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AN ECONOMIC ANALYSIS OF TRANSCANADA'S ENERGY EAST PIPELINE PROJECT

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An Economic Analysis of TransCanada's Energy East Pipeline Project

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Executive Summary

Western Canadian crude oil production is growing rapidly, but transportation has not kept pace. Most of Canada's crude oil lacks access to a deep-water port yet production is forecasted to potentially reach over 7 million barrels per day by 2030. These forecasts rely on the continued growth of conventional and unconventional oil production (primarily oil sands and tight oil) in Western Canada, which in turn, is dependent on gaining access to alternative markets. With approvals for pipelines heading south (Keystone XL) and west (Northern Gateway) being delayed, producers and transportation companies have begun to explore alternative routes. Primarily, proposals have come forward to send oil east to give east-coast refiners both access to currently discounted Western crude oils and gain tidewater access for markets abroad.

To transport oil eastwards, TransCanada Pipelines has proposed to convert a 3,000 km portion of the Canadian Mainline pipeline, and build an additional 1,460 km of new pipeline to transport oil from western to eastern Canada – the Energy East project.

The route would deliver crude oil and/or bitumen to eastern Canadian markets via an $11.3 billion pipeline and export terminal that begins in Hardisty, Alberta and ends in Saint John, New Brunswick. The pipeline will have a capacity of 1.1 million barrels per day and is scheduled to commence in 2018.

In pushing this project forward, TransCanada recently filed regulatory documents for the Energy East project with the National Energy Board (NEB).[1]

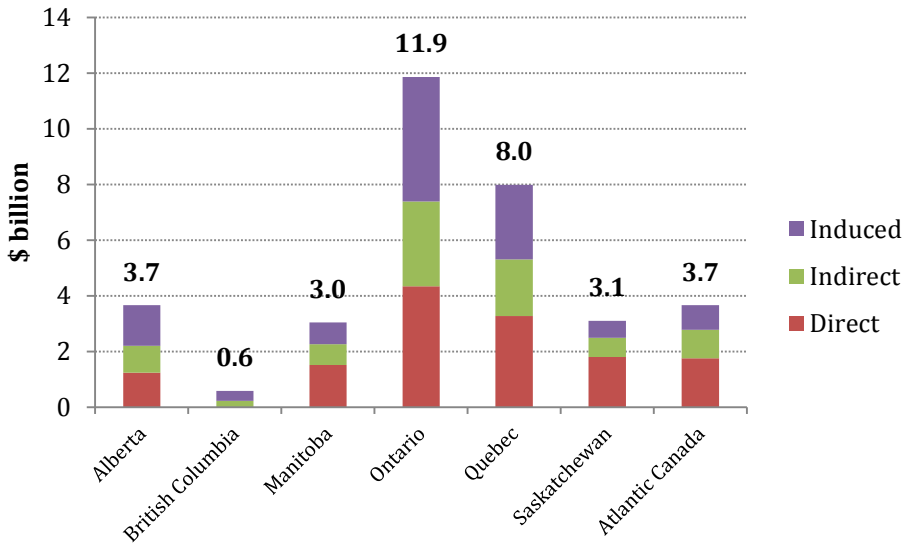
Along with providing tidewater access for western Canadian crude, other benefits could accrue to Eastern Canadian refineries. These include: providing a stable supply of crude, resulting in decreased dependence on foreign oil and at the same time improving netbacks. The benefits to refiners are not included in this report.

The Canadian Energy Research Institute's (CERI) modelling shows that the Energy East project is expected to deliver significant economic benefits to Canada, including:

- An additional $33.9 billion in GDP for the Canadian economy
- An additional 321,000 one-year full-time equivalent jobs across Canada in the construction and operation phases.
  - During the construction phase, jobs will peak at almost 48,700 and then level out at around 7,900 jobs during the operations phase
- An additional $7.6 billion in total tax revenue to Canada.

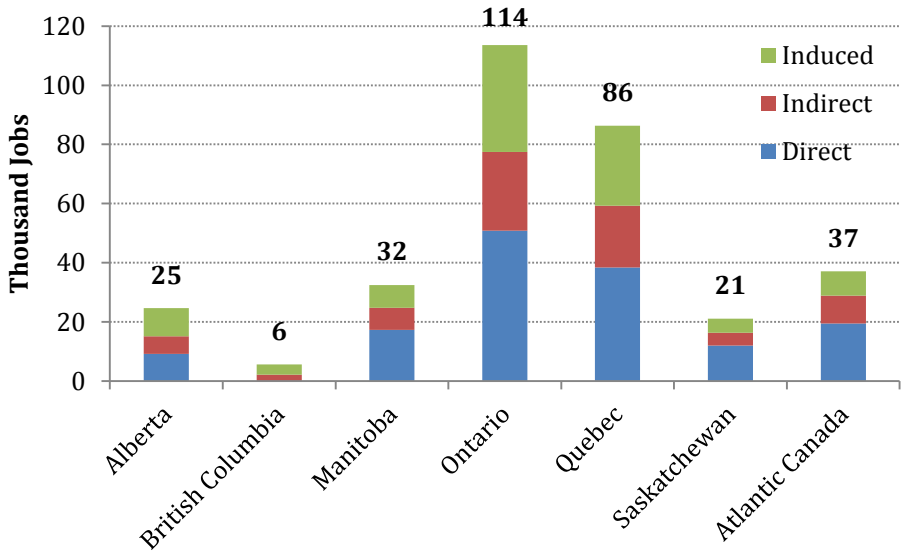
[1] TransCanada, Energy East Pipeline Project, Project Description Volume 1, March 2014

Figure E.1: Cumulative GDP Benefits by Type and Province



Source: CERI

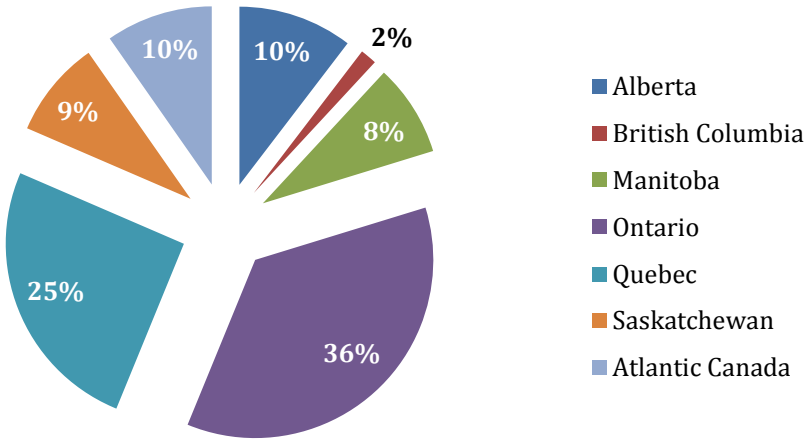
Figure E.2: Jobs Created and Preserved by Province and Type



Source: CERI[2]

[2] Yukon, the Northwest Territories, Nunavut and Government abroad are not included in the chart and have a combined total of 0.16 thousand jobs. Totals may not add to national total due to rounding.

Figure E.3: Tax Benefits



Source: CERI

Chapter 1
Introduction

A majority of Canada's crude oil production is land-locked, and while the United States (US) is one of the largest energy consumers in the world, the recent development of new technologies in horizontal drilling and hydraulic fracturing have increased US oil production. Western Canadian oil production is increasing, but its future growth would be constrained due to saturated demand in existing North American markets if new markets are not accessible. If infrastructure to different markets could be achieved there is the potential for over 7 million barrels per day by 2030 to be produced. With pipeline projects to the West and South being delayed, it is becoming increasingly essential that Western Canadian oil producers find diversified infrastructure to transport their oil to newer markets. TransCanada has proposed the Energy East pipeline which would convert a gas pipeline to oil pipeline in order to carry crude oil from Western Canada eastwards to reduce foreign imports by Eastern refineries as well as provide tidewater access to alternative markets. The purpose of this paper is to examine the economic benefits to Canada of TransCanada's Energy East pipeline project as a transportation route for Western Canadian liquid hydrocarbons to reach new markets in the East and around the world. The report is organized as follows:

- Chapter 1: Introduction
- Chapter 2: Energy Easy Project Overview
- Chapter 3: Economic Benefits

