of over $384 million; this is equivalent to the electricity required to power 1.5 million homes (Navigant 2020). In the twelve-month period - from September 2018 to September 2019 – Ontario curtailed approximately 2.9 million MWh of electricity (IESO 2020a).

The Project would use a substantial portion of the surplus electricity generated in Ontario, store and conserve that energy until it is needed, then dispatch it to generate emission free electricity. By shifting this largely emission-free surplus electricity to times of higher demand, the Project reduces the need for gas-fired power generation, resulting in lower greenhouse gas emissions. As a result, the Project has the potential to lower emissions of CO_2 in the province by an annual average of 490,000 tonnes (Navigant 2020).

The Project also builds resiliency into Ontario's electrical system as a dependable resource which can be called upon to respond quickly to changing system conditions – generating power in the event of an unforeseen outage or absorbing excess generation as a result of an unforeseen demand reduction. During a power interruption or black-out, the pumped storage facility would be an important resource to assist in restoring the grid. Effectively, the Project can act as a 1,000 MW emergency generator for Ontario.

1.2 Purpose and Method

TC Energy retained ERM Consultants Canada Ltd. to investigate the potential economic effects, both beneficial and adverse, from construction and operation of the Project as understood at this early planning stage.

The purpose of this report was to:

- Conduct economic modelling, using a proprietary model based on Statistics Canada Input-Output Model (IOM) data, to estimate beneficial effects of the Project on employment, labour income, gross domestic product (GDP), and provincial and federal government tax revenues with focus on Southern Ontario (counties of Grey, Bruce and Simcoe); and
- Conduct a preliminary socio-economic study for the Project to identify and evaluate the potential adverse effects of the proposed facility on infrastructure and services, and employment and economy.

The results of this study are meant to inform interested stakeholders and Indigenous groups early in the planning phase so there is sufficient time to plan how to maximize the economic benefits and mitigate the potential adverse effects ahead of the start of construction. Further socio-economic study for the Project will be completed as part of the anticipated combined federal Impact Assessment and provincial Individual Environmental Assessment process. Potential effects of the Project on the cost of electricity or the expected reductions in greenhouse gases attributed to the Project were investigated through a separate study by Navigant Consulting Inc. (Navigant 2020).

1.2.1 Methods

The study methods are consistent with industry best practices and are based on primary and secondary socio-economic data that cover the current and historical socio-economic context of the study area, including patterns, trends, and changes in characteristics over time. The following methods were implemented to collect data and conduct analysis:

- **Background research** – Data collection was undertaken through desktop-based research and consisted of document and database review to identify and compile available information. Data collection focused on federal, provincial, regional, and local sources, as well as published literature and reports. Throughout the research process, information from different sources was analysed and integrated, where feasible, to provide a complete description of existing conditions.
- **Economic modelling** – Project-specific direct, indirect and induced economic effects to GDP, employment, and tax revenue were predicted using the DYNATEC model based on Statistics Canada IOM of the economies of Canada and the provinces and territories.
- **Interviews** – Key stakeholders were interviewed to supplement the background research and collect new data. Interviews focused on stakeholders who understand the economic context including elected municipal officials (mayors), municipal staff (CAOs, city managers, planning staff, economic development officers), representatives from the real-estate industry, accommodation operators and other business owners. Twenty-one interviews were conducted between December 2019 and February 2020. Interviews were confidential and a combined analysis from all interviews was included in this report.

The economic study area includes three counties located in Southern Ontario: Bruce County, Grey County, and Simcoe County, collectively referred to as the Regional Study Area (RSA; Figure 1.2-1). The boundaries of the RSA were selected based on proximity to the Project and the potential for communities within these regions to be affected by, or interact with, the Project either via the Project workforce or through the provision of goods and services.

There are also several Indigenous groups, some with reserves within the RSA, others who exercise their Indigenous and Treaty Rights in the area, or those in who's asserted traditional territory the Project is proposed. Although this report does not make a distinction between impacts on Indigenous and non-Indigenous communities, TC Energy is committed to maximizing participation of and benefits to Indigenous communities and groups. As such, TC Energy should work to facilitate the participation of Indigenous communities and businesses in Project construction and operation through the provision of training, employment and procurement opportunities, and should work towards maximizing the economic benefits to those groups as a result of the Project.

1.2.2 Project Schedule

This report assumes the following Project schedule:

- Preconstruction – 2017 to 2022
- Construction – 2022 to 2027
- Operation – some operating activities will begin in 2027, concurrent with the last year of Project construction activities; the first full year of Project operations in expected to take place in 2028, with a Project lifespan of approximately 50 years.

The Project schedule is preliminary and will be updated as the project design and planning progress.

1.2.3 Economic Model Inputs and Methods

The IOM relies on the Statistics Canada 2015 dataset, as well as the expected Project inputs which include preliminary estimates of capital expenditures (CAPEX), operation expenditures (OPEX), and employment, provided by TC Energy as described below[1]:

- **Total CAPEX** for the preconstruction and construction phases (2017-2027) are conservatively estimated at $2,965 million, with $2,458 million spent in Canada.
- **Annual OPEX** for the Project during the operation phase (starting in 2028) is estimated at $19.0 million, including $2.6 million per year for environmental protection measures, for a total OPEX of $949.3 million for the operation phase (50 years).
- **Employment** is estimated at up to 1,033 jobs during peak construction. Once in operation, the Project would provide 20 direct on-site and 3 direct off-site jobs.

Appendix A provides additional information on CAPEX, OPEX and employment estimates.

Using the expected Project inputs and the IOM - direct, indirect and induced expected Project outputs (benefits) were estimated. Direct, indirect, and induced economic benefits of the Project predicted by the economic model results are defined as follows:

- **Direct benefits** are the employment, personal income, GDP and government tax revenue generated by the Project.

[1] Project inputs and schedule are preliminary estimates provided by TC Energy in July 2019. Total CAPEX, annual OPEX and employment estimates will be frequently updated during the feasibility and planning phases of the Project.

- **Indirect benefits** are the employment, personal income, GDP and government tax revenue associated with all industries ultimately supplying the goods and services used by the industries supplying the Project and includes all transactions to the beginning of the supply chain.
- **Induced benefits** are the employment, personal income, GDP and government tax revenue associated with economic activity because of workers spending their incomes on goods and services, including those directly and indirectly employed because of the Project.

IOM inputs and outputs are provided in constant 2019 Canadian dollars.

1.2.4 Organization of the Report

Indicators relevant to employment and economy are discussed in Section 2 (Labour Force, Employment, and Personal Income), Section 3 (Expenditures and GDP), and Section 4 (Tax Revenue), with IOM results incorporated throughout the three sections. Indicators relevant to infrastructure and services are discussed in Section 5 (Accommodations) and Section 6 (Infrastructure and Services). Conclusions and Recommendations are presented in Section 7.

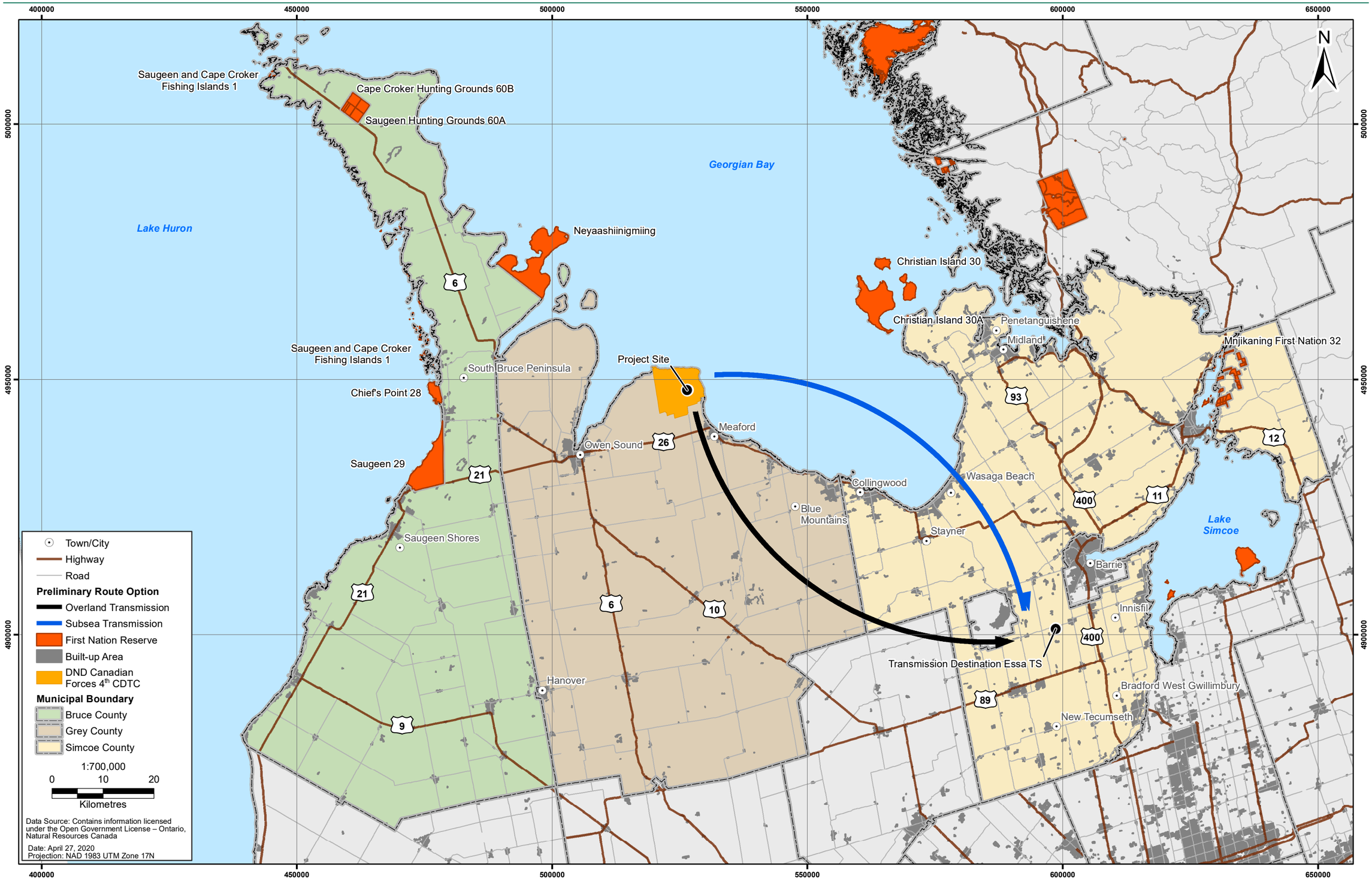


Figure 1.2-1: Regional Study Area

2. LABOUR FORCE, EMPLOYMENT, AND PERSONAL INCOME

Ontario's labour force, like the province's population in general, is aging. Over the next decade the proportion of the Province's population 65 years and over is expected to increase, while the proportion of the population at prime working age (25-54 years old) is expected to decline. As the province's population grows older, the labour force participation rate will decline steadily, tightening the labour market and increasing competition amongst all industries for talented workers (Build Force Canada 2019). This is particularly true for the RSA where the median age of residents is generally higher than the rest of Ontario (Statistics Canada 2017).

