

December 08, 2020



TRANS MOUNTAIN PIPELINE – FINANCIAL AND ECONOMIC CONSIDERATIONS – UPDATE



OFFICE OF THE PARLIAMENTARY BUDGET OFFICER
BUREAU DU DIRECTEUR PARLEMENTAIRE DU BUDGET

The Parliamentary Budget Officer (PBO) supports Parliament by providing economic and financial analysis for the purposes of raising the quality of parliamentary debate and promoting greater budget transparency and accountability.

In January 2019, PBO released a [report](#) assessing the Government of Canada's 2018 decision to acquire, expand, operate, and eventually divest of the Trans Mountain Pipeline system.

This report provides an updated financial valuation of the purchased assets, estimates the valuation's sensitivity to several key factors, and projects the economic impact of the Expansion Project's construction activities.

PBO wishes to acknowledge officials from the Canada Energy Regulator (CER), who provided prompt, ample, and extensive insight into projections of oil production and transportation in Canada. PBO also thanks officials from Trans Mountain Corporation, who provided valuable technical clarifications of financial data provided to PBO.

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Executive Summary

Parliamentarians continue to have interest in the Government of Canada's 2018 decision to acquire, expand, operate, and eventually divest of the Trans Mountain Pipeline system. In response, PBO has proactively undertaken a follow-up to his January 2019 report to provide updated financial analysis of the Trans Mountain assets.

Since January 2019, there have been several developments that alter the underlying assumptions of the previous model:

- The Trans Mountain Expansion Project (TMEP) has resumed construction (August 2019), but with a higher construction budget (\$12.6 billion) and a later in-service date (December 2022);
- TMEP's construction progress and favourable legal decisions have lowered the risk associated with the project; and
- New energy production forecasts have led to the development of scenarios with increasing action on climate change and a lower supply of Western Canadian crude oil available for export.

The Government provided PBO with projected future cash flows for the Trans Mountain Pipeline system. PBO reviewed these data in conjunction with relevant publicly available information and determined that they were reasonable projections given the current climate policy framework.

PBO then made certain assumptions on pipeline utilization, the long-term discount rate, as well as the service and tolling framework after the 20-year shippers' contracts expire. These assumptions formed the basis of PBO's "reference case" for the value of the Trans Mountain assets, which considers that future climate policy actions are limited to only the measures that are currently in place (Summary Table 1).

Summary Table 1 Key assumptions on Trans Mountain’s projected cash flows (Reference Case)

TMEP total construction costs		\$12.6 billion
TMEP in-service date		December 31, 2022
Long term discount rate		8.5%
Trans Mountain Pipeline system utilization	Initial years	Contract utilization: Full Spot utilization: Near Full
	Subsequent years	Contract utilization: Full Spot utilization: Moderate
Service and tolling framework after 20-year contracts expire (2043 –)		Continuation of similar contract service: <ul style="list-style-type: none"> - Committed contracts (up to 80% of pipeline capacity) - Spot contracts (remaining capacity)

Source: Parliamentary Budget Officer.

With these assumptions, PBO used a discounted cash flow (DCF) analysis to determine the net present value (NPV) of the Trans Mountain Pipeline system, based on the present value of the future cash flows it is expected to generate.

One significant finding of this study is that the Government’s 2018 decision to acquire, expand, operate, and eventually divest of the Trans Mountain assets continues to have been profitable for the federal government, given the current climate policy framework (Summary Table 2).

Summary Table 2 Net Present Value of Trans Mountain Pipeline System (Reference Case)

Present value of cash flows since acquisition	\$5.0 billion
Purchase Price	\$4.4 billion
Net Present Value	\$0.6 billion

Source: Parliamentary Budget Officer.

Notes: Totals may not add due to rounding.

The present value of cash flows since acquisition includes construction costs.

However, another significant finding is that the profitability of the Trans Mountain assets is highly contingent on the climate policy stance of the federal government. Consistent with modelling from the Canada Energy Regulator (CER), if policy action on climate change continues to become more stringent, it is possible for the Trans Mountain assets to have a negative net present value.

Changes to key assumptions underpinning the financial modelling, such as lower pipeline utilization or an inability to renew contracts with shippers, may negatively impact the financial value of the Trans Mountain assets (Summary Table 3).

Summary Table 3

Net present value (NPV) of the Trans Mountain Pipeline system based on changes to key assumptions in Trans Mountain's projected cash flow

(\$ millions)

Assumption	NPV
Reference case	600
In-service date	
<i>One-year delay</i>	- 400
Construction costs	
- 10.0 per cent	1,000
+ 10.0 per cent	200
Pipeline utilization	
- 5.0 percentage points	- 400
+ 5.0 percentage points	900
Discount rate	
- 0.5 percentage points	1,500
+ 0.5 percentage points	- 200
Service and tolling framework after 20-year contracts expire	
<i>Cost-of-service</i>	-1,100

Source: Parliamentary Budget Officer.

Notes: The net present value presented in the table is net of the purchase price paid by the Government of Canada to acquire the Trans Mountain Pipeline system. These figures were calculated assuming that for any given change in a specific assumption, all other assumptions remain the same.