Forecasted Oil Production and Crude Oil Transportation

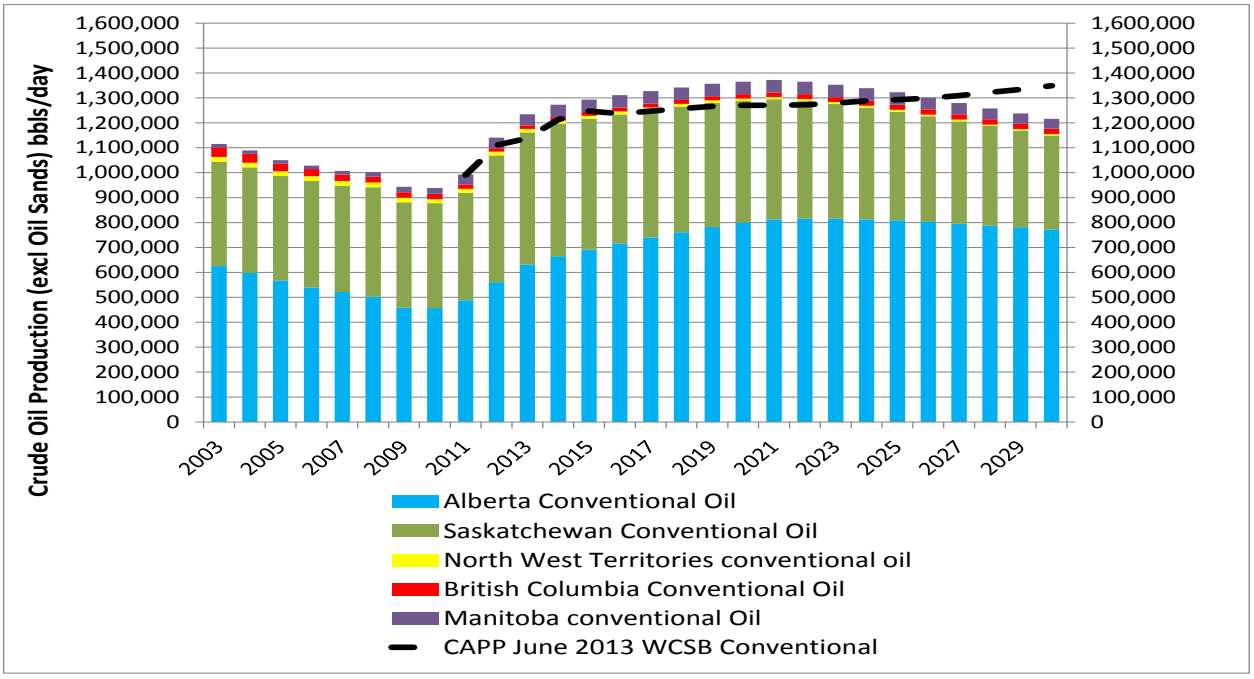
Like the US, Canada has also had a resurgence in conventional oil production with the Canadian Energy Research Institute (CERI) estimating that Canada's production of conventional light and heavy crude will increase by 225,000 barrels per day by 2020 (Figure 1.1) over the 2012 production level.

Canada's oil sands production in 2012, both upgraded and non-upgraded, reached the 1,800,000 barrel per day mark. Figure 1.2 details CERI's forecast of conventional crude oil and oil sands production that could be delivered to markets if pipeline and rail connectivity were developed. This forecast is net after accounting for local demand. In this forecast, CERI has accounted for the expansion of the Enbridge Clipper pipeline (Phase I and II), the construction of the Keystone XL pipeline, Northern Gateway, TMX expansion, and the development of rail transport to the 950,000 barrels per day level.

As of March 2014, authorization for the Keystone XL pipeline had not been granted by American officials. Figure 1.2 indicates that if the Keystone XL pipeline is not approved several oil sands projects and conventional oil projects will be faced with the tough reality that Western Canadian hydrocarbon production is constrained by lack of adequate pipeline capacity. The Northern Gateway pipeline (Enbridge) proposal and/or the Trans Mountain expansion (Kinder

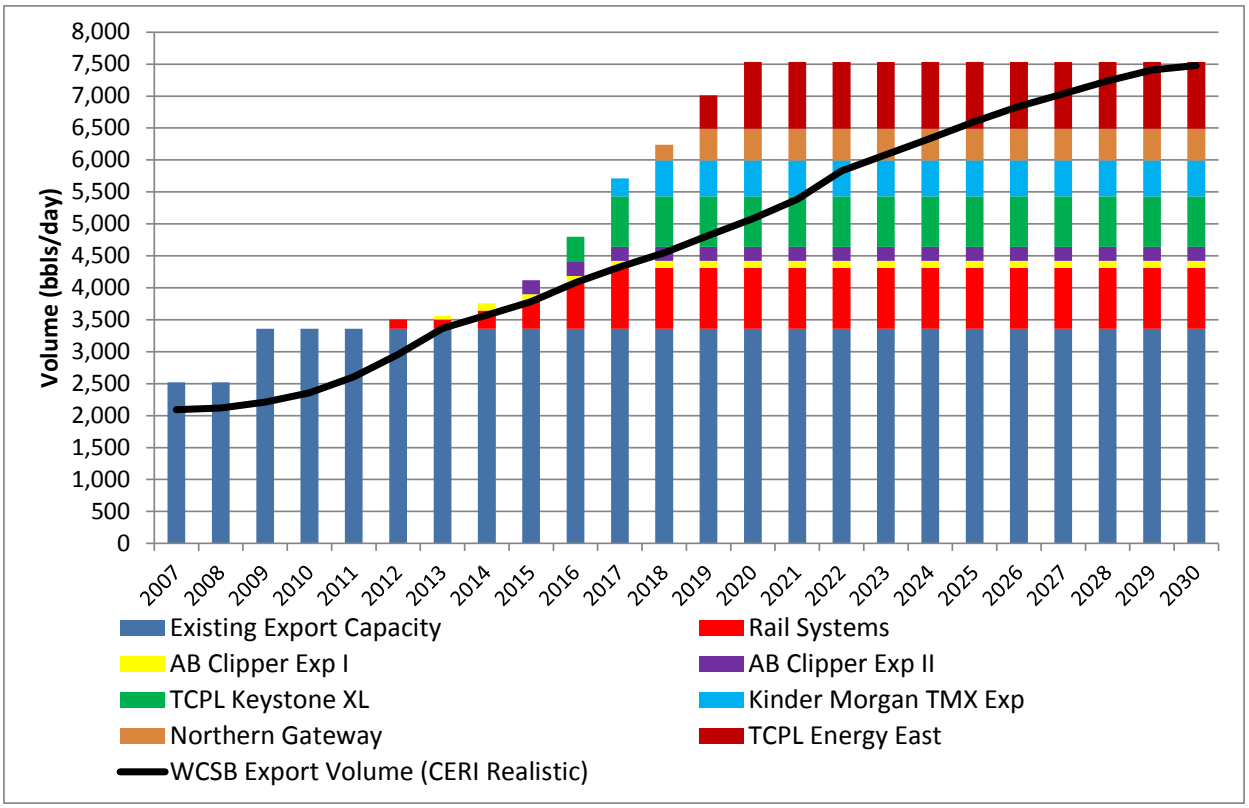
Morgan) would help alleviate bottlenecks, but even these projects face considerable opposition by environmentalist and native groups, which could delay, or potentially halt, these projects. Rail is emerging to transport oil and has largely centered on moving Bakken crude, but increasingly rail terminals are being built in Canada. Refiners in Canada have also started receiving shipments by rail with Irving Oil obtaining Bakken crude at its Saint John refinery. It is possible that rail can work in a pipeline constrained scenario, but with delays on available tanker cars, among other logistical difficulties, the reference case depicted in Figure 1.2 is only possible without prolonged delays in additional pipeline capacity. It should also be noted that while rail economics are improving, it is more cost-effective if the industry is able to access tidewater, and global markets, via pipeline.