In the RSA, retail, healthcare, manufacturing, accommodation and food services, and construction represent the greatest source of employment and account together for approximately half of all jobs by industry (Statistics Canada 2017). In Bruce County, the utilities sector employs the greatest number of people (4,530), concentrated in jobs with Bruce Power, which provides more than 4,000 full-time positions at its Tiverton and Kincardine facilities (Bruce Power 2019). Bruce and Grey Counties also support a strong and growing tourism industry. Bruce County has on average 2.5 million visitors each year contributing some $300 million annually to the RSA economy and providing more than 2,300 direct and indirect jobs (Bruce County 2019a). The main industries in Simcoe County are focussed on advanced manufacturing, agribusiness, healthcare and tourism (EDO Simcoe 2019).

It is projected the construction and maintenance industry in Ontario will require an additional 103,900 workers over the coming decade to account for continued growth in the industry as well as the attrition / retirement of an estimated 91,100 workers. While many of these positions can be filled with new entrants from the RSA population aged 30 and younger, the estimated shortfall of 26,100 workers will have to be recruited from other industries or brought in from outside the province (Build Force Canada 2019). The construction industry in Southern Ontario (which includes Grey and Bruce Counties) is expected to lead the province in construction growth, requiring a significant increase in the number of construction workers. Central Ontario (which includes Simcoe County) meanwhile is expected to see steady, modest growth over the next decade (Build Force Canada 2019).

In order to build and maintain a robust pool of skilled trades and workers, the construction and maintenance industry will also have to increase recruitment from groups which are traditionally underrepresented including women, Indigenous Peoples, and new Canadians (Build Force Canada 2019).

2.1 Employment and Job Creation

Employment during Preconstruction and Construction

The model estimates that during Project preconstruction and construction, the Project would hire up to up to 1,033 direct jobs as follows:

- 141 workers from the RSA;
- 778 workers from the rest of Ontario; and
- 114 workers from the rest of Canada.

This would be equivalent to 3,300 person-years[2] of direct employment over the entire preconstruction and construction phase (Figure 2.1-1).

[2] Estimated employment for the Project is measured in person-years and the number of jobs. Person-year is used as a measurement of workforce effort where one person-year is equivalent to 2,080 hours of work worked by one or more workers. The number of jobs represents the number of positions created in any year that is equivalent to full-time workers who work 2,080 hours a year. Person-years can be also equivalent to the Full Time Equivalent (FTE) measure under the specified assumption of 2,080 hours worked per one worker.

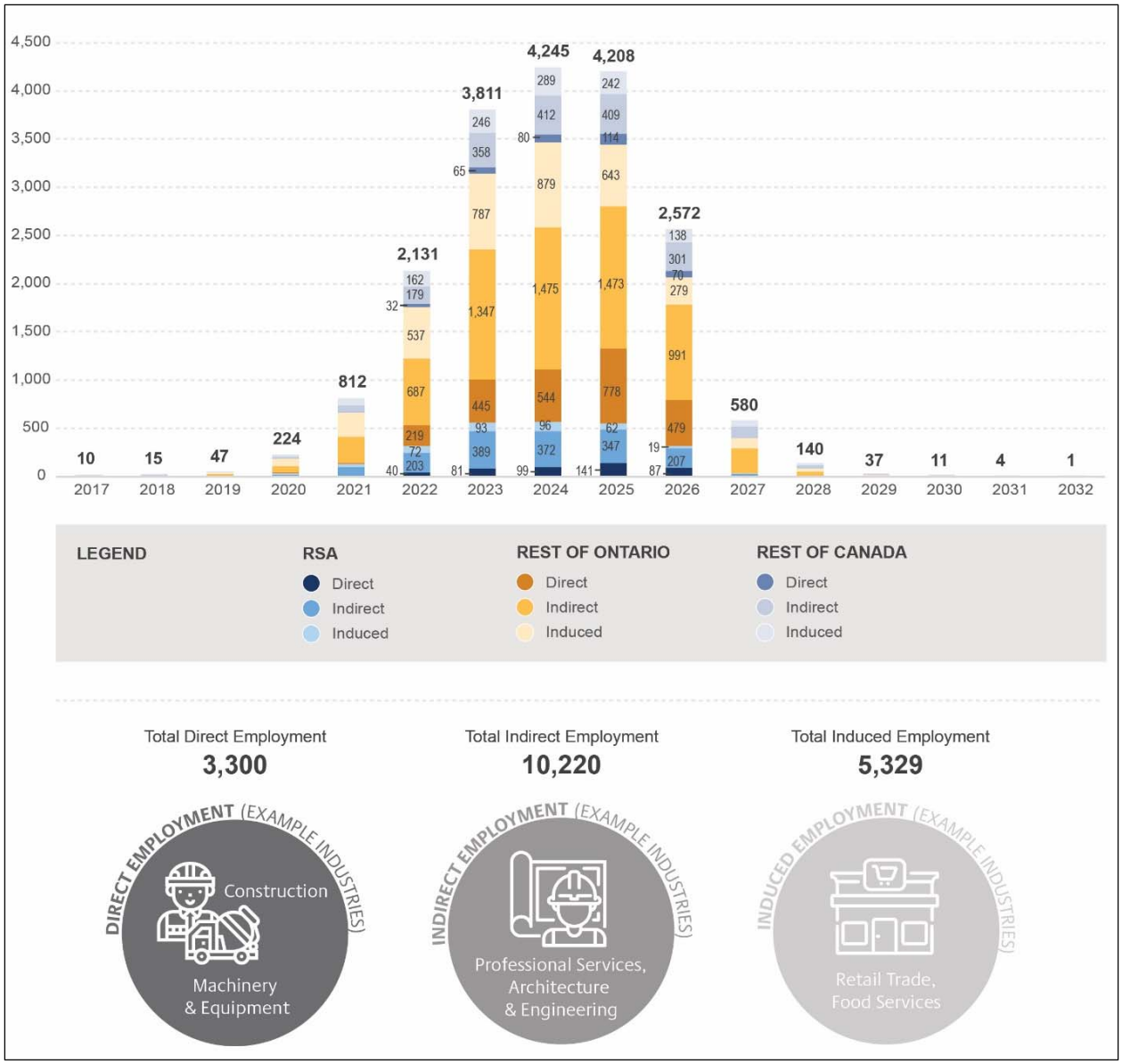


Figure 2.1-1: Total Employment during Project Preconstruction and Construction

In addition, the model estimates that, during preconstruction and construction, the Project would also support up to 3,536 indirect and induced jobs as follows:

- 482 indirect and induced jobs in the RSA;
- 2,354 indirect and induced jobs in the rest of Ontario; and
- 700 indirect and induced jobs in the rest of Canada.

This would be equivalent to 15,549 person-years of indirect and induced employment over the preconstruction and construction phase. Most indirect and induced jobs would be created in construction, manufacturing, transportation, wholesale and retail trade, and professional and business support services.

Preconstruction and construction workforce is summarized in Figure 2.1-1. Impacts on indirect and induced employment as a result of the construction phase will continue for several years after the construction of the Project is completed. Figure 2.1-1 does not show direct, indirect, or induced employment as related to Project operation.

Employment during Operation

Project lifespan is estimated at 50 years. During Project operation, there would be an estimated 20 direct on-site jobs and 3 direct off-site jobs per year. This would be equivalent to 1,150 person-years of direct employment over Project lifespan. Direct on-site jobs would be filled by workers from the RSA.

The model estimates that, during Operation, the Project would also support up to 164 indirect and induced jobs as follows:

- 52 indirect and induced jobs in the RSA;
- 85 indirect and induced jobs in the rest of Ontario; and
- 27 indirect and induced jobs in the rest of Canada.

This would be equivalent to 8,104 person-years of indirect and induced employment over Project lifespan. Most indirect and induced jobs would be created in maintenance, professional services, retail trade, wholesale trade, real estate, and food services.

2.2 Personal Income and Wages

Based on the outputs from the economic model, the direct, indirect and induced jobs created by the Project during preconstruction and construction would provide an estimated $1,343 million to workers, of which $395 million would be paid to direct (i.e. Project) workers (Figure 2.2-1). The remaining $949 million would be paid in wages (including burden[3]) to workers benefiting from indirect and induced opportunities.

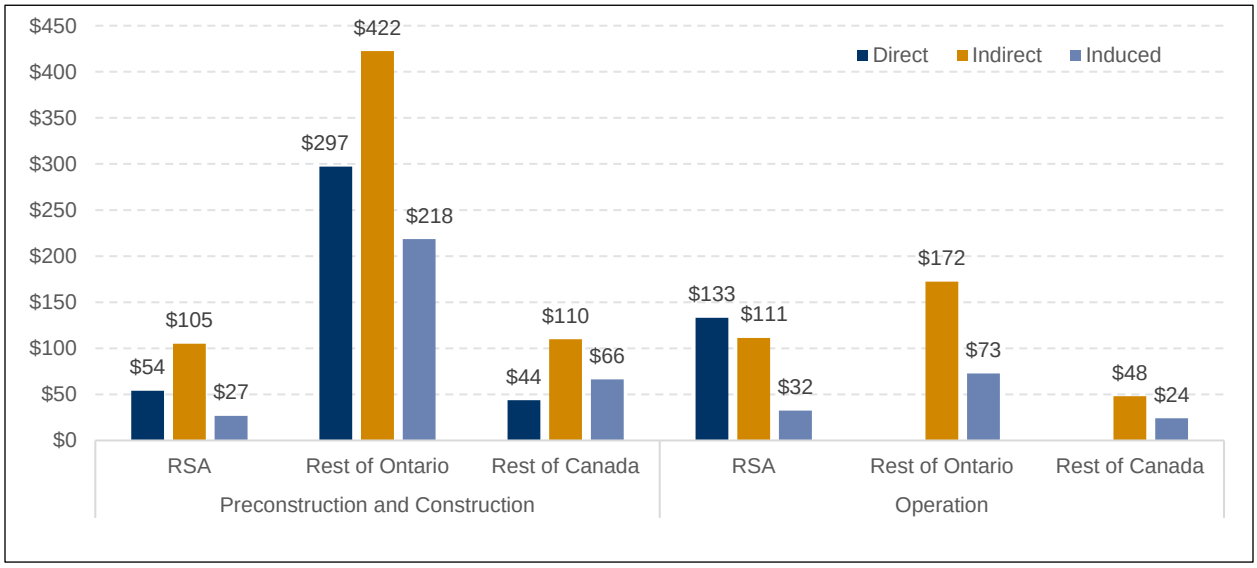


Figure 2.2-1: Total Personal Income during Project Preconstruction, Construction and Operation (2019 million CDN $)

[3] Salary or wage burden refers to benefits (health care plan, life insurance, CPP, EI, etc.) that a company must, or chooses to, pay for employees.

Once operational, the Project would pay a total of $2.7 million annually in income to workers employed at the facility and off-site (wages including burden), for a total of $133 million over the life of the Project. Indirect and induced jobs would generate another $9 million in annual income benefits, or an estimated $461 million over the life of the Project, divided between the RSA, the rest of Ontario, and the rest of Canada, as illustrated in Figure 2.2-1.