Summary Table 3 shows that reducing utilization on the Trans Mountain Pipeline system by 5 percentage points would result in a negative valuation for the assets, -\$400 million. Similarly, a reversion to a cost-of-service tolling framework in the 2040s would reduce the value of the assets to -\$1,100 million.

TMEP will also have economic impact, stemming from the construction of TMEP and from its eventual operation. PBO estimates that both real GDP and employment impacts from construction activities will peak in 2021, with a 0.18 per cent increase and 17,050 jobs added, respectively. However, these impacts could vary based on changes to the final construction cost of and timeframe to complete TMEP.

1. Introduction

1.1. Since 2019, developments have occurred that impact the financial valuation of Trans Mountain

On August 31, 2018, the Government of Canada acquired the entities controlling the Trans Mountain Pipeline system for \$4.4 billion, net of adjustments.¹ The system consists of the existing Trans Mountain Pipeline (TMP), the Trans Mountain Expansion Project (TMEP), and related assets.

Since the Government's purchase, PBO has provided parliamentarians with financial analysis and ongoing monitoring of financial reporting on the Trans Mountain assets.² PBO's [January 2019 report](#) (Initial Report) presents an overview of the assets' capacity, purchase, ownership structure, and regulatory progress and setbacks up until that point.

Building on our Initial Report, this report provides an updated financial assessment of the Government of Canada's 2018 decision to acquire, expand, operate, and eventually divest of the Trans Mountain assets.³ This updated analysis is motivated by continued parliamentary interest in the topic, as well as several developments following our Initial Report that may have potential financial implications for the Trans Mountain assets and the federal government. These include:

- The re-approval of TMEP by the Governor in Council (June 2019)⁴ and the subsequent resumption of TMEP construction activities (August 2019)⁵;
- The confirmation of a higher construction cost estimate (\$12.6 billion) and a later expected in-service date (December 2022) for TMEP than we assumed in our Initial Report⁶;
- The reduction of risk associated with TMEP in light of favourable decisions in several legal challenges and construction progress;
- The reduction of benchmark interest rates due to the COVID-19 recession; and,
- The emergence of new scenarios in energy production forecasts that incorporate assumptions of increasing action on climate change and project a lower supply of Western Canadian crude oil available for export.

1.2. PBO re-assessed Trans Mountain with new data, updated assumptions

PBO requested information from the Canada Development Investment Corporation (CDEV), the crown corporation holding the Trans Mountain assets, regarding financial analyses and projections for the Trans Mountain Pipeline system.⁷ CDEV provided all of the information that was requested to PBO, but the information was classified as commercially confidential.⁸ The data’s confidentiality did not inhibit PBO’s work to model the data, assess the value of the Trans Mountain assets, or publish analytical results in this report.

PBO’s financial modelling was based primarily on CDEV-provided data of projected cash flows for Trans Mountain Corporation (TMC) through 2062. Using these projected cash flows, PBO made several key assumptions to the model, as detailed in Table 1-1.

Table 1-1 Key assumptions on Trans Mountain’s projected cash flows (Reference Case)

TMEP total construction costs		\$12.6 billion
TMEP in-service date		December 31, 2022
Trans Mountain Pipeline system utilization	Initial years	Contract utilization: Full Spot utilization: Near Full
	Subsequent years	Contract utilization: Full Spot utilization: Moderate
Service and tolling framework after 20-year contracts expire (2043 –)		Continuation of similar contract service: <ul style="list-style-type: none"> - Committed contracts (up to 80% of pipeline capacity) - Spot contracts (remaining capacity)

Source: Parliamentary Budget Officer.

As described above, CDEV provided PBO with projected future cash flows for the Trans Mountain Pipeline system. PBO reviewed these data in conjunction with relevant publicly available information and determined that they were reasonable projections given the current climate policy framework.

PBO then made certain assumptions on pipeline utilization, assumed discount rate, as well as the service and tolling framework after the 20-year shippers’ contracts expire. These assumptions informed the base for PBO’s calculation of the Trans Mountain assets’ financial value (Section 2).

PBO’s “reference case” considers that future climate policy actions are limited to only the measures that are currently in place. PBO assumed in its reference case that shippers will recontract after their existing 20-year contracts expire.

All assumptions have a high degree of uncertainty, most notably the service and tolling framework in 20 years. Therefore, PBO developed a sensitivity

analysis to show the impact of changes to these variables on the overall net present value of the assets (Section 3).

2. Financial valuation

To determine the impact of certain changes to key variables, the first step is to calculate the overall value of Trans Mountain and its related assets in a reference case. To that end, PBO used a discounted cash flow (DCF) analysis, assessing the value to Trans Mountain Pipeline system based on the present value of the future cash flows it is expected to generate.

As discussed in the previous section, PBO's model is based on CDEV's projections. These were then adjusted based on feedback from a range of stakeholders and industry analysts. One of the most notable adjustments related to the discount rate.

2.1. Discount rate

The discount rate is an essential variable when calculating the net present value (NPV) of any investment or business activity. When determining if an asset will add value in comparison to the initial investment made, it is key to discount the projected future cash flows to the same point in time. It accounts for the time value of money, which at a high-level is that money received now is preferred to money received in the future as it can be invested and reap a return.

The discount rate also reflects the riskiness of an asset; the riskier the asset, or projected future cash flows, the higher the discount rate. Any change to the rate, both positive and negative, can result in a significant variation to the overall valuation of an asset.