Figure 1.1: Western Canadian Conventional Oil Production Forecast



Source: CERI

Figure 1.2: Canadian Conventional, Unconventional and Oil Sands Export Potential

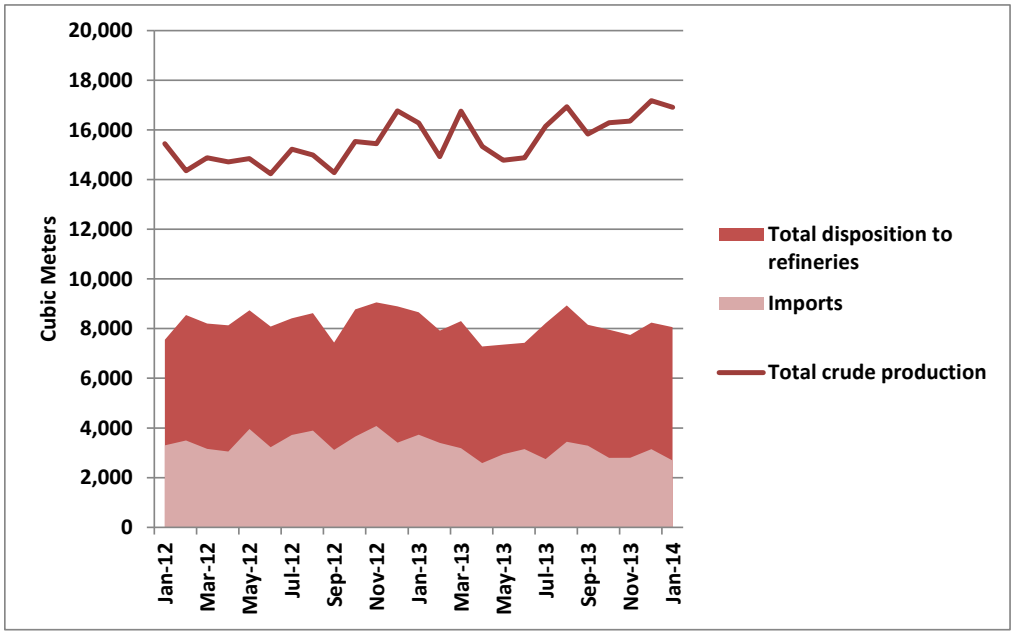


Source: CERI

Refiners

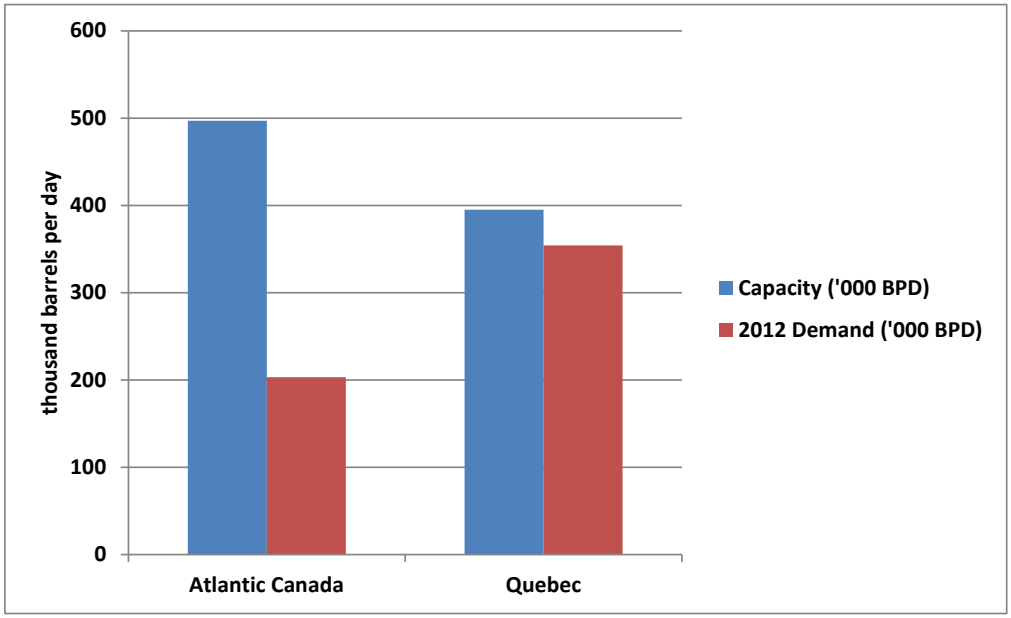
The lack of take away pipeline capacity from mid-continent markets has resulted in an oversupply in the region. Thus, WTI has been trading at a discount to Brent prices, and Western Canadian Select (WCS) has been further discounted against WTI due to an abundance of heavy crude oil on the market. Eastern refiners, particularly in Quebec, Nova Scotia, and New Brunswick, rely primarily on foreign imports and thus have not been able to take advantage of the discount. Figure 1.3 depicts the total Canadian production, refinery utilization, and imports. Figure 1.4 depicts the capacity of refineries in Eastern Canada's capacity and demand for the year 2012.

Figure 1.3: Total Canadian Crude Oil Production, Crude Imports and Refinery Utilization



Source: Statistics Canada[3]

Figure 1.4: Refining Capacity and Demand for Eastern Canada, 2012



Source: Globe and Mail[4]

[3] CANSIM Table 126-0001

[4] http://www.theglobeandmail.com/report-on-business/industry-news/energy-and-resources/oil-refinery-capacity-in-eastern-canada/article9132975/ Accessed April 17th 2014

East Coast refineries also faced decreasing downstream margins as there has been declining domestic demand for gasoline as well as higher crude oil prices. Refineries in the US Midwest have not had this problem because of the access to lower priced crudes from unconventional oil plays. Furthermore, globally there has been growing competition from refineries in Asia-Pacific and the Middle East which have built several refineries in the last several years and as a result, global capacity exceeds demand. For example, China currently has about 12 million barrels per day of refining capacity, which exceeds its domestic demand.[5] Consequently, refineries along the East Coast have been closing with the most recent Canadian shutdown occurring in 2010 with the closing of Shell's refinery in Montreal. The existence of a pipeline to East Coast refineries would help diversify their supply sources and allow them to become more competitive as long as the discount remains.

[5] http://www.forbes.com/sites/greatspeculations/2014/03/03/key-trends-impacting-global-refining-margins/ Accessed April 17th 2014.

Chapter 2
Energy East Project Overview

TransCanada's Canadian Mainline natural gas pipeline connects natural gas fields in western Canada to eastern markets as far as Quebec City. In recent years, the decline in natural gas prices and the increase of low cost natural gas production from northeastern United States has resulted in the Canadian Mainline being under-utilized, and has increased tolls on subscribers.[1] Conversely, oil supply from western Canada is constricted due to pipelines running at full capacity, and has stimulated the use of alternative and more expensive modes of transportation like rail.[2]

As a result, TransCanada has plans to convert part of the Canadian Mainline to carry oil and bitumen from western Canada to eastern refineries in Quebec and New Brunswick.[3] TransCanada conducted an open season for the proposed pipeline in June 2013 and received 900,000 barrels of oil per day (bbl/d) in firm commitments from producers. This level of interest from producers has led TransCanada to propose an engineered capacity of 1.1 million bbl/d for the mainline conversion.[4] Currently, TransCanada is projecting to service refineries in Quebec and New Brunswick by the end of 2018.[5,6]

Pipeline Path

Connecting Western Canadian oil to eastern markets by converting part of TransCanada's Canadian Mainline will require both conversion of old pipeline and construction of new pipeline. The portion of the Canadian Mainline that could be converted would extend from Burstall, Saskatchewan to Iroquois, Ontario, totaling approximately 3,000 km.

Approximately 1,460 km of new pipeline will also be built to connect to the converted line. About 280 km of new pipeline would be required to connect the oil terminal at Hardisty, Alberta to the start of the Canadian Mainline conversion at Burstall, Saskatchewan. Another section of new pipeline would need to be built from Iroquois, Ontario to Montreal, Quebec which would be roughly 100 km in length, and would require a lateral of about 20 km to connect the Canadian Mainline conversion to the Suncor refinery in Montreal. There would also be the building of some additional laterals with 60 km of pipeline between a proposed pump

[1] Catteneo, Claudia (2012, May 25). Future of TransCanada's Mainline could spur Canada's next great energy debate. Financial Post, http://business.financialpost.com/2012/05/25/retooling-transcanadas-mainline-could-spur-canadas-next-great-energy-debate/?__lsa=b3e2-2667
[2] Haggett, Scott (2013, Jan 14). Full pipelines to cut into Canadian oil producers' profits. Financial Post. http://business.financialpost.com/2013/01/14/full-pipelines-to-cut-into-canadian-oil-producers-profits/?__lsa=b3e2-2667
[3] Platts (2012, Oct 13). TransCanada close to decision on converting gas Mainline to crude: officials. Platts, http://www.platts.com/RSSFeedDetailedNews/RSSFeed/Oil/8868665
[4] TransCanada Energy East home page, http://www.transcanada.com/6246.html
[5] Ibid, http://www.energyeastpipeline.com/home/timeline/
[6] TransCanada, Energy East Pipeline Project, Project Description Volume 1, March 2014

station and a tank terminal at Moosomin, SK, and 10km to the Ultramar/Valero refinery in Lévis, QC.

The pipeline would be extended from Montreal to Quebec City, and on to the Irving refinery in Saint John, New Brunswick. The refinery in Saint John is Canada's largest refinery, and currently receives its crude oil inputs from overseas imports. An additional 720 km of new pipeline in Quebec and 400 km in New Brunswick is needed to complete the connection to Saint John.

Figure 2.1 shows the proposed pathway of the mainline conversion and new pipeline additions.

Figure 2.1: Map of Pipeline Path

Source: TransCanada

In addition to the pipeline itself, other associated components will also be required for the project:

- Pipeline laterals, terminal interconnections and delivery meter stations
- Storage tank terminals and ancillary facilities at Hardisty, Alberta, Moosomin, Saskatchewan, Cacouna, Quebec and Saint John, New Brunswick
- Pump stations
- Marine terminals at Cacouna, Quebec and Saint John, New Brunswick
- Temporary infrastructure such as access roads, construction camps and stockpile yards.

Refining Capacity

Quebec and the Maritimes have three refineries totaling 702 kb/d (thousand barrels per day) of refining capacity, albeit most of the capacity is limited to light crude refining. Details are listed in Table 2.1.

Table 2.1: Eastern Refinery Details

Location	Owner	Capacity (bbl/d)	Type
Montreal, QC	Suncor	137,000	Light
Quebec City, QC	Valero	265,000	Light
Saint John, NB	Irving	300,000	Light/Heavy

Source: CAPP

Each refinery would require some level of reconfiguration in order to be capable of refining significant volumes of western Canadian heavy oil. Marine terminals, including mooring and loading facilities are planned for Cacouna, Quebec and Saint John, New Brunswick to serve as export terminals for crude oil or bitumen, upgraded bitumen, or refined petroleum products.[7]

Project Costs

In September 2013, TransCanada released estimated costs of the Energy East Project.[8] The same costs have been used in this analysis and are outlined below.

Total project costs are estimated to be $11.3 billion.[9] This consists of $2.7 billion to convert the existing pipeline, $7.1 billion to build the new sections of pipeline and $1.5 billion for contingency costs. Table 2.2 summarizes the project capital expenditures and is exactly the same as table 1 in Deloitte's Energy East report. Below the table are the assumptions CERI has made to assign each portion of the costs to each province. The capital and operating cost breakdowns are shown in Figures 2.1 and 2.2.

[7] Irving Oil website. http://www.irvingoil.com/newsroom/news_releases/irving_oil_and_transcanada_announce_joint_venture_to_develop_new_saint_john/ (Accessed August 7, 2013)

[8] All costs obtained from the Deloitte Energy East report, http://www.energyeastpipeline.com/wp-content/uploads/2013/09/Energy-East-Deloitte-Economic-Benefits-Report.pdf

[9] All project costs are expressed in 2013 Canadian dollars unless otherwise specified. TransCanada officially states the cost of the pipeline to be $12 billion; CERI obtained all costs from the Deloitte report but suspects the difference may be the book value of the existing gas pipeline.