2.3 Labour Availability and Competition

While the Project is expected to create significant numbers of new jobs and create employment opportunities at the regional (RSA), provincial and national level, it is also expected to experience challenges in terms of recruitment. Almost every interview participant described a significant labour shortage existing throughout the RSA. Interview participants stated that the labour shortages extended across all industries and sectors, but mentioned the following specific trades and positions where competition was particularly notable:

- all trades related to construction including electricians, journeymen, millwrights, pipe fitters, steam fitters, and welders;
- drivers;
- social service workers, including healthcare professional and personal support workers;
- retail and service industry workers; and
- hospitality workers.

Some RSA businesses are reducing their hours of operation to manage the shortage of staff, or bussing workers from communities, such as City of Barrie, City of Vaughan and City of Brampton. In the hospitality industry, many large resorts and spas are hiring workers from outside the region and offering them housing as part of their compensation package.

The labour market in the RSA is very closely related to the demographics of the general area. Similar to other small towns and rural areas in Ontario, the RSA is characterized by an aging/retired population, low unemployment, and past or current residents who want to stay or return to the area. Based on the existing labour shortages, the demographics of the RSA, and numerous other projects anticipated in the region, all interview participants were concerned the Project could encounter significant challenges recruiting workers from the RSA. There are also concerns that the Project would draw workers from other industries and businesses in the RSA, with potential adverse effects for those industries and businesses. Thus, the construction of the Project could increase the competition for skilled labour and/or increase skilled labour shortages in the RSA.

While other large projects in the region have the potential to compete with the Project for workers, several of those interviewed also noted that the large, highly skilled workforces of other projects could present an opportunity, depending on the construction schedule of the Project. This is especially relevant to the Bruce Power Life-Extension Program and Major Component Replacement, which is expected to employ more than 5,000 workers at its peak. After peak construction, the workforce at Bruce Power would diminish and many of these workers could be available to work on the construction of the Project.

The proposed Project is currently in an early feasibility stage, and construction is at least 2 years away; current Project construction and operation schedules could be also delayed depending on regulatory process and approvals. It is anticipated peak construction labour demands for the RSA would not occur until at least 2025. This provides adequate time to plan, develop and implement training and apprenticeship programs – in partnership with regional post-secondary institutions and labour groups – to enhance RSA participation and reduce the effects on surrounding employers.

2.4 Academic and Training Opportunities

According to many interview participants, a major challenge in the RSA is the shortage of post-secondary educational programs. Many youth leave the RSA for post-secondary educational institutions which frequently leads to them remaining outside the RSA for their careers and residency.

Some interview participants noted there is a labour force shortage related to certain skills and available opportunities. A survey conducted in 2019 by the Four County Labour Market Planning Board revealed that 72% of employers reported difficulty filling at least one position in 2018, and 37% indicated that they spent over a year trying to fill hard-to-fill positions (Four County Labour Market Planning Board 2020). Top reasons for not being able to fill a positions included not enough applications, lack of motivation, and a lack of qualifications, while key training barriers included a lack of relevant training offered regionally.

Several interview participants mentioned there could be good opportunities for the Project to partner with colleges and academic institutions in the RSA, which already offer relevant courses in construction, skilled trades, and other fields relevant to the Project. Interview participants noted that these institutions have the capacity to deliver apprenticeship programs, technical development programs, and short-duration retraining programs, for the skills and trades that are in short supply in the RSA. If developed in collaboration with the Project, these programs could provide training for a pool of regional labour with the specific skills required for Project construction and operation.

2.5 Labour Force, Employment, and Personal Income Recommendations

It is recommended that TC Energy develop a Human Resource Strategy and Labour Utilization Plan to achieve the following:

- Increase labour force skill levels in the RSA through collaboration with training institutions and/or labour groups to understand skills and training needs in the region and to identify and develop appropriate training programs to expand the regionally available skilled workforce prior to the commencement of the construction phase;
- Promote awareness of training, employment and contracting opportunities in the RSA and Indigenous communities through community meetings, community information and career awareness sessions, and Project brochures, news releases and other communication methods;
- Identify Project-associated opportunities for entry level or unskilled workers and encourage recruitment of qualified workers from diverse groups;
- Encourage the attraction of skilled workers to the region from other parts of Ontario and Canada for construction;
- Engage with other potential developers in the region to understand their construction schedules and labour needs and investigate opportunities to transition workers between projects;
- Continue to communicate the Project's schedule and needs to stakeholders and Indigenous groups so that municipal governments in the RSA, as well as the workforce, are aware of Project activities and emerging opportunities; and
- Facilitate the participation of Indigenous groups from the RSA through training, employment and contracting opportunities.

3. EXPENDITURES AND GDP

3.1 Direct Expenditures (CAPEX and OPEX)

The economic model assumes that during preconstruction and construction the Project would procure the majority of goods and services from the RSA, the province and the rest of Canada. A limited amount of materials and equipment may be procured internationally, and those costs have not been accounted for in the economic model. Preconstruction and construction activities would result in total direct spending of $2,458 million in Canada, of which $750 million is expected to be spent in the RSA. Figure 3.1-1 provides an overview of the Project's CAPEX along with a high-level summary of the resulting impacts on jobs, GDP, and taxes. Figure 3.1-2 provides a more detailed breakdown of the Project's CAPEX by year.

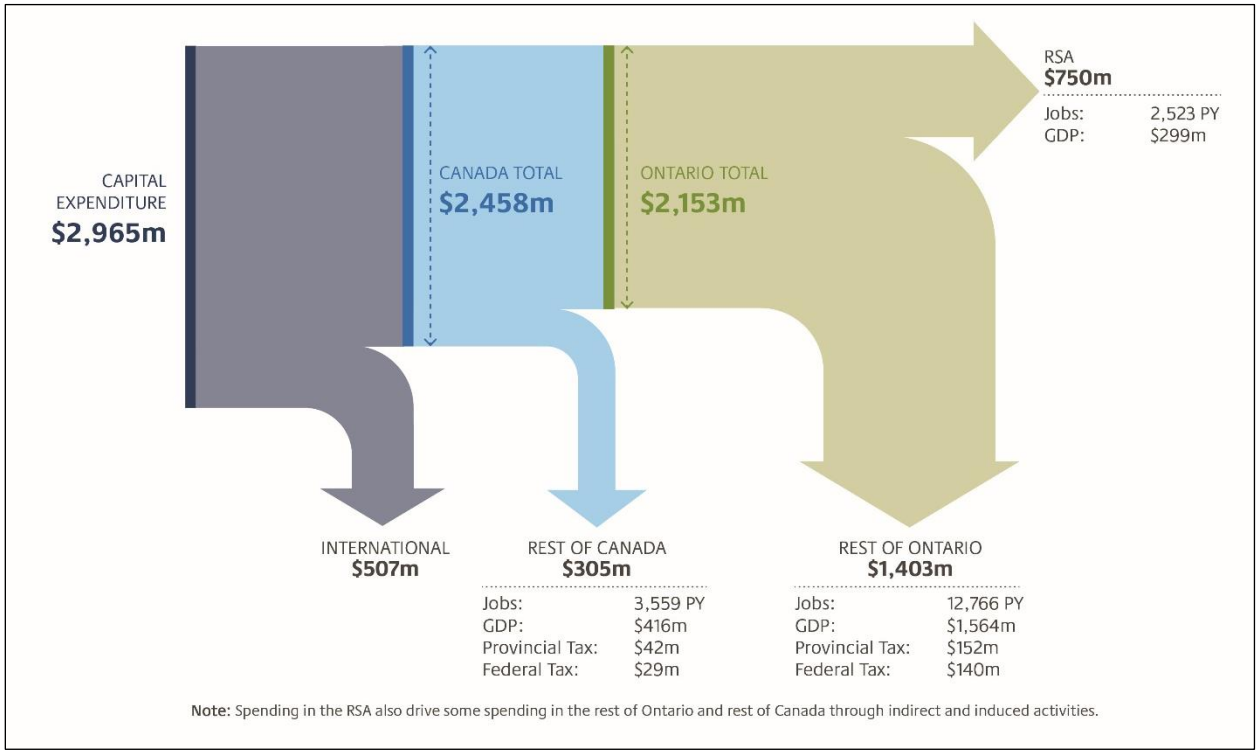


Figure 3.1-1: Direct CAPEX during Preconstruction and Construction

During operations, the model assumes that direct annual OPEX would total $19 million all of which would be spent within the RSA, with indirect and induced impacts in the RSA, the rest of Ontario and rest of Canada.

3.2 Indirect and Induced Spending

While the majority of the Project's CAPEX and OPEX would be spent directly on materials, equipment, supplies, and construction and engineering services, the indirect and induced spending would benefit a wide array of other services and businesses in the RSA including retail, accommodations, and food and entertainment providers. During construction, the model estimates that the Project would generate $536 million in indirect and induced spending in the RSA, $2,888 million in the rest of Ontario, and $851 million in rest of Canada, for a total of $4,275 million in indirect and induced spending (Figure 3.1-2).

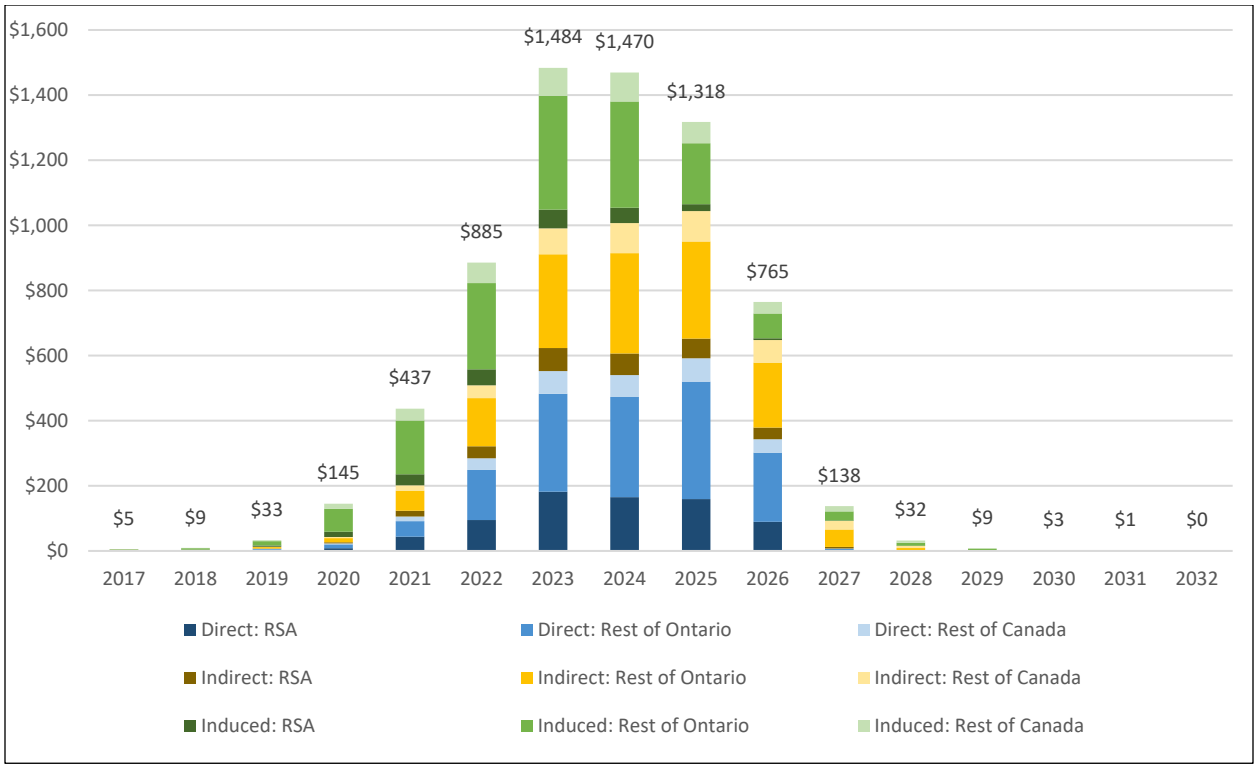


Figure 3.1-2: Project-related Spending by Year during Preconstruction and Construction (2019 million CDN $)

During operation, the indirect and induced spending generated as a result of the Project are estimated at $38 million annually split between the RSA ($12 million), the rest of Ontario ($19 million), and Canada ($7 million). The direct, indirect and induced total spending associated with operations over the life of the Project is estimated at $2,838 million.