For the calculation of the discount rate, PBO used a weighted average cost of capital (WACC). This includes both the cost of equity and after-tax cost of debt, which is then weighted based on the optimal capital debt structure of the company.⁹ To calculate this, PBO used data and information from various sources, including Capital IQ, PBO's *Fiscal Sustainability Report 2020* and data provided by CDEV.¹⁰

One key variable in the calculation of the cost of equity is the risk-free rate. For this analysis, PBO used its own projection of the Government of Canada's long-term benchmark bond yield. This rate is projected to remain relatively low in the short-term and increase to 3.25 per cent over the long-term. As this variable changes in the short term, the annual discount rate used by PBO

also changes up until 2028, as shown in Table 2-1. All other variables are held constant over the entire period of analysis.

Table 2-1 Weighted Average Cost of Capital

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Discount Rate	7.9%	7.6%	7.2%	7.2%	7.3%	7.3%	7.5%	7.8%	8.1%	8.4%	8.5%

Sources: PBO Calculations using data from Capital IQ, confidential data from CDEV and PBO's *Fiscal Sustainability Report 2020: Update*.

2.2. Trans Mountain continues to be a profitable undertaking under current climate policy framework

Pipelines typically generate steady cash flows over a long period of time given that, as monopolies, their revenues are subject to provisions in the Canada Energy Regulator Act. In the case of the expanded Trans Mountain Pipeline system, the revenues it can collect (referred to as tolls) are negotiated and agreed upon in contracts with shippers, and ultimately overseen by the CER.

Offsetting these regulated toll revenues are ongoing expenses such as those related to operating and maintaining the pipeline. In addition to the ongoing expenses, the Trans Mountain Expansion Pipeline has significant construction costs in the early years until it is in service, which has most recently been publicly stated as being at the end of 2022.

When calculating the overall financial value of the expansion (also referred to as the Net Present Value, or NPV), cash flows in the near term are more heavily weighted than cash flows in the long term. This gap increases as the discount rate also increases.

For this analysis, PBO discounted all cash flows, including construction costs, back to the initial date when the Government purchased the pipeline. This was done in order to accurately compare the discounted cash flows with the purchase price. Under PBO's reference case, which makes the assumptions highlighted earlier in the report, PBO estimates that all cash flows since the acquisition have a positive present value of \$5.0 billion.¹¹ After accounting for the initial purchase price of \$4.4 billion, PBO estimates a positive NPV of \$0.6 billion (Table 2-2).

Table 2-2 Net Present Value of Trans Mountain Pipeline System (Reference Case)

Present value of cash flows since acquisition	\$5.0 billion
Purchase Price	\$4.4 billion
Net Present Value	\$0.6 billion

Source: Parliamentary Budget Officer.

Notes: Totals may not add due to rounding.
The present value of cash flows since acquisition includes construction costs.

The Government has indicated its intention to sell the assets once the expansion pipeline is operational.¹² PBO assumes that the pipeline would be sold at a market value (equal to the NPV). While it has yet to determine an exact date and price for the divestiture, the Government has indicated a willingness to include certain indigenous stakeholder groups in the negotiation process.

This was the case in the divestment of Ridley Terminals, where 10 per cent of Canada’s shares were transferred to a limited partnership owned by the Lax Kw’alaams Band and the Metlakatla First Nation.¹³

3. Sensitivity analysis

3.1. Risks to Trans Mountain’s financial valuation

The key assumptions underpinning PBO’s financial valuation of the Trans Mountain are subject to risk and uncertainty.

TMEP construction costs and in-service date

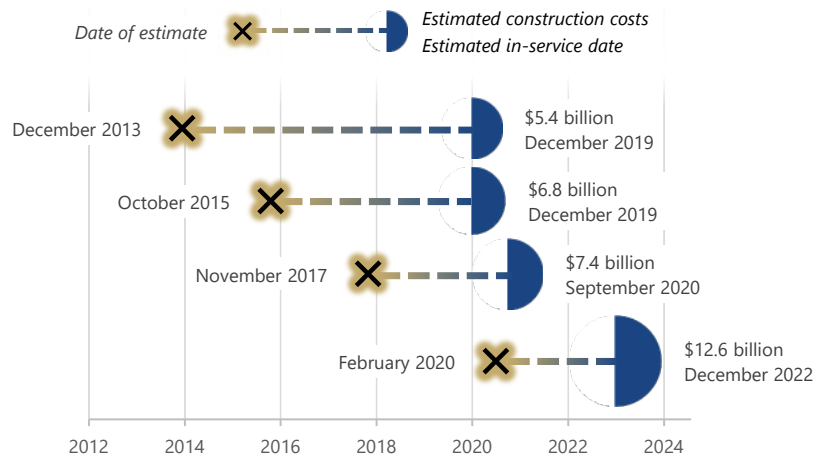
PBO’s reference case assumed TMEP would cost \$12.6 billion to build and enter into service in December 2022. These assumptions are consistent with public statements from Trans Mountain Corporation in February 2020.¹⁴

It is unclear whether or how the COVID-19 pandemic may impact TMEP’s development. CDEV’s 2020 Third Quarter Report noted that “the COVID-19 pandemic may increase certain risks related to development of the TMC expansion project schedule” but that “at this time, these are not expected to have a material impact on the project’s completion schedule or project cost.”¹⁵ As recently as November 2020, the company indicated “Trans Mountain’s expansion project cost and schedule remains intact with a planned in-service date of December 2022.”¹⁶

There are additional risks to TMEP’s costs and schedule. Trans Mountain Corporation has “recommended to the Government of Canada in its capacity as owner and lender, a further \$600 million in reserve for cost impacts beyond the control of Trans Mountain.”¹⁷ TMEP also continues to face legal and regulatory challenges.¹⁸

Since Trans Mountain first submitted applications to build TMEP, the estimated construction costs and in-service date have deteriorated several times (Figure 3-1).