Table 2.2: Project Capital Expenditures

Segment	Scope	Cost ($ Millions)
AB and SK New Build	Pipeline Hardisty, AB to Burstall, SK	$598
	Facilities/Pump Stations	$561
Bakken Segments in SK and MB	Pipeline segments SK and MB	$63
	Facilities/Pump Stations	$142
Conversion	Pipeline Burstall, SK to Stn. 1401 ON	$596
	Facilities/Pump Stations	$2,097
ON New Build	Stn. 1401 ON to ON/QC Border	$165
	Facilities/Pump Stations	$214
QC New Build	Pipeline ON/QC Border to QC/NB Border	$1,959
	Facilities/Pump Stations	$1,262
NB New Build	Pipeline QC/NB border to St. John	$1,259
	Facilities/Pump Stations	$897
Contingency		$1,472
Total		$11,285

Source: Deloitte

Assumptions

The Alberta and Saskatchewan new build was assigned to Alberta as most of the pipeline segment is in Saskatchewan. The Bakken segments in Saskatchewan and Manitoba were split evenly between two provinces. The conversion segments were split 15/15/70 for Saskatchewan, Manitoba and Ontario, respectively. The rest is assigned to their respective provinces.

Cost of Conversion

The majority of the cost for converting 3,000 km of existing pipeline across Saskatchewan, Manitoba and Ontario is estimated to be for new pumping stations and facilities along the pipeline ($2.1 billion). New electric pumping stations are required along the existing pipeline at approximately 80 km intervals. Each pumping station would house 2-5 pumps and where possible would be co-located with existing compressor stations. The pump station facilities would include an electrical sub-station and a small structure to house the electrical, measurement and control system components. With approximately 72 pumping stations planned along the entire 4,460 km pipeline, the cost of each pumping station is estimated to be around $70 million.

The remaining $596 million is attributed to pipeline conversion.

Costs of New Pipeline

Two new sections of pipeline would need to be built on each pipe in order to connect Western Canadian oil to markets in Quebec and Atlantic tidewater. The first new segment of pipeline would connect Hardisty, Alberta to Burstall, Saskatchewan. The second is a new segment from Iroquois, Ontario to Montreal, continuing to Quebec City and Saint John, New Brunswick.

TransCanada estimates the cost of building new pipeline and associated facilities would be $7.1 billion. Again, this is split between pipeline costs ($4.1 billion) and facilities and pump stations ($3.0 billion).

Given there is 1,460 km of new pipeline to build, the estimated cost to construct new sections of pipeline is around $2.8 million per km of pipe. While the cost of new pipeline would vary from region to region due to topography and other surface conditions, almost half of the cost of new build is estimated to be in Quebec, which reflects the greatest distance of pipe to be built.

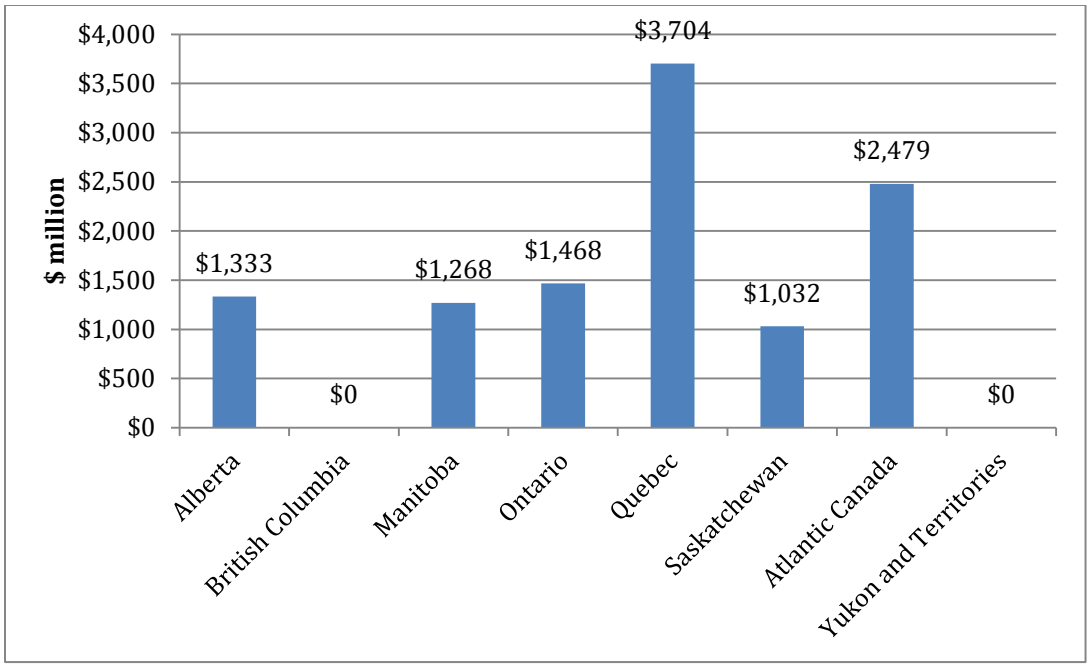
Operating Costs

The incremental operating costs – those above the existing mainline operating costs – are assumed to be $665 million per year and include power, operating and maintenance, property taxes, insurance, leases and other taxes.

Provincial Breakdown

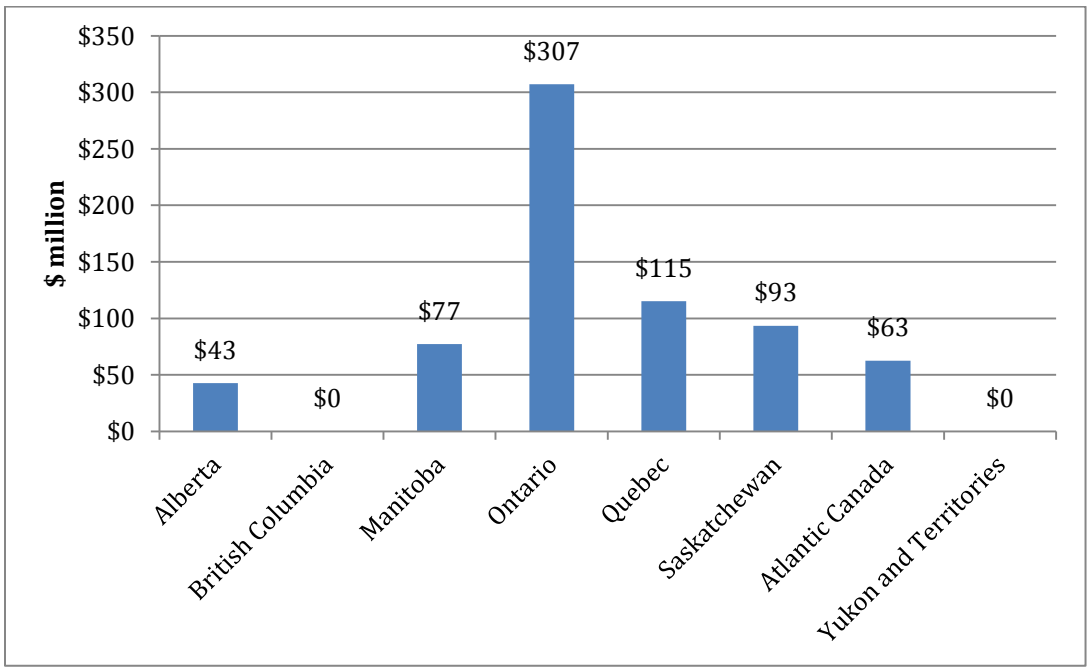
The breakdown of capital and operating costs by province is summarized in Figures 2.2 and 2.3. The highest capital spend occurs in Quebec, as it has the longest new pipeline segments to construct. The same is true for Atlantic Canada. Ontario incurs the largest operating cost component of all the provinces as it has the largest pipeline segment to operate, almost half of the total length of the pipeline traverses Ontario.

Figure 2.2: Total Capital Costs by Province



Source: TransCanada, CERI

Figure 2.3: Operating Costs by Province



Source: TransCanada, CERI

Chapter 3
Economic Benefits

CERI estimates that significant economic benefits are expected to arise from TransCanada's proposal to convert a portion of its Canadian Mainline to transport crude oil from western to eastern Canada. Specifically, the $11 billion project is expected to generate an additional $33.9 billion[1] in the Canadian economy over 28 years.[2]

In addition, CERI's modelling estimates that employment on the project is expected to peak at almost 48,700 jobs during the construction phase and flatten out to around 7,900 jobs during the operations phase. The project is expected to raise around $7.6 billion in tax revenue over the period.

Approach

To measure the economic impacts of the Energy East project, CERI utilized its Multi-Regional Input-Output (I-O) model for Canada. The model measures economic impacts within Canada for the provinces and territories, due to a change in the economy. The results of the analysis are presented for the major economic variables of GDP, employment, compensation and tax revenue.

CERI's I-O model has been updated to a 2009 base year from the previous 2006 base year.[3] CERI used TransCanada's estimated project costs as inputs or "shocks" into the I-O model.[4]

Direct, Indirect and Induced

Most versions of input-output models are known as open which provides estimates on direct and indirect effects. Direct impacts can be termed as "first-round" impacts which are the increases in demand from industries that expand production in order to satisfy the increased demand of the industry that received the shock. Indirect impacts result from the affected industries purchasing additional inputs from other firms.[5] CERI's model is known as a closed model where induced impacts are also estimated. Induced impacts are those that result from spending of labour income by the household sector.