3.3 Gross Domestic Product

The total Project-related GDP is estimated at $2,280 million for the preconstruction and construction phases of the Project with $299 million in total GDP benefits for the RSA. During operation, the model predicts that the Project would generate another $984 million ($19 million per year) in GDP, with about 43% of that generated in the RSA (Figure 3.3-1).

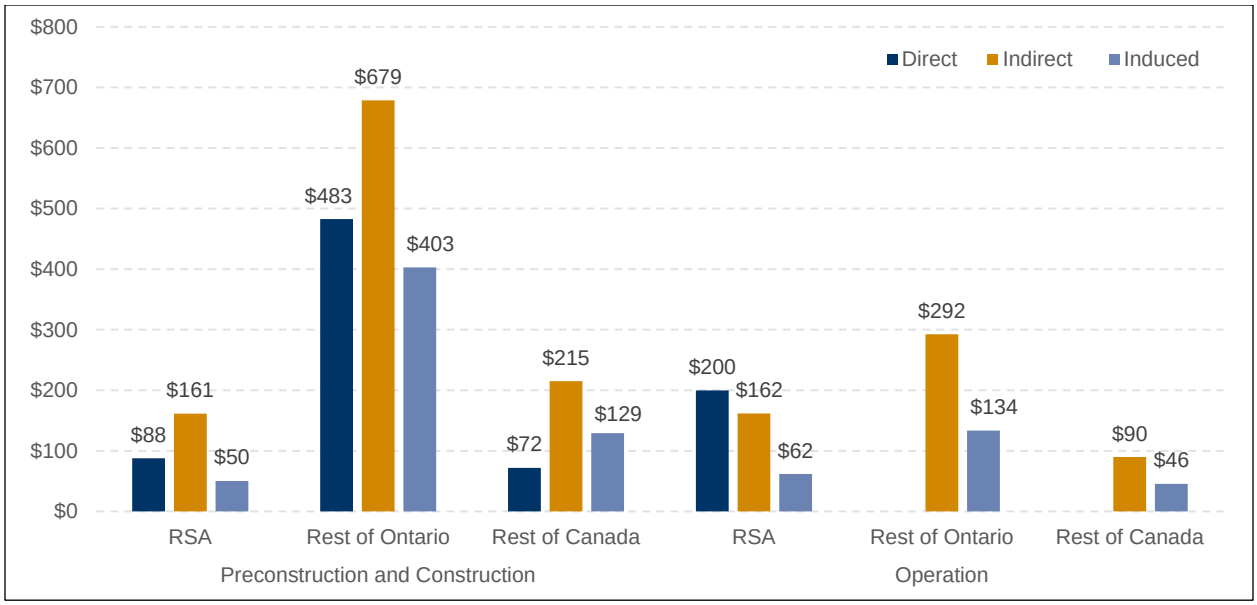


Figure 3.3-1: Total Project-related GDP during Preconstruction, Construction and Operation (2019 million CDN $)

3.4 Maximizing Benefits: Expenditures and GDP Recommendations

To maximize benefits of the Project in the RSA, it is recommended that TC Energy encourage procurement and contracting opportunities in the RSA with proposed measures to:

- Promote awareness of procurement opportunities for the Project within the RSA;
- Provide information and lead time to contractors from the RSA including contractors from Indigenous communities;
- Develop a forecast of business opportunities prior to commencement of construction activities;
- Monitor regional content on major bids;
- Host community meetings in major RSA and Indigenous communities to meet with regional businesses to inform of Project schedule, opportunities and the bidding process; and
- Work with Bruce Power, and other major project proponents within the RSA to coordinate initiatives to increase levels of procurement in the RSA.

4. TAX REVENUE

4.1 Business Tax, Income Tax, and Sales Tax

The Project would contribute to federal and provincial tax revenues through the payment of business tax, income tax and sales tax. The model predicts the total impact on government tax revenues for preconstruction and construction to be $364 million. During operations the model predicts the Project would generate $205 million in tax revenues, roughly $4 million per year (Table 4.1-1).

Table 4.1-1: Total Tax Revenue by Tax Category (2019 million CDN $)

	Preconstruction and Construction		Operation		Total
	Ontario	Rest of Canada	Ontario	Rest of Canada	
Federal					
Federal Income Tax	$78	$12	$49	$6	$145
GST and Other Indirect Taxes	$44	$9	$26	$3	$83
Federal Tax on Profits	$19	$7	$11	$4	$41
Total Federal Tax Revenues	$141	$29	$86	$12	$269
Provincial					
Provincial Income Tax	$40	$12	$26	$4	$82
PST and Other Indirect Taxes	$100	$25	$61	$7	$192
Provincial Tax on Profits	$12	$5	$7	$2	$26
Total Provincial Tax Revenues	$152	$42	$94	$13	$300
Total	**$293**	**$71**	**$180**	**$25**	**$569**

The total tax benefit to the federal government is estimated at $269 million with $170 million in federal taxes during preconstruction and construction, and another $99 million during operation (Table 4.1-1). The total tax benefit to the provincial governments is estimated at $300 million, with $194 million paid during preconstruction and construction, and another $107 million paid during operation (or $2.1 million per year; Table 4.1-1).

The provincial tax benefits for Ontario is estimated at $152 million during preconstruction and construction, and $94 million during operations (approximately $1.9 million per year; Table 4.1-1).

Total tax revenue impact can also be defined in terms of direct, indirect and induced impacts as presented in Figure 4.1-1 and defined as:

- **Direct tax revenue** are the taxes paid by the Project including corporate income taxes and provincial and federal income tax on wages earned by direct Project workers.
- **Indirect tax revenue** are the taxes paid by suppliers and service providers, including taxes on their purchases and on the salaries of their workers, and includes the whole supply chain.
- **Induced tax revenue** are the taxes that come from direct and indirect workers spending their income and buying goods and services; these taxes are generated through sales tax and income tax on induced employment.

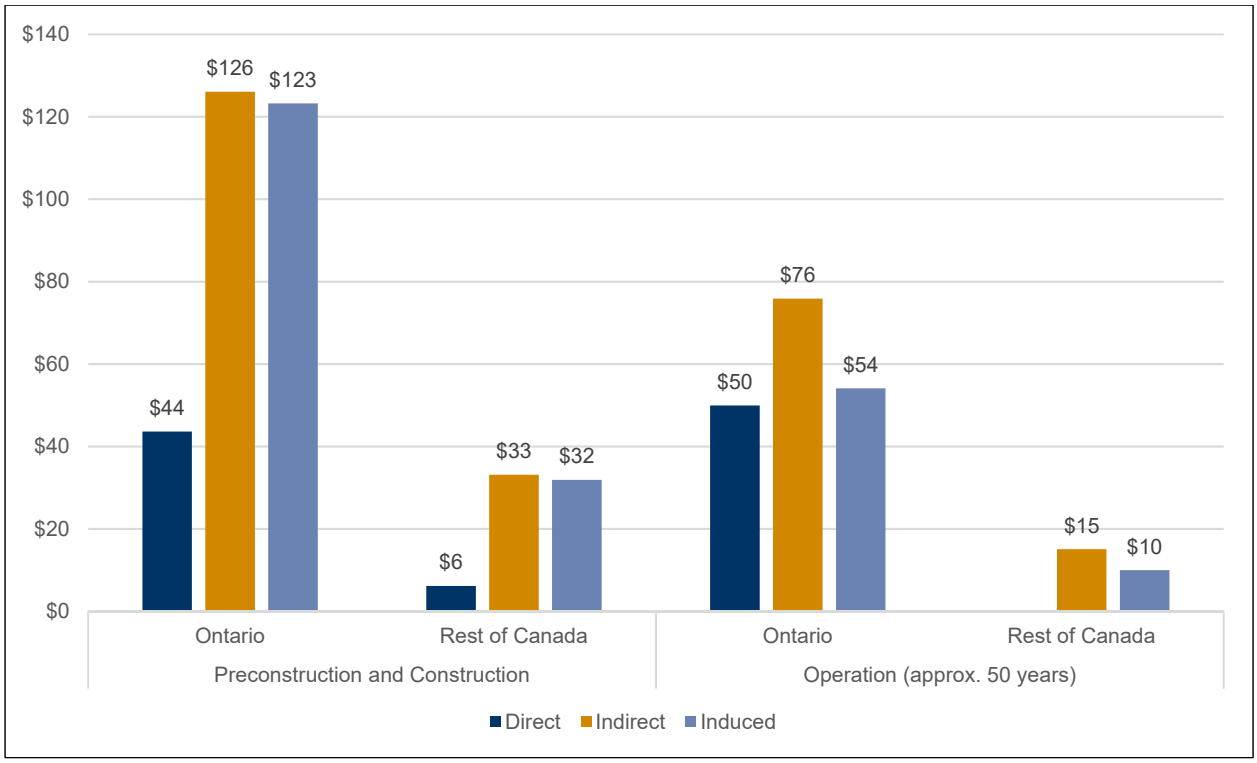


Figure 4.1-1: Total Tax Revenue (2019 million CDN $)

4.2 Municipal Taxes and Other Contributions

The economic model does not estimate property taxes or any other municipal taxes paid directly or indirectly to municipalities. While the Project is located in Municipality of Meaford, which normally would assess property values and collect property taxes on an infrastructure project, the Project is on federal lands (DND Canadian Forces 4th CDTC). The Government of Canada is exempt from paying taxes, such as property taxes, levied by local and provincial levels of government on federal lands and instead makes payments in lieu of taxes to host municipalities. At this point it is not yet clear if the Project would be exempt from property taxes, nor what the terms of a payment in lieu of taxes agreement would be with the relevant municipality.

Under the terms of the Access Agreement with DND, TC Energy would pay all of DND's costs related to site control and security through the environmental assessment, permitting and construction stages which is estimated at $13 million from 2017 to 2027. In addition, a long-term access agreement or lease is anticipated to support the operation phase of the Project, and payments to DND would be expected under this agreement for the term of the *Dominion Water Power Act* final licence period of 50 years.

It is recommended that TC Energy work with the Municipality of Meaford and other RSA municipalities to reach agreements regarding appropriate contributions to the communities during Project operation. These payments would be in addition to the tax payments projected by the economic model to increase contributions of the development and operation of the Project to the municipalities.