Figure 3-1 There is a risk of further increases in construction costs and delays to the in-service date for the Trans Mountain Expansion Project



Sources: PBO interpretation of news reporting, earnings call transcripts, and public documentation from Trans Mountain Corporation.¹⁹

Pipeline system utilization

During TMEP’s first couple of decades of operation, the Trans Mountain Pipeline system is almost assured to garner regulated tolls for most of its 890 kbpd of pipeline capacity. 80 per cent (708 kbpd) of the pipeline system’s capacity is locked into 15- and 20-year committed contracts. These contracts require shippers to transport a certain volume of petroleum on the pipeline, and if not, to still pay for the capacity to which they committed.

There is uncertainty around how much of the remaining 20 per cent capacity of the expanded pipeline system will be used. The tolls charged for this “spot” capacity are higher than for the committed contracts, but shippers have no obligation to use it. Spot utilization will depend on oil supply available for export, the availability of other takeaway capacity, and the relative netbacks shippers receive from different pipeline options, among other factors.

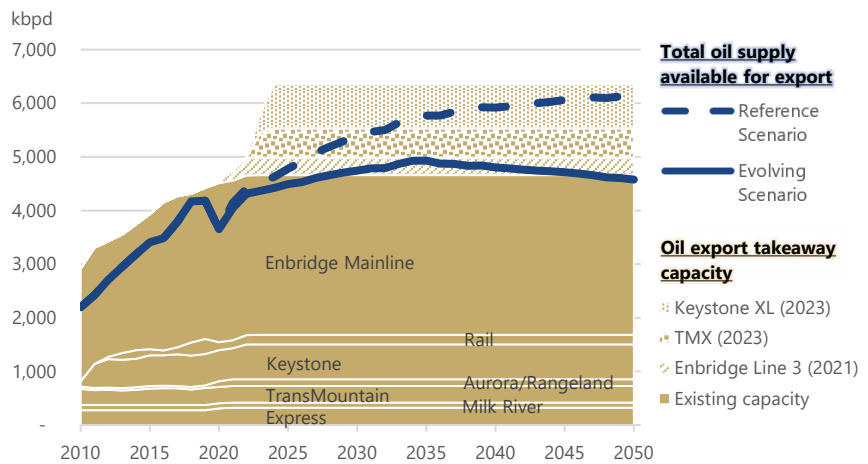
Service and tolling framework

As noted above, during TMEP’s first 15 to 20 years of operation, most of the Trans Mountain Pipeline system’s capacity is earmarked toward committed contracts. Once those contracts expire in the late 2030s – early 2040s, it is uncertain what kind of service and tolling framework will prevail. PBO’s reference case assumes a continuation of the contract framework after 20 years of operation, in which shippers re-enter into committed contracts.

However, in light of certain scenarios for oil supply in recent energy market projections, there is a risk that shippers will choose to not re-enter into committed contracts in the 2040s. The Canada Energy Regulator’s recent *Energy Futures 2020* presents two scenarios for projected oil supply available for export from Western Canada: A “reference scenario” in which climate change actions are limited to only the measures currently in place; and an “evolving scenario” that continues the historical trend of increasing policy action on climate change throughout the projection.

According to CER’s projections, by the early 2040s the portion of pipeline and rail capacity that will be needed to export Western Canadian crude oil will be over 90 per cent in the “reference scenario”. That ratio drops to only 75 per cent by the early 2040s in the “evolving scenario” and follows a downward trajectory (Figure 3-2).

Figure 3-2 There is a risk of unused pipeline capacity for Western Canadian oil exports in the decades ahead depending on federal climate policy



Source: PBO calculations of the Canada Energy Regulator’s *Energy Futures 2020*.

Given the considerable spare pipeline capacity in the CER’s “evolving scenario”, shippers may not be compelled to re-enter into committed contracts. In that case, the Trans Mountain Pipeline system could revert to a

cost-of-service tolling framework.²⁰ In such an outcome, the total tolls charged to shippers would equal the total cost to Trans Mountain to provide service, including a regulated return on the base rate. A reversion to a cost-of-service toll framework in the 2040s would be less lucrative for Trans Mountain Corporation and lower the assets' net present value accordingly.

There is additional uncertainty around future oil export takeaway capacity. In the CER's current projections, by the early 2040s there will be 4,660 kbpd of takeaway capacity from existing pipelines and another 1,700 kbpd of takeaway capacity from pipelines that are currently under construction: Enbridge Line 3 (330 kbpd), TMEP (540 kbpd), and Keystone XL (830 kbpd). However, the in-coming US administration may block Keystone XL given campaign commitments by the President-elect.²¹ Other pipeline capacity may come online or go offline based on political and business decisions over the next decades.