The calculation of total impacts is based on the multiplication of direct impact from an inverted matrix. A more in-depth explanation on the math can be found in Miller and Blair's "*Input-*

[1] All economic benefits are expressed in 2013 Canadian dollars unless otherwise specified.
[2] This analysis is conducted over 28 years, 3 years of construction (2016-2018) and 25 years of operation (2019-2043).
[3] For more information on CERI's I-O model see Appendix B Study 129 Pacific Access: Part 1 – Linking Oil Sands Supply to New and Existing Markets, July 2012: http://www.ceri.ca/images/stories/part_i_-_impacts_of_oil_sands_production_-_final_july_2012.pdf . The methodology for the 2009 model is forthcoming.
[4] Capital and operating expenditures obtained from Deloitte, Energy East: The economic benefits of TransCanada's Canadian Mainline conversion project, September 2013 https://www.energyeastpipeline.com/wp-content/uploads/2013/09/Energy-East-Deloitte-Economic-Benefits-Report.pdf
[5] The initial shocked industry is not included in indirect impacts.

Output Analysis: Foundations and Extensions 2nd Edition" as well as Appendix B of CERI's Study 129*: Pacific Access*. Induced impacts are calculated by including the column of personal expenditures into final demand. When total impacts have been calculated this is referred to as the total gross output. Once the total gross output has been calculated it is possible to calculate the impacts on GDP, household income, employment, and taxes by multiplying the ratio of the economic metric to total gross output. For example, GDP is based on the ratio of value-added by industry to the industry's gross output.

Employment and Compensation

Generally, analysts of I-O models are concerned with the economic impacts of new final demand in the form of increased income, and jobs created. Final demand multipliers relate final demand of sector j to total economy-wide output.[6] For employment, the dollar amounts of sector j's output in relation to total economic outputs are then transformed from dollars to person-years.[7] This amount is then multiplied by the change in gross output as a result of the exogenous shock. Wages and supplementary income of the I-O table contain the increase in the amount paid from employers to their employees as a result of the shock.

When reading the employment numbers the jobs should be interpreted as the equivalent of employing one person full-time for a year. This differs from the mainstream perception that a job is akin to a person potentially being employed multiple years – for example, an engineer. Thus one person-year for 10 years would have the label of 10 jobs in this report but in fact could be 1 person being employed for 10 years. Furthermore, the calculations denote the number of jobs that would be created as a result of this project. It has no relation to people being employed in other industries currently, or previously. For example, construction workers may participate in other projects during the time, and may have been employed previously, but the calculations from this impact show additional time that could be spent constructing this pipeline. This could mean hiring new people, or could be taking people from other projects.

Taxation

The I-O tables from Statistics Canada contain indirect taxes in the form of taxes on products and production. However, the other operating surplus (OOS) contains gross profits of corporations before income taxes, among other things. Labour compensation contains gross income before taxes. Using OOS and labour compensation from the tables in combination with federal and provincial tax information from *Finances of the Nation,* for the year 2009, allows for the calculation of direct taxes from corporations and individuals. Calculation of corporate taxes is more accurate than personal income taxes because I-O models cannot handle the progressivity of the personal income tax system. Any changes in corporate income tax structures from 2006 to 2009 have been accounted for; changes post-2009 are not included. Thus, tax estimates should be interpreted on a 2009 basis.

[6] An output multiplier for sector j is defined as the total value of production from all components of the economy that is needed to satisfy a dollar's worth of final demand for sector j's output.
[7] A person year is the equivalent of one person being employed at full-time equivalent for one year.

Limitations

Like all economic models, I-O models have limitations. These limitations stem from the static nature of the model, and for its disregard of the distinction between marginal and average values.[8] Economic relationships within the model are fixed to those that existed in the base year (2009). In reality, an economy will evolve and change as it reacts to forces, such as inflation, regional shortages and improvements in production efficiency. Over time these static assumptions may no longer be relevant for the economy of the future, as those relationships may no longer hold. This can become a problem when analyzing larger investments over a long timeframe as they may have a more significant effect on the structure of the economy. Furthermore, it is important to remember that I-O models assume unlimited access to resources (i.e., labour, materials etc.) and the realization of the impacts may be constrained by the above-mentioned factors.

With fixed prices and a fixed ratio of inputs to outputs, an I-O model cannot incorporate the effects of price inflation or scarcity. As a result, the size and distribution of future benefits is less certain than estimates of current benefits.

Lastly, there can be controversy over the use of induced impacts. Some view it as introducing bias because projects that have a higher proportion of labour income will typically show a greater impact than projects that have a higher OOS despite both projects potentially having the same amount of direct GDP. Furthermore, some workers in certain industries (i.e., mining projects) are transitory, or non-residents, and even if their income is attributed to the area of their work, it could be incorrect to assume that these employees would choose to spend most of their income in that region.

In general, results from I-O models should not be taken as precise.

Comparing One Model to Another

Economic impacts from one model to another should be compared with caution and with attention paid to the methodological differences. Although Deloitte has also done an economic impact analysis using I-O, the results cannot be directly comparable due to differences in the model shocks per province and methodology. Deloitte used Statistics Canada's I-O model and CERI used an in-house model utilizing Statistics Canada's symmetrical I-O tables as data. Shocks per province differ most strongly in the operational phase as CERI assumes greater expenditures in Quebec and Ontario than Deloitte.

Deloitte, unlike CERI, applies a discount factor to impacts, so that Deloitte's results could be termed discounted economic impacts and CERI's results can be called undiscounted economic impacts. Discounting causes the stated impacts to be lower; this is the main reason why results from the two studies are so different. CERI's review of the literature suggests that the discounting of I-O impacts is not a common practice.

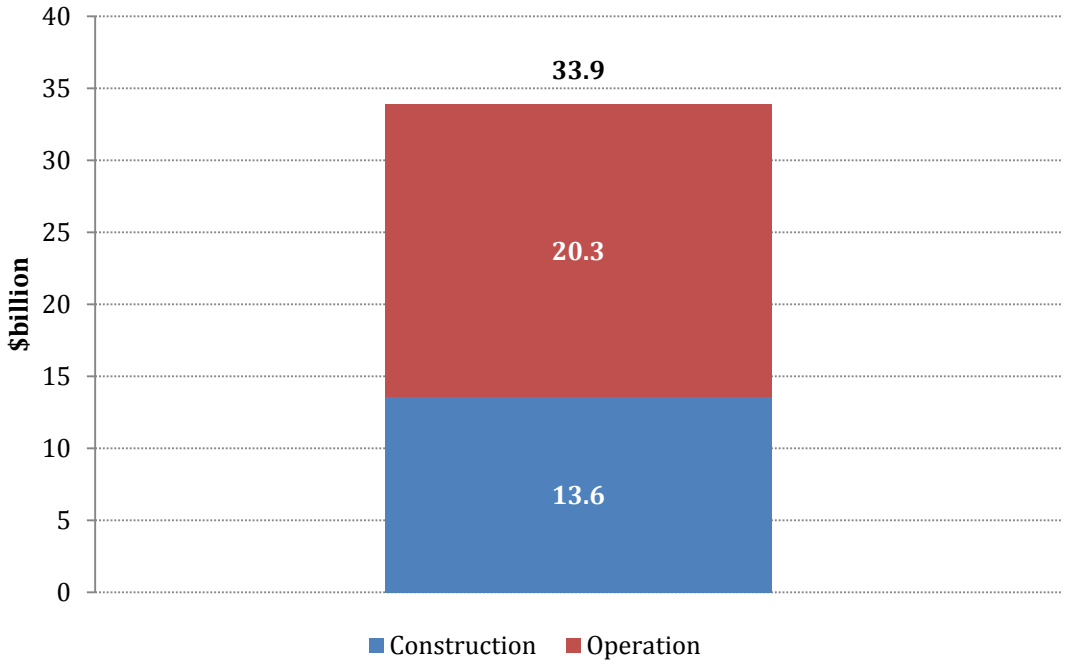
[8] For example, in order to increase output by 10% the costs may not go up 10%. As a result, I-O assumes away economies of scale.

Lastly, CERI's analysis has been conducted over 25 years from the start of operation of the pipeline (28 years with the construction phase included). Deloitte models the economic impacts of this project over a longer timeframe.[9] While CERI expects that the economic life of the pipeline would be much longer than the 25 years analyzed the static nature of I-O modelling means that the estimates of future benefits become less reliable the further out you go.

Benefits to Canada

The construction phase of the project, from 2016 to 2018, is estimated to give rise to $13.6 billion in additional GDP to Canada, while the operational phase, from 2019 to 2043, is estimated to generate $20.3 billion, resulting in cumulative economic benefits of $33.9 billion.