4.3 Ontario Water and Power Taxes

Under Ontario's *Electricity Act*, 1988, owners of hydro-electric generating stations and water power leaseholders are liable to pay taxes and charges on the gross revenues of hydro-electric generating stations. Taxes and charges include:

- Property taxes payable to the Minister of Finance;
- Property taxes payable to the Ontario Electricity Financial Corporation; and
- Water rental charges payable to the Minister of Finance.

Total taxes are calculated based on the amount of electricity generated. Assuming the Project generates 1.5 gigawatt-hours per year (Navigant 2020) the Project would pay approximately $9.9 million per year in taxes to the Minister of Finance and the Ontario Electricity Financial Corporation.

A 9.5% gross generation revenue water rental charge also applies to the all holders of a water power lease. Given that the Project is on federal land, it is not yet clear if this charge would apply, but if applicable, it would entail an additional $5.7 million per year payable to the Ontario Minister of Finance.

4.4 *Dominion Water Power Act* Fees

Hydro development projects located on federal lands are subject to the requirements of the *Dominion Water Power Act*. The Act governs the development, construction and operation of hydro facilities and assesses a fee associated with the use of a Crown resource, which in the case of the Project includes the water used to generate the power, and the land occupied by the Project. Fees are calculated using a formula based on the power capacity of the facility and the amount of water used or stored. While not included in the economic model, it is estimated the Project would pay up to $2.2 million per year in additional fees to the federal government under the Act.

5. ACCOMMODATIONS

5.1 Temporary Accommodations

Throughout the RSA, temporary accommodations include hotels, motels, bed and breakfasts (B&Bs) and campgrounds. Temporary accommodations are available in City of Owen Sound, Town of The Blue Mountains and Municipality of Meaford (all within a 30-minute drive of the proposed Project) and in Town of Collingwood (approximately 45-minute drive).

The temporary accommodation market is driven predominantly by the tourism industry. In places like City of Owen Sound and Municipality of Meaford, this means that demand for accommodations is seasonal. Interview participants indicated accommodations are near or at capacity in the summer, while there are vacancies in the shoulder seasons of late fall and spring. By contrast, in places like Town of Collingwood and Town of The Blue Mountains, the demand for temporary accommodations is year-round.

Stakeholders interviewed for this study reported that communities are seeing a rise in Airbnb rentals, as well as a rise in residents renting out parts of their homes as short-term rentals or leases. In a few instances, communities saw a rise in illegal short-term rentals. As demand for accommodations increases, a number of new accommodations are being built and more have been proposed, but most of these new and existing facilities cater to higher-end, more expensive units.

Unavailability of short-term rental accommodations could force unskilled, hospitality and service sector workers to commute to the RSA from further away, creating pressure on wages and making it more difficult to retain workers. Many businesses are already reliant on workers from outside the RSA (see Section 2.3). The influx of workers seeking temporary accommodations also has the potential to reduce the availability of housing for renters as well as for tourists, which could affect other businesses that rely on visitors to the region. While several communities are taking steps to address the shortage of affordable, rental and short-term accommodations, the issue persists. Some interviewees commented on the difficulties associated with incentivizing the development of temporary accommodation options.

Project workers who choose to relocate short-term to the RSA during construction are expected to select communities closest to the Project that offer key services (e.g., City of Owen Sound, Municipality of Meaford, Town of The Blue Mountains, and Town of Collingwood). These communities are also frequented by recreational visitors and, therefore, increased demand for temporary accommodation could decrease rental availability and increase rental prices in the RSA.

5.2 Permanent Accommodations

According to information from Statistics Canada, permanent accommodations are available throughout the RSA, with occupancy rates varying from 70% in Bruce County to almost 90% in Simcoe County (Table 5.2-1). In 2016, City of Owen Sound had 468 unoccupied dwellings, Municipality of Meaford had 760 unoccupied dwellings while Town of Collingwood had 2,061 (Statistics Canada 2017). This data does not account for the state of dwellings, and so likely includes dwellings that are seasonal, in need of major repairs, or uninhabitable. As a result, the number of available dwellings is likely lower and the occupancy rates higher than the data presented by Statistics Canada.

Vacancy rates for rental apartments are typically low in the RSA, however, show significant year-to-year variation (Figure 5.2-1). For example, in City of Owen Sound vacancy rate was 1.9% in October of 2019, 3.6% in 2015, 4.6% in 2012; and 1.2% in 2005 (CMHC 2019). Most of those interviewed believe that vacancy rates would continue to be very low for years to come and that this issue could be further exacerbated by the Project.

Table 5.2-1: Private Dwellings in the RSA, 2016

County	Total Private Dwellings	Private Dwellings Occupied by Usual Residents	Total Private Households		Average Household Size	Occupancy Rate*	Rental Rate**
			Owned	Rented			
Bruce	41,183	28,866	23,530	5,285	2.3	70.1%	18.3%
Grey	47,560	39,563	30,340	9,225	2.3	83.2%	23.3%
Simcoe	206,549	183,536	144,705	38,700	2.6	88.9%	21.1%

*Notes: *Occupancy rate is calculated as a ratio of private dwellings occupied by usual residents to total private dwellings. **Rental rate is calculated as a ratio of rented total private household units to private dwellings occupied by usual residents.*

Source: Statistics Canada (2017)

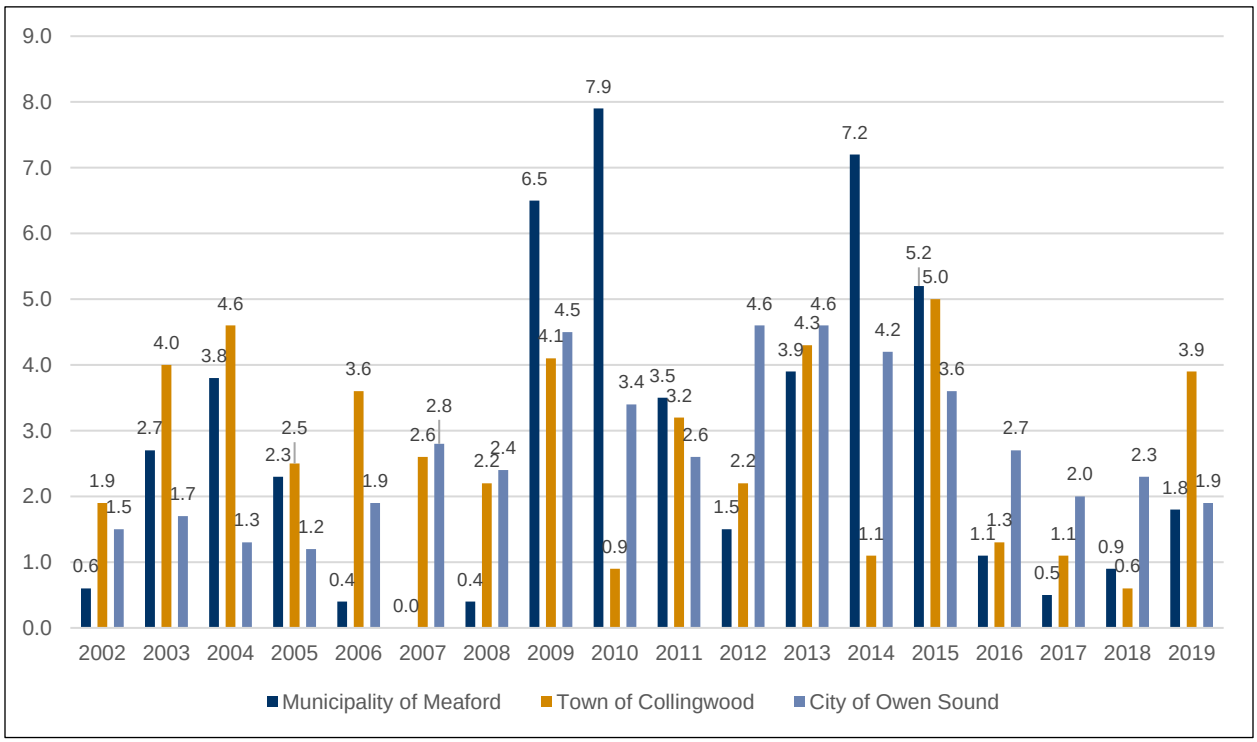


Figure 5.2-1: Historical Vacancy Rates for Row/Apartment Rentals in October of Each Year

Notes: Vacancy rates were not available for other communities in the RSA.

Source: CMHC (2019)

According to interview participants, the housing market has been strong and competitive across the RSA for several years. Construction of new developments cannot keep up with increased demand and selling prices remain high, especially for single-detached homes.

While single-family detached housing is the most sought-after type of unit, there is a notable lack of all housing options. The rising cost of housing and developers' focus on higher-end, single-family detached units mean the entry-point for new homeowners is high. Housing is becoming increasingly unaffordable for many young people, especially those in the service and hospitality industries where wages tend to be lower. Some interviewees commented that workers in the construction industry and trades cannot afford the new high-end housing being developed in Town of Collingwood and Town of The Blue Mountains.

Instead, these workers are settling in places like City of Owen Sound and Municipality of Meaford which tightens these markets.

Almost all interviewees acknowledged the issues of housing and labour were intricately related and that affordable housing was a significant contributor to the labour market issues. The problem was described as circular: the existing lack of housing makes it difficult to attract and retain labour, while the shortage of workers makes it difficult for developers to increase the amount of housing. The result is the slow growth of development leading to the shortage of affordable housing.

The Project is at least two years away from start of construction (Section 2.3). Peak construction accommodation requirements in the RSA are not expected to occur until at least 2025. The proposed timing provides time to work with municipalities on a plan to increase the amount of accommodations available to support the Project and reduce the effects on employers and residents in the RSA.

5.3 Accommodation Recommendations

It is recommended that TC Energy work with municipalities and existing housing and accommodation providers in key communities, and other developers in the RSA, to:

- Identify housing needs for Project workers;
- Communicate the Project construction schedule to minimize potential effects on housing and accommodation; and
- Develop a Workforce Accommodation Plan to manage effects to short- and long-term housing in the RSA.

6. INFRASTRUCTURE AND SERVICES

6.1 Railways, Roads, and Highways

The RSA and Project are both well-serviced by public highways and county roads. Highways 410 and 400 connect the Georgian Bay area to the Greater Toronto Area, offering two transportation routes for supplies and services to access the RSA. Both highways turn into smaller rural roads, which are all paved and generally in good condition. Railway passes through Simcoe County from City of Toronto, to City of Barrie (by Midhurst), and going north towards Coldwater Village and beyond.

Construction of the Project would require the transportation of material, equipment and labour to the Project site. This would increase traffic on roads including Highway #26, as well as Highway #6 and #10, depending on the preferred route of transportation. Although the average increase in annual average daily traffic cannot be specifically estimated, Project construction would require at its peak up to 141 workers from the RSA, up to 778 workers from the rest of Ontario, and up to 114 workers from the rest of Canada. To minimize the increase in the number of private vehicles on the road, workers would be encouraged to use carpooling or multi-passenger vehicles for the transport of crews to and from the job site, as public transportation options to the Project site are limited. Also, workers from beyond the RSA would be likely to relocate short-term closer to the Project to reduce time needed to get to work. However, the increased usage of roads could have the potential to cause additional “wear and tear” on road infrastructure, especially during the transportation of heavy equipment and material.