Discount rate

As described in a previous section, the discount rate is the rate used to determine the present value of future cash flows. The discount rate also incorporates risk and can therefore change based on the perceived risk and the cost for firms to obtain financing to undertake investments.

In its 2018 Annual Report, CDEV stated that the discount rate is approximately 9%, while its 2019 Annual Report reduced the rate to 8.6%.²² This decrease is consistent with the reduction in the perceived riskiness of the project, given that many of the court challenges have been resolved.

Another key factor in calculating the discount rate is the risk-free rate. This generally refers to the interest rate that the Government pays on its long-term bonds. With the recent decline in interest rates, the overall discount rate has also declined.

While these changes provide an understanding of where things stand today, there remains uncertainty around many of the elements which factor into future discount rates. While PBO has used its own projection of the Government of Canada (GoC) long-term benchmark bond yield, it is not a guarantee. Therefore, given this uncertainty, and since the discount rate has a significant impact on the NPV, we have also performed a sensitivity analysis with changes to the discount rate.

3.2. With different assumptions, Trans Mountain's value may be higher, lower, or even negative

PBO considered how the value of the Trans Mountain Pipeline system is impacted by changes to five key assumptions from the financial valuation discussed above:

- TMEP’s in-service date;
- TMEP’s construction costs;
- Pipeline utilization on the Trans Mountain system;
- The service and tolling framework after 20-year contracts expire; and
- The discount rate used to valuate Trans Mountain’s cash flows.

Table 3-1 provides a summary of the impact of changing each assumption individually. Assumptions of a later in-service date, higher construction costs, lower pipeline utilization, a higher discount rate, and a cost-of-service tolling framework each result in a lower NPV relative to PBO’s reference case – and vice-versa. For example, holding all else equal, a 10 per cent increase in remaining construction costs reduces the NPV from \$600 million to \$200 million, while a 10 per cent reduction in construction costs increases the NPV from \$600 million to \$1,000 million.

Table 3-1 Net present value (NPV) of the Trans Mountain Pipeline system based on changes to key assumptions in Trans Mountain’s projected cash flow

(\$ millions)

Assumption	NPV
Reference case	600
In-service date	
<i>One-year delay</i>	- 400
Construction costs	
- 10.0 per cent	1,000
+ 10.0 per cent	200
Pipeline utilization	
- 5.0 percentage points	- 400
+ 5.0 percentage points	900
Discount rate	
- 0.5 percentage points	1,500
+ 0.5 percentage points	- 200
Service and tolling framework after 20-year contracts expire	
<i>Cost-of-service</i>	-1,100

Source: Parliamentary Budget Officer.

Notes: The net present value presented in the table is net of the purchase price paid by the Government of Canada to acquire the Trans Mountain Pipeline system. These figures were calculated assuming that for any given change in a specific assumption, all other assumptions remain the same.

Table 3-2 presents the impact of changing multiple assumptions in Trans Mountain’s projected cash flow concurrently. For example, the boxed figure in the table (\$600 million) refers to assumptions of an in-service date of December 31, 2022; \$12.6 billion in construction costs; pipeline utilization with no change relative to PBO’s reference case; a contract service and tolling framework; and a long-term discount rate of 8.5%. The boxed figure also refers to PBO’s reference case, whereas every other figure refers to some combination of alternative assumptions relative to PBO’s reference case.

Table 3-2 Net present value (NPV) of the Trans Mountain Pipeline system based on changes to key assumptions in Trans Mountain’s projected cash flow

(\$ millions)

			Service and tolling framework after 20-year contracts expire					
In-service date	Construction costs	Pipeline Utilization (relative to ref. case)	Contract service (ref. case)			Cost-of-service		
			Long-term discount Rate			Long-term discount Rate		
			8.0%	8.5%	9.0%	8.0%	8.5%	9.0%
Dec 31, 2022	\$11.3 billion (10% lower)	+ 5.0 p.p.	2,300	1,300	500	200	- 400	-1,000
		No change (ref. case)	1,900	1,000	200	- 100	- 700	-1,300
		- 5.0 p.p.	800	-	- 700	- 900	-1,400	-1,900
	\$12.6 billion (ref. case)	+ 5.0 p.p.	1,900	900	100	- 200	- 800	-1,400
		No change (ref. case)	1,500	600	- 200	- 500	-1,100	-1,700
		- 5.0 p.p.	400	- 400	-1,200	-1,300	-1,900	-2,400
	\$13.9 billion (10% higher)	+ 5.0 p.p.	1,500	500	- 300	- 600	-1,200	-1,800
		No change (ref. case)	1,100	200	- 700	- 900	-1,500	-2,100
		- 5.0 p.p.	-	- 900	-1,600	-1,700	-2,300	-2,800
Dec 31, 2023	\$11.3 billion (10% lower)	+ 5.0 p.p.	1,200	300	- 400	- 600	-1,200	-1,700
		No change (ref. case)	800	-	- 700	- 800	-1,400	-2,000
		- 5.0 p.p.	- 100	- 900	-1,600	-1,500	-2,100	-2,600
	\$12.6 billion (ref. case)	+ 5.0 p.p.	800	- 100	- 900	-1,000	-1,600	-2,200
		No change (ref. case)	400	- 400	-1,200	-1,200	-1,800	-2,400
		- 5.0 p.p.	- 600	-1,300	-2,000	-2,000	-2,500	-3,000
	\$13.9 billion (10% higher)	+ 5.0 p.p.	400	- 500	-1,300	-1,400	-2,000	-2,600
		No change (ref. case)	-	- 800	-1,600	-1,600	-2,300	-2,800
		- 5.0 p.p.	-1,000	-1,800	-2,500	-2,400	-3,000	-3,500

Source: Parliamentary Budget Officer.