Figure 3.1: Cumulative Economic Benefits of the Energy East Project

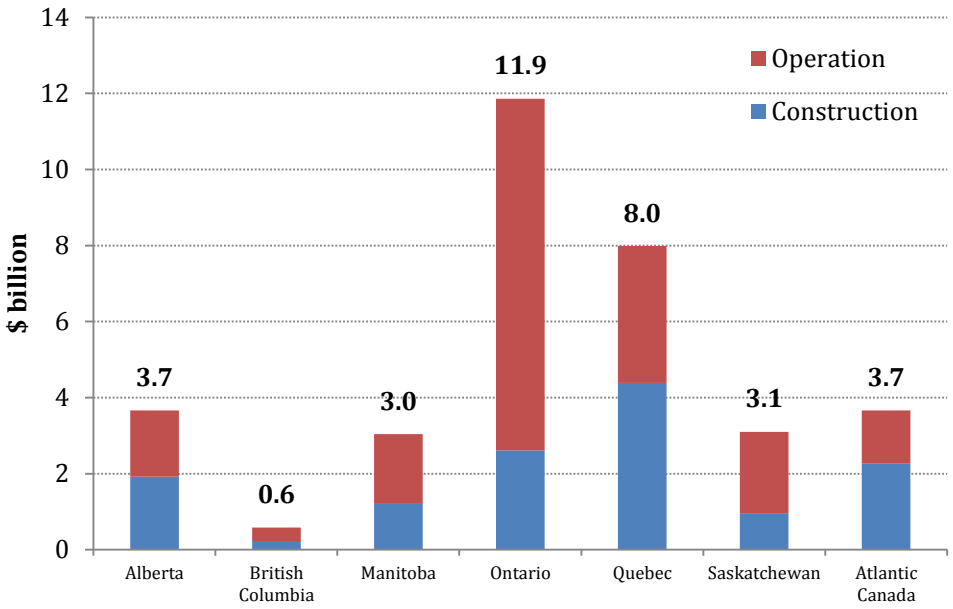


Source: CERI

While the direct economic activity associated with the pipeline will occur across six provinces, all provinces and territories are impacted indirectly. Ontario stands to gain the most from this project, with an additional $11.9 billion to GDP. Quebec, Alberta and Saskatchewan also stand to gain significantly from the project. The split of benefits across the provinces is a reflection of the construction and operation activities in each province.

[9] Deloitte used a 46 year timeframe, see: https://www.energyeastpipeline.com/wp-content/uploads/2013/09/Energy-East-Deloitte-Economic-Benefits-Report.pdf

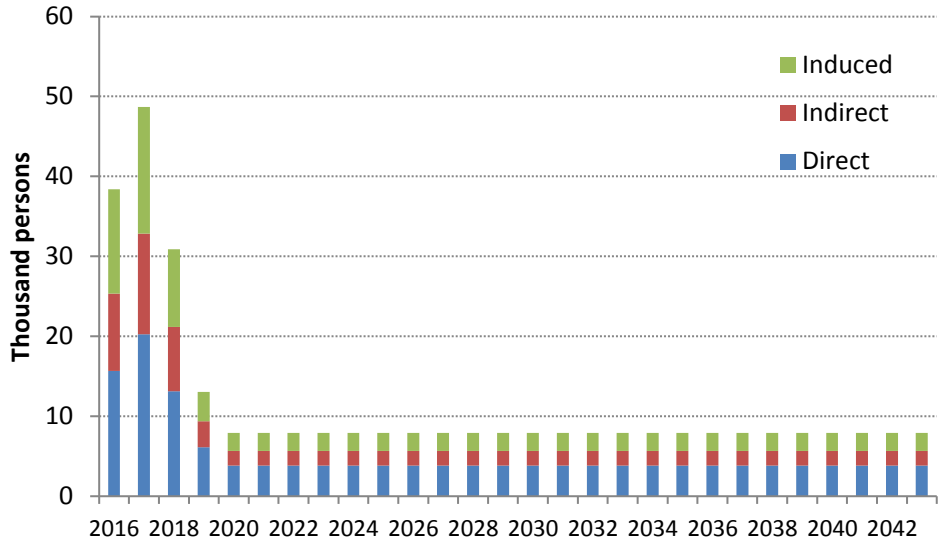
Figure 3.2: Cumulative Economic Benefits by Province



Source: CERI

The construction and operation of the pipeline also gives rise to an increase in employment. The Energy East project is expected to create approximately 321,000 one-year full-time equivalent jobs over the entire project period. The construction phase is expected to create about 40 percent of these jobs, with employment peaking at almost 48,700 jobs in 2016, while during the operations phase employment flattens out at around 7,900 jobs.

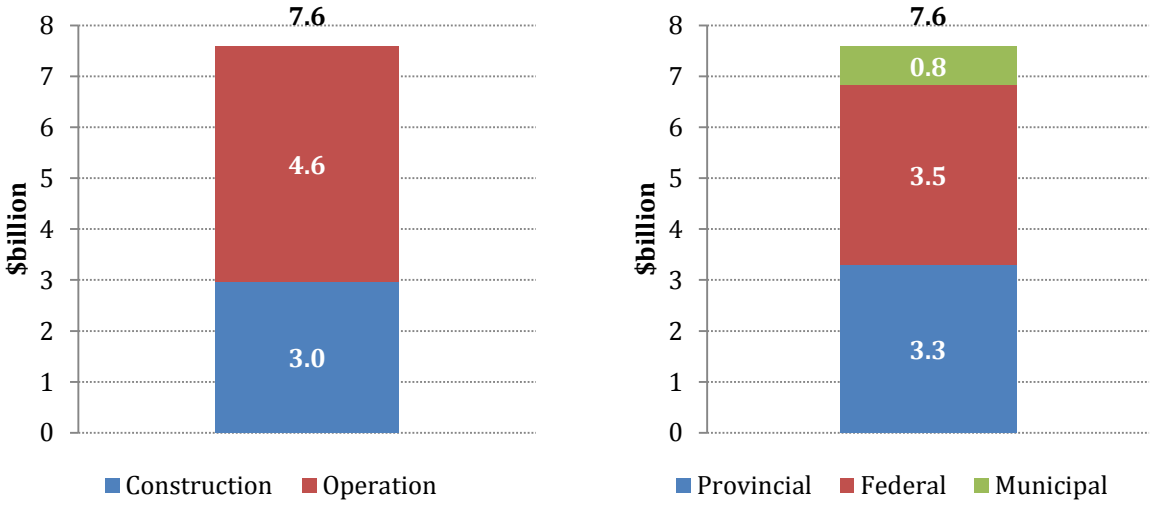
Figure 3.3: Jobs Created and Preserved



Source: CERI

The modelling shows that the Energy East project is expected to generate a total of $7.6 billion in tax revenues to all levels of government. The operations phase creates the largest portion of tax revenues, at $4.6 billion, with Ontario contributing the most, at $2.1 billion. The construction phase yields $3.0 billion in tax revenues, with Quebec contributing the most, at $1.0 billion. The Federal Government gains the most tax revenue at $3.5 billion, the provincial governments gain $3.3 billion and municipal governments gain $757 million.

Figure 3.4: Tax Revenues



Source: CERI

Gross Domestic Product

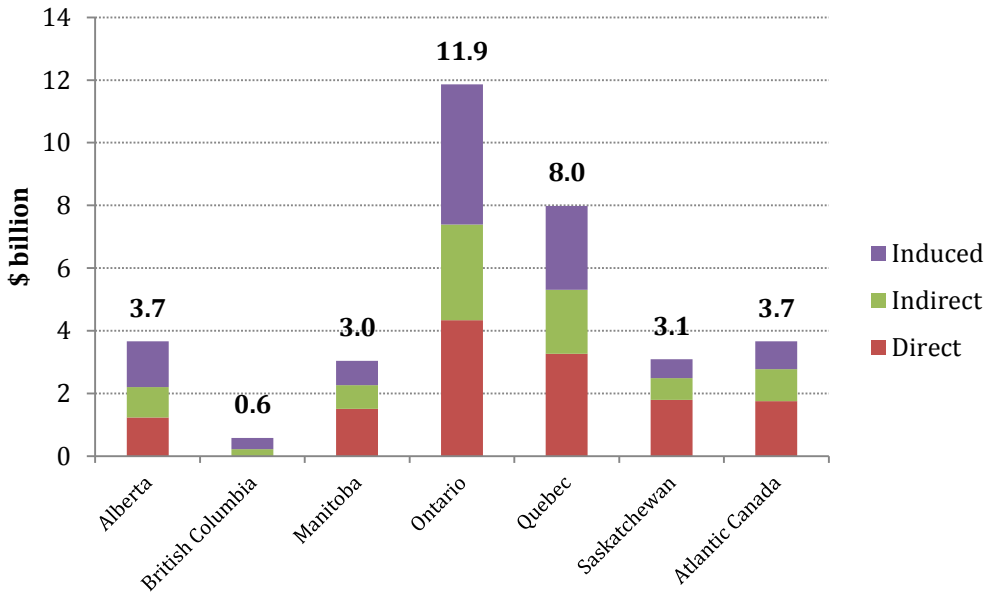
The initial investment of $11.3 billion during the construction phase results in estimated GDP benefits of $13.6 billion. This is because the initial investment causes flow on effects by interacting with the broader economy. CERI's I-O model tries to measure this multiplier effect by breaking down the benefits that arise from a given investment into three types:[10] direct, indirect and induced effects.

- The direct effect is the impact of each new dollar spent in the economy, including the initial investment. It includes the expenditures associated with the construction and operation of the project.
- The indirect effect is the secondary impact caused by the initial investment. It includes the inter-industry transactions that occur as a response to the new demands of the industry. For example, suppliers of the project purchase goods and hire workers.
- The induced effect is the spending effect from workers who receive income from either the direct or indirect effect, who then in turn spend it (also known as the income effect) on goods and services.

[10] Explained in greater detail earlier in the chapter under Approach.

At the Canadian level, the total direct effect causes the largest resulting GDP benefits, at $13.9 billion. The total induced effect is of a similar magnitude, $11.3 billion, highlighting the powerful multiplier effect in the economy from a project such as this.