TC Energy should incorporate specifications in its contracts with construction firms to implement transportation plans including bussing, carpooling and ride-sharing to minimize the traffic congestion and noise and “wear and tear” to roads. TC Energy should also work with applicable infrastructure owners, operators and municipalities to obtain all necessary road use agreements, bridge restrictions and oversize load permits; operate under strict health and safety regulations; and implement a Traffic Control Management Plan to minimize or avoid potential impacts to existing infrastructure. TC Energy should also obtain all appropriate permits and conform to existing regulations to move equipment and supplies to the Project Site. In cases of structural damages to roads resulting from the transportation of Project equipment and supplies to the site, TC Energy should work with municipalities in the RSA and the Province, as appropriate, to address any damages.

6.2 Utility Services, Pipelines, and Power Lines

The RSA is well-serviced by power infrastructure (115 kV and 230 kV) and gas distribution with lines running throughout all three counties, as well as municipal water treatment plants in most urban centers. Natural gas distribution is currently being expanded in South Bruce to the communities of Chesley, Paisley, Inverhuron, Tiverton, Kincardine, Lurgan Beach, Point Clark, Ripley, Lucknow and the Bruce Energy Centre under the province’s Natural Gas Expansion Program (Epcor 2020).[4] There are also proposals for further expansion of natural gas distribution systems to the communities in the region to reduce the economic pressure of high electricity and heating costs for residents.

Construction equipment is not expected to interact with underground infrastructure during clearing at the Project site as there is limited infrastructure in the proposed Project area. The Project would need to construct new transmission lines leading to the Project facility, as the existing line 115 kV infrastructure does not have the capacity to carry the Project’s 1000 MW of incoming and outgoing power. There will also be a

[4] Natural Gas Expansion Program was created to help extend access to natural gas to unserved communities across the province, providing access to thousands of households and businesses to the clean and affordable fuel they deserve. Nine projects were selected under the first phase of the program, with construction well underway in Southern Bruce.

need to augment the existing power distribution system to support the construction power requirements. However, service disruptions are not predicted beyond the time required to connect the service.

Construction of the new transmission line would require extensive planning and permitting. The two options being explored by TC Energy include a subsea transmission cable and an overland transmission line. The overland transmission line would consist of a combination of aboveground and underground power lines on new and existing rights-of-way and could be up to 95 km long. Underground construction and installation of power cables has the potential to strike or damage pipelines, or water and sewer lines, while aboveground construction of power lines has the potential to come in contact with communication lines and power lines. These could result in service disruptions but is highly unlikely to occur given existing standard construction practices, procedures, and regulations.

Additional impacts on utility services may occur as a result of an increase in the regional workforce during Project construction. Workers who relocate to communities closest to the Project could increase demand for water and electricity in those communities although these would generally conform to the permitted capacity of the dwellings in existence. City of Owen Sound, Municipality of Meaford, Town of The Blue Mountains and Town of Collingwood have sufficient water treatment capacity to meet the needs of existing housing and accommodation. Temporary construction workers who intend to rent dwellings in the RSA, will use existing infrastructure designed and permitted to meet peak demands. The construction of new accommodations would be done through issued building permits to ensure new loads fall within existing capacities. If construction of new accommodations requires additional capacity, such construction would not be approved or expansions to the existing infrastructure would be needed to meet increases in demand.

TC Energy should work with applicable infrastructure owners and operators and abide by all applicable health and safety regulations such that potential impacts to existing infrastructure are minimized or avoided. In cases of structural damages to infrastructure resulting from construction of Project components, TC Energy should work with the relevant owners and/or operators to address any damages. TC Energy should also work with municipal service providers to identify and address any major changes in the demand for municipal services (water, sewer, electricity) as a result of Project construction.

6.3 Waste Disposal

Garbage, recycling and hazardous waste disposal services are provided in City of Owen Sound as well as in all townships and municipalities in Grey, Bruce and Simcoe counties (Bruce County 2019b; Grey 2019a; Simcoe 2019b).

Potential increase in waste disposal is anticipated on landfill site(s) in proximity to the proposed Project. This effect is only predicted for the construction phase as there is expected to be construction waste and other discarded material that would be disposed of through regional waste management facilities. Additional impacts on waste disposal can be expected as a result of an increase in the regional workforce during Project construction. Workers who relocate to communities closest to the Project could increase the disposal of household waste, increasing the amount of disposed waste on landfills. Increases to disposed waste could reduce the life expectancy of landfills.

TC Energy should work with applicable operators and municipalities to minimize or avoid potential impacts on waste disposal. TC Energy should implement a Waste Disposal Plan, if required, to manage waste produced at the site during Project construction. Scrap material should be recycled whenever possible or resold.

6.4 Medical and Emergency Services

Medical services are available in all three counties. Grey Bruce Health Services (GBHS) operates six hospitals in Grey and Bruce counties, including a hospital in City of Owen Sound that provides a 24-hour emergency department, inpatient surgeries, advance diagnostic services and acts as a regional referral centre for Grey and Bruce Counties (Grey 2019b; Schulich 2019).There are four hospitals in Simcoe County including the Collingwood General and Marine Hospital (CGMH), which is a 70-bed hospital located in Town of Collingwood. There are also several health centres in the three counties that serve permanent residents and recreational visitors to south Georgian Bay.

Policing, fire and emergency services are also available in all three counties. Grey County is serviced by the Owen Sound Fire & Emergency Services that provide 24/7 fire and emergency response, while the South Bruce Fire Department and the Simcoe County Fire Services serve respectively Bruce and Simcoe counties. Policing is covered by multiple overlapping levels of authority, including the Ontario Provincial Police and county-specific forces (South Bruce Detachment, South Simcoe Police Service and Grey County Police Service).

TC Energy operates under strict health and safety regulations and Project-specific precautionary work practices should be determined, communicated and enforced prior to and during construction activities. TC Energy is committed to providing a safe and healthy work environment, with a goal of zero incidents. While policies and procedures limit the risk for serious accidents, they can happen as can illness, which could temporarily increase demand for emergency services. If some construction workers decide to temporarily relocate to the RSA communities, this could also increase demand for healthcare and emergency services.

TC Energy should work with municipalities and health service providers in key communities to identify any potential needs for community infrastructure and services, and for emergency services to service the Project. Health and safety regulations, as well as Project-specific precautionary work practices should be maintained during Project construction to prevent any potential emergencies, and a skilled team should be employed to construct the Project.

Although negligible impacts on medical and emergency services are expected for the operation phase of the Project, an Emergency Preparedness and Response Plan[5] should be prepared by TC Energy for both the construction and operation phases of the Project.

6.5 Transportation

The closest international airport is the Toronto Pearson Airport while larger regional airports in proximity to the Project include Owen Sound Billy Bishop Regional Airport and Collingwood Regional Airport.

Public transportation options in Bruce and Grey Counties include:

- Owen Sound Transit Bus;
- Owen Sound Taxi Service;
- Greyhound Bus Lines with bus stations in City of Owen Sound; and
- Grey Bruce Airbus that provides bus service to Metro Toronto.

There are also Uber services and a variety of specialized transit services for City of Owen Sound servicing senior clients, clients with medical needs or with mental/physical challenges.

[5] The Emergency Preparedness and Response Plan typically includes detail about the level of first aid to be provided. First Aid requirements would be captured in the Prime Contractor's Site Specific Safety Plan and would be respective of the jurisdiction for where the work is taking place.

Simcoe County is serviced by LINX, a public transit system that links major urban hubs and transit services operating Monday to Friday on routes including Town of Wasaga Beach to Town of Collingwood, and to and from City of Barrie (Simcoe 2019a).

Sporadic changes in traffic patterns (e.g., road or lane closures) in the RSA could occur during the delivery of construction supplies, equipment, and labour. Temporary road or lane closures could also happen if there are any improvements required to roads or road connections (such as the need to construct a new access road to the Project) or where the overland transmission line may need to be constructed. Residents, visitors and businesses in the RSA could, therefore, experience periodic increased traffic as well as longer travel times. The increase in the regional labour force during Project construction could also lead to heavier traffic on roads as well as potential concerns over safety on roads. Overall, an increase in traffic would be expected to have a localized impact on the level of service on roads and it is predicted only for the construction phase. Impacts on public transportation (an increase in demand) is not predicted, as there are no public transportation options to the 4th CDTC.

TC Energy should employ construction planning measures and best industry practices such that potential impacts to transportation in the RSA are minimized or avoided. A Traffic Management Plan should be developed in accordance with requirements of the Province and municipalities in the RSA.

6.6 Recreational Facilities and Parks

South Georgian Bay has a large recreational community dominated by cottages in the south and east, boating throughout, hiking, biking and skiing, as well as a wide variety of other attractions including national, provincial and regional parks, trails, mountain climbing, fishing, rural gardens and waterfalls, resorts, museums, wineries, and much more. The region has a large number of summer residents, cruising boaters and seasonal visitors. Communities such as Town of Collingwood and Thornbury (Town of The Blue Mountains) brand themselves as four-season resort towns, drawing on the proximity and wealth of Greater Toronto area residents. In recent years there has been substantial investment into recreational facilities in the RSA including housing, hotels, restaurants, galleries and retail.

Lake Huron and Georgian Bay are themselves a focal point of activity, particularly from spring to fall with thriving boating and boat-access cottages. Recreational users also have a very strong affinity for Georgian Bay with related landscapes being iconic in South Ontario, across Canada and globally. Georgian Bay was recognized as a United Nations Educational, Scientific, and Cultural Organization (UNESCO) Georgian Bay Biosphere Reserve (GBBR) in 2004 (UNESCO 2015). The GBBR, also known as 'The Thirty Thousand Islands,' consisting of a complex association of bays, inlets, sounds, islands and shoals.

The proposed Project is located in proximity to: the Niagara Escarpment, the Bayview Escarpment Provincial Nature Reserve, and a number of public recreation sites such as the Roebuck Family Camp Ground or the Fairview Trailer Park both located northwest of Municipality of Meaford.

Effects of construction noise, dust, air emissions, and change in visual aesthetics are not included in this study but will be assessed in the future impact assessment and environmental assessment for the Project. Construction of the Project could result in a temporary increase in noise, dust and air emissions from the installation and construction of Project components although much of this is expected to be contained within 4th CDTC. These changes could disrupt recreational users visiting the RSA around the 4th CDTC and other affected areas during construction, however, it is anticipated that those effects would be localized and would not affect recreational facilities and parks in the RSA. It is not anticipated that operation of the Project would affect recreational facilities and parks.

During Project construction, TC Energy should inform potentially affected residents and businesses of any planned work, potential disturbances and service disruptions in advance of activities.

6.7 Educational Facilities

The RSA has elementary, secondary and post-secondary educational institutions.

Post-secondary education is available, but not limited to: Georgian College that has five campuses including a campus in City of Owen Sound and Town of Collingwood (Georgian College 2019), the Academy of Learning College (Computer & Business Career College) and Creative Career Systems (private college offering job-focused programs) both in City of Owen Sound. Other post-secondary training in the RSA is mostly available in City of Barrie. University of Toronto, York University, Durham College and University of Guelph provide post-secondary educational institutions in proximity to the RSA.