Note: The net present value presented in the table is net of the purchase price paid by the Government of Canada to acquire the Trans Mountain Pipeline system.

4. Economic impact

TMEP will have economic impacts, stemming from the construction of the asset itself and from its eventual operation.

4.1. TMEP’s construction will impact real GDP, employment

Construction impacts include the money spent to build the pipeline, the multiplier effect from that economic activity and jobs created during construction.

PBO assumed a total project cost \$12.6 billion and an in-service date of December 31, 2022 for TMEP. PBO deducted \$1.7 billion of financial carrying costs included in the \$12.6 billion cost estimate to arrive at \$10.9 billion in spending on construction activities with a direct economic impact.²³

Projected spending outlays were inputted to PBO’s macroeconomic model. Based on this model, the multiplier associated with non-residential construction over the construction period is estimated to average 1.4.²⁴ That is, for every \$100 spent on constructing the pipeline in a given year, approximately \$140 in real GDP would be generated.

Funds related to construction activities that occurred prior to 2018 were not included in PBO’s economic impact calculations. The results are presented in Table 4-1.

Table 4-1 Economic impact of TMEP construction

	2018	2019	2020	2021	2022	2023	2024	2025	Peak impact
Real GDP Impact (per cent)	0.02	0.05	0.13	0.18	0.14	0.09	0.07	0.06	0.18
Employment Impact ('000s)	0.64	3.22	11.78	17.05	16.35	13.38	10.94	9.20	17.05

Source: Parliamentary Budget Officer.

Note: The baseline scenario underlying these estimates are from PBO’s *Economic and Fiscal Outlook – September 2020*.²⁵

PBO estimates that the peak annual real GDP impact due to the construction of TMEP will be 0.18 per cent in 2021, which then decreases to 0.06 in 2025. The impact on real GDP is concentrated during construction.

The impact on employment would follow a similar pattern with a peak annual employment impact of 17,050 jobs added in 2021 and decline steadily thereafter. These impacts may vary based on the final construction cost of and timeframe to complete TMEP.

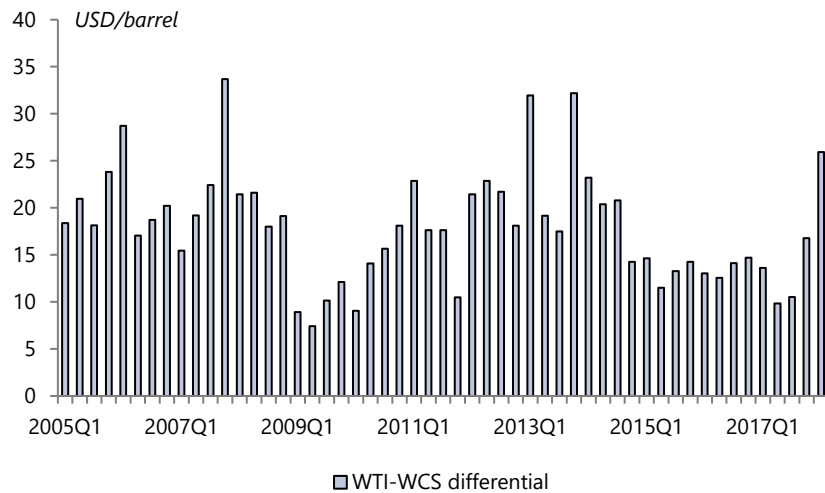
4.2. TMEP’s operation could increase optionality

Operating impacts could include revenues from increased shipments and activity generated by the operation of the pipeline.²⁶ During our consultations, industry and government stakeholders identified increased optionality for shippers of Western Canadian crude oil as an additional benefit of TMEP’s operation.

Optionality refers to the availability of more pipeline export capacity to more downstream markets for Western Canadian oil producers. Optionality allows shippers more opportunities to maximize returns and reduce the netback disadvantage, reflected in the price differential between West Texas Intermediate (WTI) and Western Canadian Select (WCS).

It is difficult to determine the impact TMEP would specifically have to enhance optionality and potentially reduce the WTI-WCS price differential. However, PBO’s *Fall Economic Statement 2018: Issues for Parliamentarians* provides useful information on the impact of a reduction in the WTI-WCS differential on Canada’s GDP. That analysis determined that a reduction in the WTI-WCS price differential of US\$5 per barrel would, on average, increase nominal GDP by \$6.0 billion annually over 2019 to 2023.²⁷

Figure 4-1 WTI-WCS differential



Source: Parliamentary Budget Officer.