Figure 3.5: GDP – by Province Split by Direct, Indirect and Induced

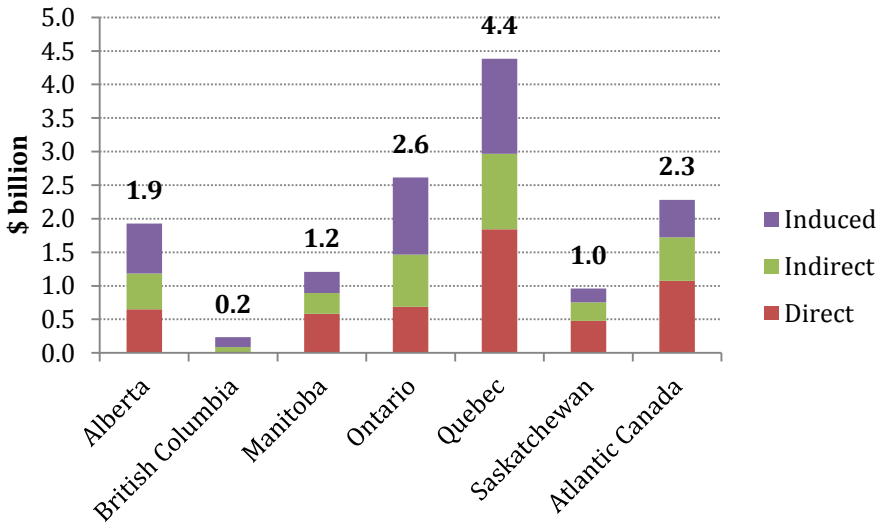


Source: CERI

Ontario and Quebec are the major beneficiaries of the project, with respective GDP benefits of $11.9 billion and $8 billion. This is due to the large segments of pipeline that traverse these provinces combined with their large population sizes in comparison to the rest of the country. However, the provincial distribution of GDP benefits differs when analyzing the construction and operation phases separately.

Since the pipeline does not go through British Columbia, it does not receive any direct GDP benefits from the project. All benefits are a result of the inter-provincial economic ties between British Columbia and the rest of the country.

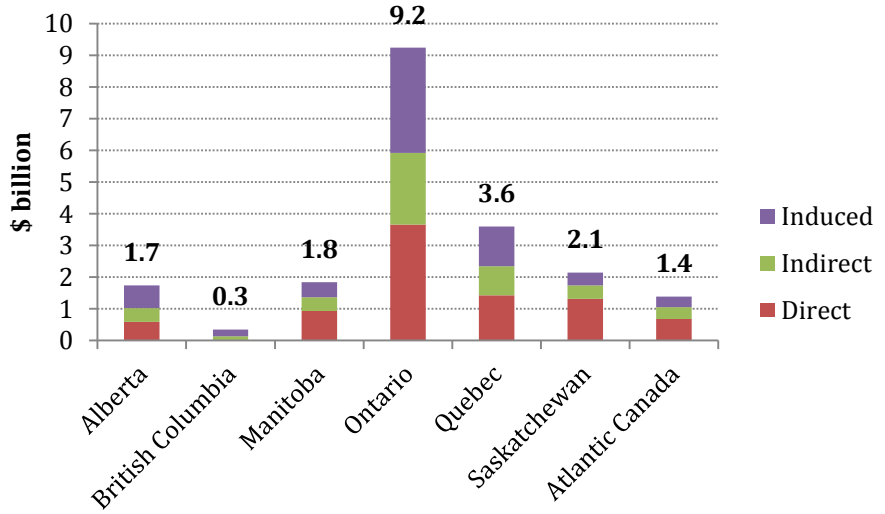
Figure 3.6: GDP from Construction – by Province Split by Direct, Indirect and Induced



Source: CERI

In contrast to the total GDP results, Quebec gains the most GDP benefits from the construction phase, at $4.4 billion. This is because Quebec contains the longest new construction portion of the project, at 722 km as well as 30 km of laterals and interconnections. Ontario, New Brunswick and Alberta also gain significantly through the construction phase. Similarly, Quebec claims the largest portion of induced GDP benefits with a total of $1.4 billion and is followed closely by Ontario with approximately $1.1 billion.

Figure 3.7: GDP from Operation – by Province Split by Direct, Indirect and Induced



Source: CERI[11]

[11] Yukon, the Northwest Territories, Nunavut and Government abroad are not included in the chart and have a combined total of 0.16 thousand jobs. Totals may not add to national total due to rounding.

In the operations phase, not surprisingly, Ontario gains the most in terms of additional GDP for the province, at $9.2 billion. Since it is the largest segment of the pipeline, it makes sense that it would gain the most once the project is up and running. Quebec, Saskatchewan and Alberta also gain significantly through the operations phase.

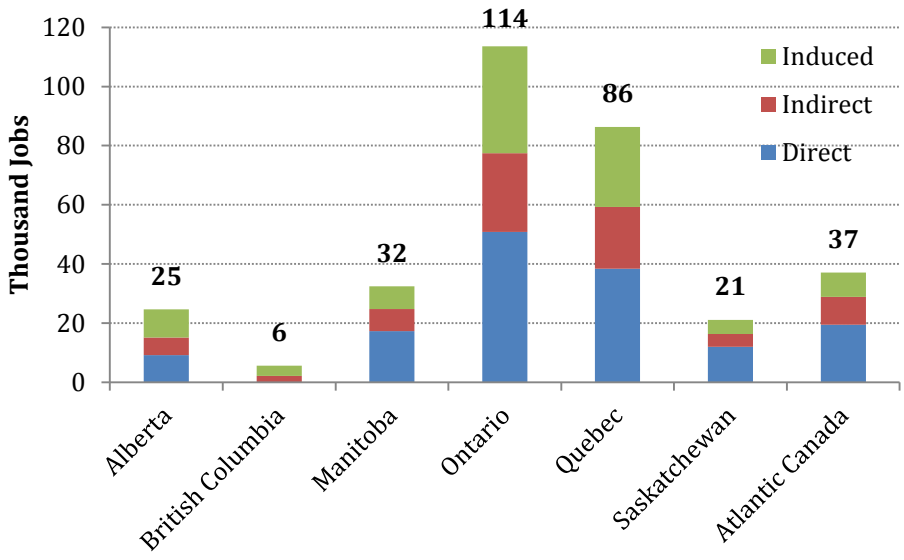
Saskatchewan and Quebec have similar direct GDP benefits from the operations phase, with direct GDP benefits for Saskatchewan of $1.3 billion compared to Quebec at $1.4 billion. Manitoba is also able to claim a significant amount of direct GDP benefits of the operations phase at $0.9 billion. This is explained in part by the similar operating expenses between Quebec, Saskatchewan and Manitoba of $115 million, $93 million and $77 million per year, respectively.

Employment

CERI's modelling estimates that 321,000 additional one-year full-time equivalent jobs would be created and preserved over the life of the project. As with GDP, employment figures are separated into direct, indirect and induced jobs.

- Direct jobs refer to those positions that are created and preserved directly – construction jobs, administrative jobs, or any other positions directly related to the development and ongoing operation of the pipeline.
- Indirect jobs are jobs created in industries tangential to the pipeline industry. For example, these would include jobs in the upstream oil sands industry and other jobs where the work that is done serves the pipeline project in some way.
- Induced jobs are those which provide services, facilities, and other goods and services to the people directly employed in the pipeline industry. This is the largest category of employment, as the ripple effects of the project spread far and wide throughout the Canadian economy.

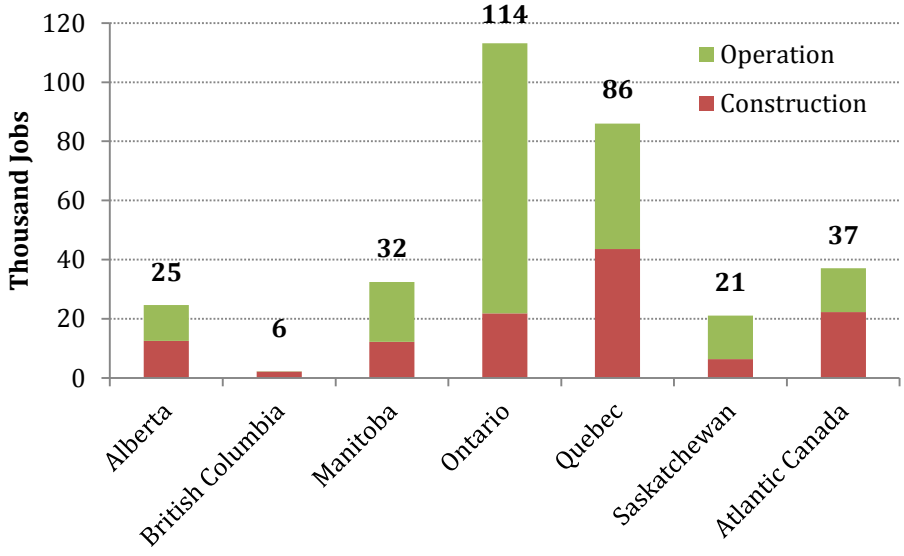
Figure 3.8: Jobs Created and Preserved by Province and Type



Source: CERI[12]

At the provincial level, Ontario gains the most new jobs, at 114,000. Almost half of these are directly related to the development of the pipeline. Quebec also gains significantly on the employment side, adding 86,000 equivalent jobs.