The construction phase could commence as early as 2022, and last for approximately five years. This gives some time for TC Energy to engage with educational and training institutions in the RSA and beyond to design and provide training opportunities and prepare workers for construction jobs. This also provides an opportunity to encourage unskilled and unemployed workers in the RSA to undertake training, potentially helping to reduce the skilled labour shortage in the region. These activities would likely cause a short-term increase in the demand for training in the RSA in related fields, however, a long-term effect is not expected following the construction phase.

This Project may provide the opportunity to work with education and training institutions to align anticipated skilled labour required for construction with their internal capacity to deliver programing.

6.8 Infrastructure Services Recommendations

The following mitigations measures are recommended for TC Energy to implement to minimize or remove identified adverse impacts on infrastructure and services:

- Coordinate multi-passenger transport for workers from hubs to and from the Project during construction to reduce the number of vehicles using roads and highways.
- Work with applicable infrastructure owners, operators and municipalities to obtain all necessary road use agreements, bridge restrictions and oversize load permits.
- Develop and implement a Traffic Control Management Plan to minimize or avoid potential effects to existing infrastructure.
- Work with applicable operators and municipalities to minimize or avoid potential effects on municipal waste disposal facilities. A Waste Disposal Plan should be developed to manage waste produced at the site during Project construction.
- Determine, communicate and enforce precautionary work practices prior to, and during, construction activities. Contractors would be responsible for the health, safety and quality performance on-site and would abide by TC Energy's health and safety standards or their own standards, whichever are more stringent. Health, wellness and other best practices should be continuously promoted and reinforced through morning tailgates, safety moments, and ongoing communication with workers to ensure topical and relevant risks are recognized and controlled.
- An Emergency Preparedness and Response Plan should be prepared by TC Energy for both the construction and operation phases of the Project.
- Work with educational and training institutions in the RSA to support programs that provide skills needed to support the direct and indirect needs of Project construction.
- Work with municipalities and health service providers in key communities to identify potential needs for medical and emergency services.
- In cases of structural damages to infrastructure resulting from construction of Project components, TC Energy should work with the relevant owners and/or operators to address any damages.

7. CONCLUSIONS AND RECOMMENDATIONS

7.1 Conclusions

The proposed Project would address the growing need for power capacity and storage in Southern Ontario. If approved, Project construction could start as soon as 2022.

The construction of the Project would have a number of benefits for the regional, provincial and national economy. Details are summarized in Figure 7.1-1; economic benefits for the RSA during preconstruction and construction include:

- **up to 141 direct jobs** during peak construction activities;
- **up to 482 indirect and induced jobs** per year during peak construction activities;
- **$186 million** worth of wages to workers in the RSA during preconstruction and construction;
- **$750 million** spent in the RSA by the Project on labour, equipment and material;
- **$152 million** in provincial tax revenue to Ontario; and
- **$299 million** in GDP impact in the RSA.

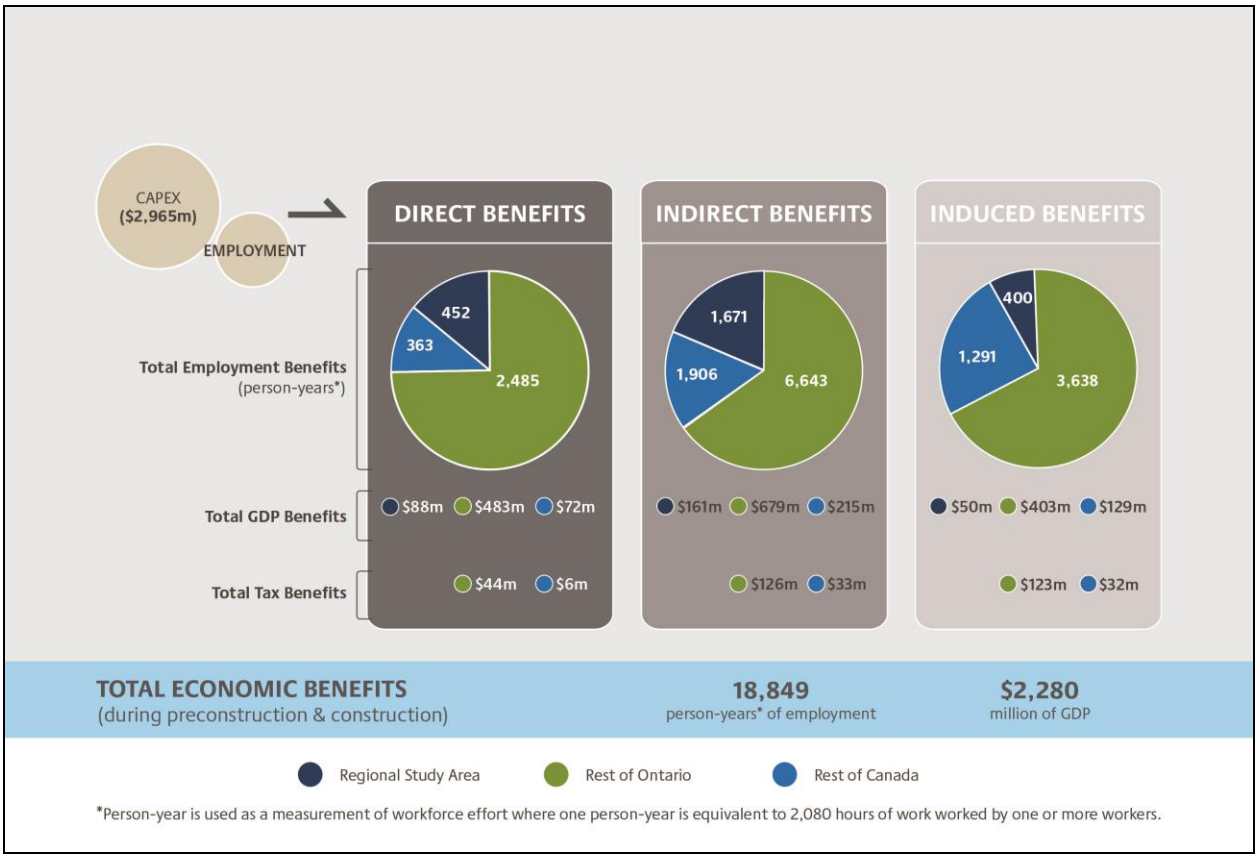


Figure 7.1-1: Summary of Economic Benefits during Preconstruction and Construction

During operation, the Project would provide Ontario with 1,000 MW of flexible, on-demand capacity and lower the annual emissions of CO_2 by an annual average of 490,00 tonnes. The economic model predicts the Project would provide 23 long-term jobs (20 on-site and three off-site), with annual operating spending on labour, mitigation and maintenance of $19 million. Annual provincial tax revenue is estimated at approximately $1.9 million. Direct, indirect and induced benefits of the operation phase are summarized in Figure 7.1-2.

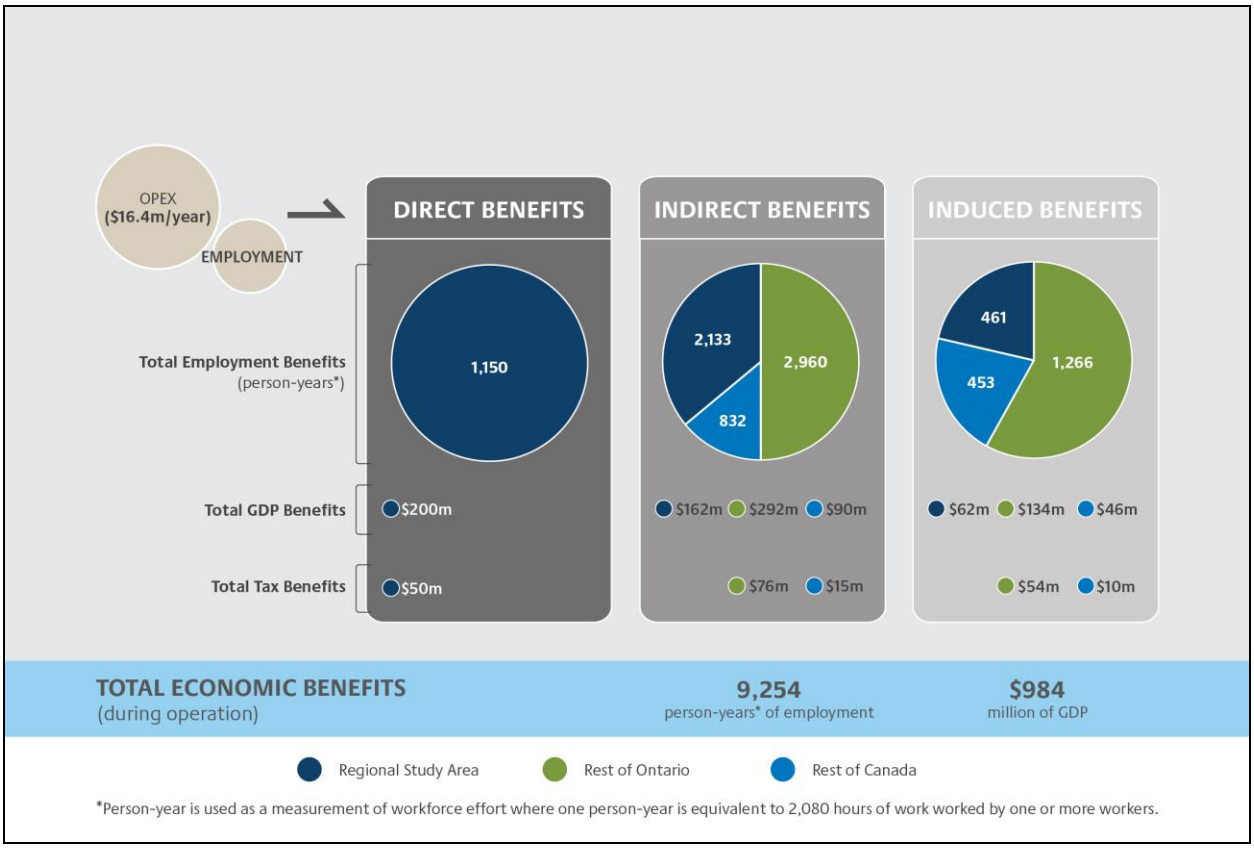


Figure 7.1-2: Summary of Economic Benefits during Operations

Potential adverse economic effects of the Project during the construction period include:

- Temporary increase in demand for skilled labour in communities closest to the Project where demand is currently high;
- Temporary increase in demand for housing and accommodations in communities closest to the Project; and
- Temporary increase in use of infrastructure and services including, roads and highways, utilities, water, waste disposal, medical and emergency services.

7.2 Recommendations

Table 7.2-1 provides a summary of the recommended mitigation measures to avoid or reduce the potential adverse effects. Potential adverse effects on employment and economy, and infrastructure and services, are limited to the construction phase, given that during operation the Project would hire 23 on-site and three off-site workers, with spending in the RSA directed at wages and maintaining day-to-day operations.