Appendix A: Conceptual Accounting Impact of the Trans Mountain Purchase, Expansion, and Divestiture

The purchase, operation and ultimate sale of the Trans Mountain Corporation impacts various aspects of the government's financial statements. This appendix outlines the conceptual linkages between these three stages and the line items in the government's operating statement and balance sheets. This approach, while accurate, is stylized in nature and leaves out some non-material details.

Stage 1: Purchase of Trans Mountain Corporation by the government

This stage encompasses the purchase of Trans Mountain Corporation by the Government of Canada.

Balance Sheet Impacts

- (i) The Government of Canada issued new debt (a liability) to obtain cash (an asset) to finance the purchase of Trans Mountain Corporation.
- (ii) The cash was then transferred to the Export Development Corporation (EDC). For the Government, this decreased its cash (an asset) but increased its equity in EDC (an asset) by the same amount. For EDC, this increased its cash (an asset) and its equity value (an asset).
- (iii) EDC in turn lent the money to another federal Crown Corporation – the Canada Investment Development Corporation (CDEV) to purchase Trans Mountain Corporation. For EDC, this reduced its cash (an asset), which was fully offset by loans receivable (an asset). For CDEV, this increased its cash (an asset), which was fully offset by loans payable (a liability).
- (iv) Finally, CDEV purchased Trans Mountain Corporation. This reduced its cash (an asset) and increased its capital (an asset) and goodwill (an asset; the difference between the purchase price and the value of assets), offset by other acquired liabilities.

Stage 2: Pipeline Expansion

During this stage Trans Mountain Corporation continues to operate existing assets and completes the pipeline expansion.

Operating Statement Impacts

- (v) As Trans Mountain Corporation continues operations, it generates revenues and expenses from existing assets that are consolidated on CDEV's operating statement.
- (vi) CDEV, in turn, will incur ongoing and growing interest expenses associated with its borrowing from EDC to finance the original purchase of Trans Mountain Corporation and pipeline expansion.
- (vii) EDC will receive the interest revenues identified in (vi) from CDEV.
- (viii) The Government of Canada will continue to pay interest on the debt incurred to purchase Trans Mountain and expand the pipeline (PBO estimates these payments to be roughly \$100 million in 2019). In addition, it will also report changes in the value of EDC and CDEV through other revenues.
- (ix) The Government of Canada will also generate additional personal income tax (PIT) and corporate income tax (CIT) revenue arising from the additional economic activity associated with the pipeline expansion. In 2019, PBO estimates the additional PIT, CIT, and GST revenues were approximately \$60 million, \$10 million, and \$6 million, respectively.

Balance Sheet Impacts

- (x) As in steps (i) to (iii), additional debt must be issued by the Government, transferred to EDC and then lent to CDEV to pay for construction costs.
- (xi) As construction costs are incurred, CDEV's cash (an asset) balance falls, offset by increases in the value of capital assets.

Stage 3: Divestiture of Trans Mountain Corporation

During this stage, it is assumed that the government divests Trans Mountain Corporation following completion of the expansion in December 2022.

Operating Statement Impacts

- (xii) The ongoing operations of Trans Mountain Corporation will continue to generate federal PIT and CIT revenues.

- (xiii) Depending on the ultimate sale price of Trans Mountain Corporation, CDEV will either recognize a gain or a loss on the sale of the firm.

Balance Sheet Impacts

- (xiv) Steps (i) to (iv) are reversed.
 - CDEV sells Trans Mountain Corporation (an asset) for cash (an asset).
 - The cash (an asset) is then used to repay outstanding debt owed to EDC (a liability).
 - After extinguishing its loans (an asset) to CDEV, EDC will either use its cash (an asset) balance to engage in further lending or remit the cash back to the Government of Canada.
 - If the latter, the Government of Canada can decide to maintain a higher cash balance (an asset) or extinguish the debt originally issued to finance the purchase of Trans Mountain Corporation (a liability).

Appendix B: Alternative scenario

In addition to the sensitivity analysis, PBO has received multiple requests to examine the impacts of a scenario where the Trans Mountain Pipeline system is no longer operational by 2050. The reason for this scenario is to address the climate policy of the Government of Canada to achieve net-zero emissions by 2050.²⁸

While this section calculates an NPV for this scenario, it is not intended to indicate that it is what PBO deems most likely. It is solely to address the scenario requested by some parliamentarians.

For this scenario, PBO used the same financial model which was used in the main body of the report; however, PBO made certain adjustments to key assumptions to address the requested scenario. The list of key assumptions for this scenario are detailed in Table B-1.

Table B-1 Key assumptions for alternative scenario

TMEP total construction costs		\$12.6 billion
TMEP in-service date		December 31, 2022
Trans Mountain Pipeline system utilization	Initial years	Contract utilization: Full Spot utilization: Near full
	Subsequent years	Contract utilization: Full Spot utilization: Moderate
Service and tolling framework after 20-year contracts expire (2043 –)		Cost-of-service
Final year of future cash flows		2049 ²⁹

Using these key assumptions, PBO calculates the NPV of the future cash flows to be \$3.0 billion. After accounting for the \$4.4 billion purchase price, the Trans Mountain Pipeline system would result in a loss of \$1.5 billion (after rounding).