Figure 3.9: Jobs Created and Preserved by Province and Phase of Project



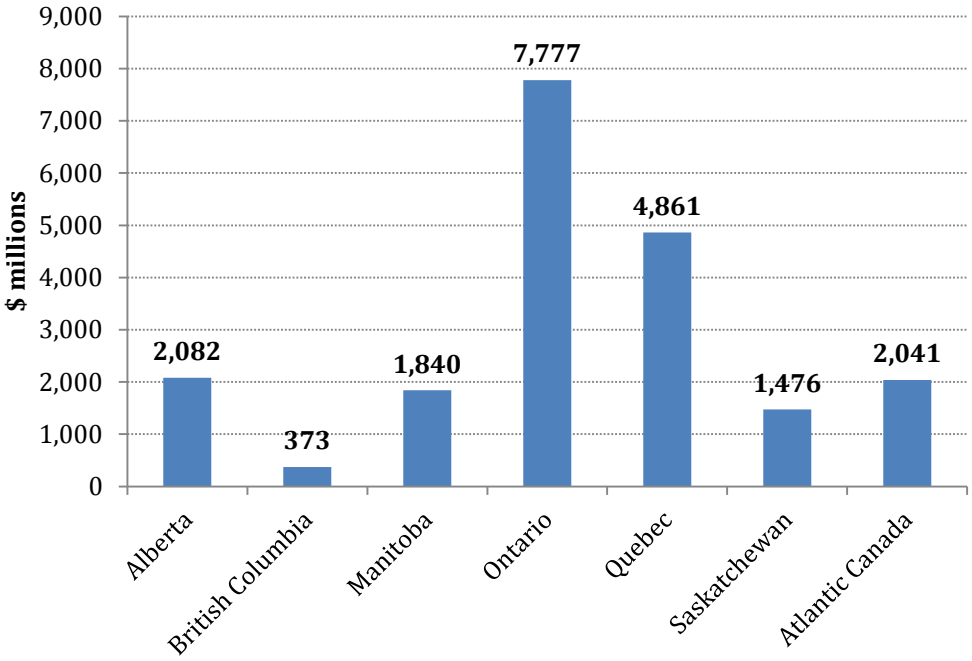
Source: CERI[13]

[12] Ibid
[13] Ibid

During the construction phase, Quebec gains the most jobs of all the provinces, again due to the significant construction of new pipeline sections in that province. Interestingly, it gains almost as many jobs during the operations phase as well. Atlantic Canada also benefits significantly in terms of employment during the construction phase, adding around 22,000 jobs, and an additional 15,000 during the operations phase.

In general, employment generated in the operations phase is dominated by Ontario, reflecting again the largest pipeline segment and large population.

Figure 3.10: Employee Compensation by Province



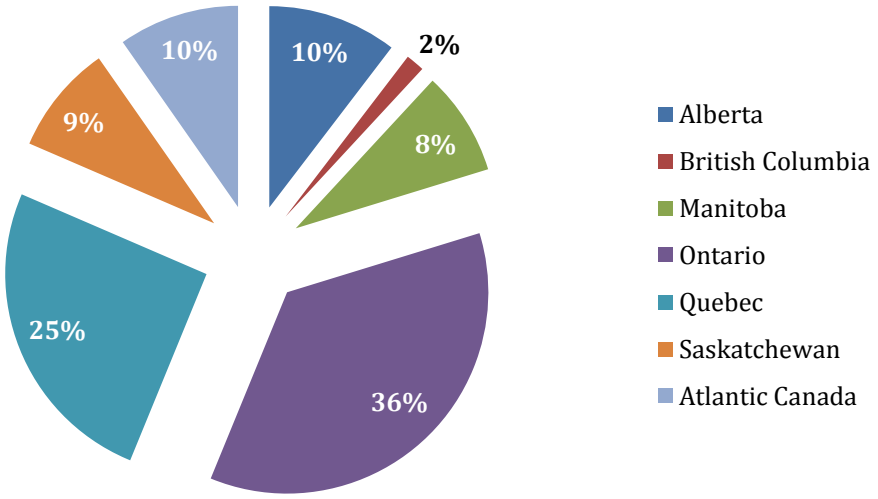
Source: CERI

Benefits to Government

The Energy East project is expected to generate $7.6 billion in tax revenue over 28 years. Personal income tax makes up more than half the tax revenues earned. Indirect taxes make up about a third and corporate taxes the remainder. The federal and provincial government each earn about the same amount of tax revenues, with the federal government earning slightly more at $3.5 billion compared with $3.3 billion for provincial governments.

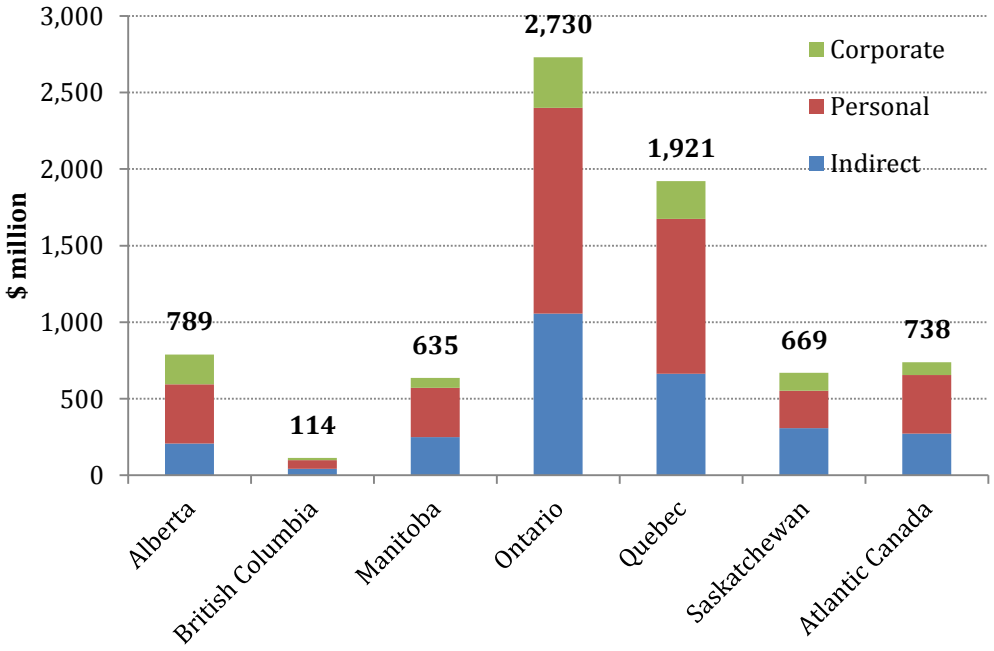
Ontario and Quebec contribute the majority of tax revenues of all the provinces (almost two thirds combined), with a significant portion coming from personal income taxes in those provinces.

Figure 3.11: Tax Revenues Split by Province



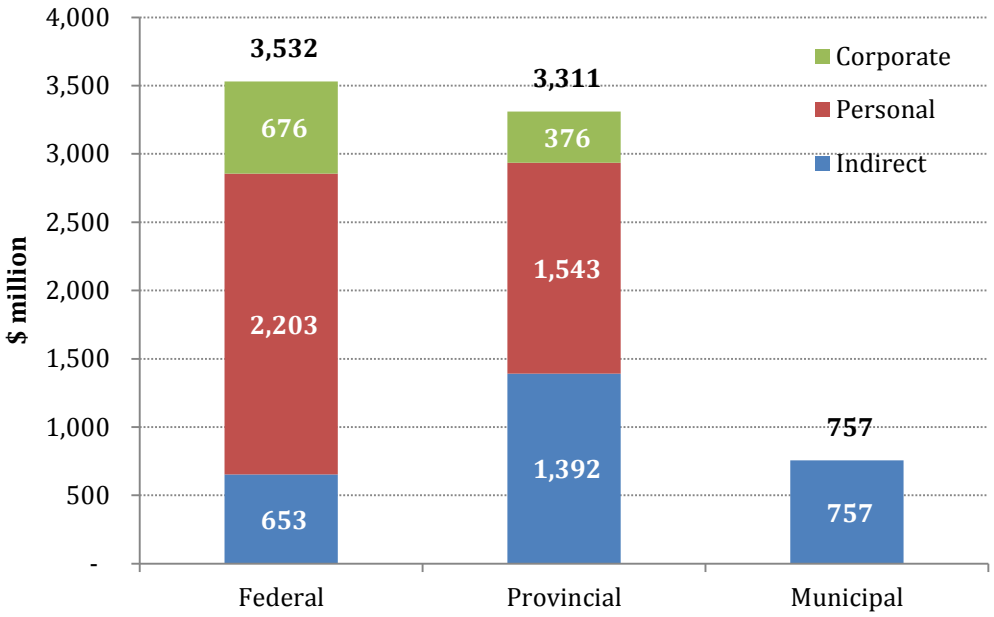
Source: CERI

Figure 3.12: Tax Revenues by Type and Province



Source: CERI

Figure 3.13: Tax Revenues by Type and Level of Government



Source: CERI

Concluding Remarks

CERI's analysis shows that enabling access to markets for western Canadian crude oil is imperative for the continued growth of both conventional and unconventional oil resources and growth in the Canadian economy.

The Energy East pipeline is designed for a capacity of 1.1 million bbls per day of Western Canadian crude to reach tidewater in the east and potentially reach new international markets. The expected economic benefits of this project are significant in terms of both GDP and jobs for Canada. The Ontario and Quebec economies stand to gain the most from this project compared with other provinces as much of the new construction and operations occur in these two provinces.

Although not specifically quantified in this analysis, additional benefits could accrue to Eastern Canadian refineries. These include the provision of a stable, secure supply of crude, resulting in less dependence on foreign crudes and potentially increasing refinery netbacks and profitability.