Table 7.2-1: Potential Adverse Effect and Recommended Mitigation Measures

Potential Effect	Phase	Indicator	Recommended Mitigation Measures
Increased competition for / shortage of skilled workers	Construction	Labour force and employment	■ Communicate the Project's construction plan and schedule to RSA stakeholders and Indigenous groups so workforce is aware of the Project activities and opportunities. ■ Develop a **Human Resources Strategy** with measures to increase the regional skill level, maximize employment of workers from the RSA, and recruit skilled workers to the RSA. ■ Develop a **Labour Utilization Plan** to strategize and collaborate with other potential employers and developers in the region.
Increased demand for housing and accommodation	Construction	Housing and accommodation	■ Work with governments and service providers in key communities to identify housing needs for Project workers. Communicate Project work schedule to minimize potential effects on housing and accommodation. ■ Develop a **Workforce Accommodations Plan** to manage short- and long-term housing impacts.
Increase use of roads and highways	Construction	Roads and highways Transportation	■ Work with applicable infrastructure owners, operators and municipalities to secure relevant permits, communicate Project work schedule, provide notification of disruptions, and address any damages. ■ Develop a **Traffic Management Plan** to address construction-related traffic routing, access locations, access restrictions, and construction vehicles speed limits. ■ Follow health and safety regulations, standards and procedures, including: road closure regulations, and signage requirements. ■ Encourage workers to use carpooling or multi-passenger vehicles for transport of crews to and from the Project site.
Increased waste disposal	Construction	Impacts on waste disposal	■ Communicate with waste disposal operators and municipalities to coordinate waste disposal of construction material. ■ Develop and implement a **Waste Disposal Plan** if required to manage waste produced at the site during Project construction.
Increased demand for medical and emergency services	Construction	Impacts on medical and emergency services	■ Develop a **Site-Specific Safety Plan** and an **Emergency Preparedness and Response Plan** for the Project to address field health services, emergency call-out procedures, fire response plans and other safety requirements and share these with service providers in the RSA. ■ Establish on-site medical services at the Project site during construction.

Potential adverse effects would also be addressed by complying with all permits, approvals, and authorizations and by following these recommended initiatives:

1. **Engage and communicate with stakeholders and Indigenous groups**, including municipalities, businesses, residents and others in the RSA to share information about Project timelines and work schedules, and gather feedback and input to inform development of mitigation measures.
2. **Work with infrastructure and service owners and operators** (provincial, municipal, and private operators) to address increased demand for services, and obtain approvals as required.
3. **Prepare and apply Project-specific mitigation measures** to avoid or minimize potential effects, informed by consultations and implemented in collaboration with stakeholders and Indigenous groups in the RSA. Extensive planning will go into the development of mitigation plans and strategies required for a Project of this scale. Proposed plans and strategies should include: Human Resources Strategy, Labour Utilization Plan, Workforce Accommodations Plan, Traffic Management Plan, Waste Disposal Plan, Site Specific Safety Plan, Emergency Preparedness and Response Plan, Construction Management Plan, and Communication Plan (Table 7.2-1).
4. **Work with the municipalities in the RSA** to alleviate the potential financial burden associated with the development and operation of the Project, in lieu of municipal tax.
5. **Monitor, evaluate, and report on** the Project's effects and the effectiveness of the mitigation measures.

A number of enhancement measures could be also introduced to maximize the beneficial impacts of the Projects. Such measures could include, amongst others:

- Where possible, utilize the pool of unemployed or recruit workers from diverse groups, including Indigenous communities, to fill available jobs in construction.
- Work with educational and training institutions in the RSA, with a specific focus on institutions in close proximity to the Project site, to design and implement programs that would support jobs in construction and help to address skilled labour shortages in the RSA.
- Communicate and promote employment opportunities at the Project well in advance of the commencement of the construction phase to encourage increased skill levels within the regional labour force to prepare workers for jobs.
- Communicate procurement opportunities and processes to businesses in the RSA in advance of the construction phase to maximize the participation of RSA businesses in the Project and business revenue impacts in the RSA.

Construction and operation of the Project is an opportunity for significant economic benefits in the RSA, Ontario and Canada. Temporary adverse effects during construction can be mitigated by implementing the recommendations. The 1,000 MW proposed pumped storage project responds to the future power grid needs of Ontario, reduces greenhouse gas emissions from power generation, and provides economic benefit to local communities in the RSA, Ontario and Canada

.

8. REFERENCES

Bruce County. 2019a. *Key Industries*. https://brucecounty.on.ca/business/bruce-overview/key-industries (accessed June 2019).

Bruce County. 2019b. *Waste Management Programs*. https://brucecounty.on.ca/waste-management (accessed June 2019).

Bruce Power. 2019. *Careers*. https://www.brucepower.com/careers/ (accessed May 2019).

Build Force Canada. 2019. *Construction & Maintenance Looking Forward: Ontario*. https://www.constructionforecasts.ca/sites/default/files/highlights/2019/2019_ON_Constr_Maint_Looking_Forward.pdf (accessed February 2020).

CER. 2016. *Market Snapshot: Pumped-storage hydro – the largest form of energy storage in Canada and a growing contributor to grid reliability*. https://www.cer-rec.gc.ca/nrg/ntgrtd/mrkt/snpsht/2016/10-03pmpdstrghdr-eng.html (accessed March 2020).

CMHC. 2019. *Housing Market Information Portal*. https://www03.cmhc-schl.gc.ca/hmip-pimh/en#Profile/1/1/Canada (accessed June 2019).

EDO Simcoe. 2019. *County of Simcoe Top 100 Employers 2016*. https://edo.simcoe.ca/Shared%20Documents/About%20Page%20Links/2016%20Top%20100%20Employers.pdf (accessed June 2019).

Epcor. 2020. *Bringing natural gas to your community*. https://www.epcor.com/products-services/infrastructure/Pages/southern-bruce-infrastructure.aspx (accessed April 2020).

Four County Labour Market Planning Board. 2020. *Local Labour Market Plan*. https://www.planningboard.ca/wp-content/uploads/2020/03/FCLMPB_2020LocalLabourMarketPlan.pdf (accessed April 2020).

Georgian College. 2019. *Full-time Programs*. https://www.georgiancollege.ca/academics/full-time-programs/?campus=owen%20sound (accessed June 2019).

Grey. 2019a. *Garbage and Recycling*. https://www.grey.ca/garbage-recycling (accessed June 2019).

Grey. 2019b. *Paramedic Services*. https://www.grey.ca/paramedic-services (accessed June 2019).

IESO. 2020a. *Planning and Forecasting - Reliability Outlook. An adequacy assessment of Ontario's electricity system, from Jan 2020 to Dec 2024, Figure 6-1 | MWh Curtailments versus Ontario Demand*. http://ieso.ca/en/Sector-Participants/Planning-and-Forecasting/Reliability-Outlook (accessed March 2020).

IESO. 2020b. *Planning and Forecasting: Annual Planning Outlook*. http://ieso.ca/en/Sector-Participants/Planning-and-Forecasting/Annual-Planning-Outlook (accessed March 2020).

Navigant. 2020. *Economic Analysis of a Proposed Hydroelectric Pumped Storage Project in Ontario*. Prepared for TC Energy. https://www.tcenergy.com/siteassets/pdfs/power/pumped-storage-project/tc-energy-value-of-pumped-storage-project-report.pdf (accessed February 2020).

Schulich. 2019. *Grey-Bruce Academy*. https://www.schulich.uwo.ca/distributededucation/academies/greybruce_academy.html (accessed June 2019).

Simcoe. 2019a. *About Simcoe County LINX*. https://www.simcoe.ca/Transit/Pages/About.aspx (accessed June 2019).

Simcoe. 2019b. *Waste Facilities*. https://www.simcoe.ca/dpt/swm/landfills (accessed June 2019).

Statistics Canada. 2017. *Census Profile, 2016 Census*. https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/index.cfm?Lang=E (accessed May 2019).

TC Energy. 2020. *Proposed TC Energy Pumped Storage Project*. https://www.tcenergy.com/operations/power/pumped-storage-project/ (accessed March 2020).

UNESCO. 2015. *Ecological Sciences for Sustainable Development: Georgian Bay*. http://www.unesco.org/new/en/natural-sciences/environment/ecological-sciences/biosphere-reserves/europe-north-america/canada/georgian-bay/ (accessed June 2019).

APPENDIX A TC ENERGY-SUPPLIED PROJECT INPUTS

Appendix A: TC Energy-supplied Project Inputs

Total CAPEX

Real-Dollar and Nominal-Dollar CAPEX

In economic studies such as this one, it is the convention that dollar figures are stated in real dollars (otherwise known as constant dollars) of a particular year, so as to avoid comingling the impacts of expected inflation on the conclusions. Over long periods of time, inflation can give economic expenditures and economic impacts the appearance of increasing. For example, over the course of ten years passing, the sum of $1.00 billion dollars at the start of the period inflated at 2% per year will grow to $1.22 billion dollars (nominal dollars, otherwise known as dollars of the day) at the end of the period. In order to avoid overstating the impact of these figures, real dollars are used – in this case, the real dollar figure would remain at $1.00 billion.

The total construction costs (CAPEX) for the Project cited in this report are $2,965 million in real 2019 dollars. In other publicly-released communications, TC Energy has estimated Project CAPEX at $3.3 billion – this figure was stated in nominal dollars. Table A-1 below shows a simplified example comparing a stream of estimated real dollar CAPEX compared to a stream of nominal dollar CAPEX assuming 2% annual inflation from 2019, showing how the nominal dollar escalated figure becomes $3.3 billion.

Table A-1: Estimated CAPEX Amounts, Real 2019 Dollars Compared to Nominal Dollars (millions of dollars)

	Y-5	Y-4	Y-3	Y-2	Y-1	Y1	Total
Real 2019 Dollars:	40	155	638	638	1,118	377	**2,965**
Nominal Dollars:	46	165	690	704	1,259	433	**3,297**

Annual OPEX

TC Energy provided that annual OPEX for the Project during the operation phase (starting in 2028) is estimated at $19.0 million, including $2.6 million per year for environmental protection measures. The figure is in 2019 real dollars.

Employment

TC Energy indicated that employment during Project construction is estimated at 3,274 direct person-years of employment over the 5-year construction period (or up to 1,033 jobs during peak construction activities). Once in operation, the Project would provide 20 direct on-site and 3 direct off-site jobs. Estimated employment for the Project is measured in person-years and the number of jobs. Person-year is used as a measurement of workforce effort where one person-year is equivalent to 2,080 hours of work worked by one or more workers. The number of jobs represents the number of positions created in any year that is equivalent to full-time workers who work 2,080 hours a year.

ERM has over 160 offices across the following countries and territories worldwide

Argentina
Australia
Belgium
Brazil
Canada
Chile
China
Colombia
France
Germany
Ghana
Guyana
Hong Kong
India
Indonesia
Ireland
Italy
Japan
Kazakhstan
Kenya
Malaysia
Mexico
Mozambique
Myanmar
The Netherlands
New Zealand
Norway
Panama
Peru
Poland
Portugal
Puerto Rico
Romania
Russia
Senegal
Singapore
South Africa
South Korea
Spain
Sweden
Switzerland
Taiwan
Tanzania
Thailand
UAE
UK
US
Vietnam

ERM's Toronto Office
120 Adelaide Street West, Suite 2010
Toronto, ON
Canada M5H 1T1

T: +1 416 646 3608
F: +1 416 642 1269

www.erm.com

The business of sustainability

ERM