Under this scenario, the NPV of the cash flows after 2049 have been removed. This assumption doesn't have a significant impact on the NPV when comparing to the results of the valuation's sensitivity to a cost-of-service tolling framework in the 2040s, due to the highly discounted nature of cash flows beyond 2049. However, there is a significant variance when comparing this scenario to the reference case in which shippers' contracts are re-contracted.

Notes

1. Canada Development Investment Corporation. (2020). *2019 Annual Report*. Retrieved from <https://www.cdev.gc.ca/wp-content/uploads/2020/05/CDEV-2019-Final-Art-English-03.31.2020-2.pdf>

2. PBO previously published a financial analysis of the Government of Canada's purchase of the Trans Mountain Pipeline system in January 2019:

Parliamentary Budget Office. (2019). *Canada's purchase of the Trans Mountain Pipeline – Financial and Economic Considerations*. Retrieved from <https://www.pbo-dpb.gc.ca/web/default/files/Documents/Reports/2019/Transmountain/Trans Mountain Report EN FINAL2.pdf>

Since the January 2019 publication, PBO has provided ongoing monitoring of financial reporting on the Trans Mountain Pipeline system via several blog posts:

Parliamentary Budget Office. (2019). *Canada's purchase of the Trans Mountain Pipeline – Financial and Economic Considerations – Update*. Retrieved from <https://www.pbo-dpb.gc.ca/en/blog/news/Transmountain>

Parliamentary Budget Office. (2019). *Canada's purchase of the Trans Mountain Pipeline: Financial and Economic Considerations – Updated CDEV Financial Reporting*. Retrieved from <https://www.pbo-dpb.gc.ca/en/blog/news/trans-mountain-pipeline-updated-cdev-financial-reporting>

Parliamentary Budget Office. (2019). *Canada's purchase of the Trans Mountain Pipeline: Financial and Economic Considerations – Updated CDEV Financial Reporting (November 2019)*. Retrieved from <https://www.pbo-dpb.gc.ca/en/blog/news/trans-mountain-pipeline-updated-cdev--reseau-pipelinier-trans-mountain-mise-a-jour-cdev--2019-12-10>

Parliamentary Budget Office. (2020). *Canada's purchase of the Trans Mountain Pipeline: Financial and Economic Considerations – Updated CDEV Financial Reporting – July 2020*. Retrieved from <https://www.pbo-dpb.gc.ca/en/blog/news/canada-purchase-trans-mountain-pipeline-financial-economic-considerations-updated-cdev-financial-reporting-july-2020--achat-pipeline-trans-mountain-canada-considerations-economiques-financieres-mise-jour-information-financiere-cdev-juillet-2020>

3. Former Finance Minister Bill Morneau's August 2018 letter to CDEV provides more rationale for the Government of Canada's decision to acquire, expand, operate, and divest of the Trans Mountain assets.

Canada Development Investment Corporation. (2018). *Minister's Letter of Expectations*. Retrieved from https://www.cdev.gc.ca/wp-content/uploads/2018/12/Ministers_Letter_August-27_-2018.pdf

4. Certificate of Public Convenience and Necessity OC-65 to Trans Mountain Pipeline ULC in respect of the Trans Mountain Expansion Project; and Amending Orders AO-004-OC-49, AO-005-OC-2, AO-002-OC-49 and AO-003OC-2. (2019). *Canada Gazette Part I*, 153(25). Retrieved from <http://www.gazette.gc.ca/rp-pr/p1/2019/2019-06-22/html/sup1-eng.html>

5. Trans Mountain Corporation. (2019). *Trans Mountain Restarts Construction on Expansion Projection*. Retrieved from <https://www.transmountain.com/news/2019/trans-mountain-re-starts-construction-on-expansion-project>

6. By comparison, PBO’s Initial Report assumed a construction cost estimate of \$9.3 billion and an expected in-service date of December 2021.

Trans Mountain Corporation. (2019). *Backgrounder: Trans Mountain Expansion Projection Construction Accelerating*. Retrieved from <https://www.transmountain.com/news/2020/backgrounder-trans-mountain-expansion-project-construction-accelerating>

7. Giroux, Y. (2020, July 29). [Letter to Mr. Stephen Swaffield, Chairman, CDEV]. Retrieved from https://www.pbo-dpb.gc.ca/web/default/files/Documents/Info%20Requests/2020/IR0513_CDEV_TMC_TMEP%20financial%20analyses_ltr_e.pdf

8. Stafil, A. (2020, August 12). [Letter to Yves Giroux, Parliamentary Budget Officer]. Retrieved from https://www.pbo-dpb.gc.ca/web/default/files/Documents/Info%20Requests/2020/IR0513_response_e.pdf

9. The weighted average cost of capital (WACC), which is the overall discount rate, is calculated based on the following formula:

$$WACC = \frac{E}{D+E} \times r_e + \frac{D}{D+E} \times r_d \times (1-t)$$

where E refers to the equity value, D refers to the value of debt, r_e refers to the cost of equity, r_d refers to the cost of debt and t refers to the corporate tax rate.

10. Capital IQ data was retrieved on October 5, 2020.

11. In calculating the NPV, PBO assumed that all cash flows after the 20-year contracts expire would grow by 2% (in line with inflation and CDEV’s expectation, cited in its 2019 Annual Report, for long-term growth of Trans Mountain cash flows). PBO’s analysis includes cash flows up until 2062. This is consistent with the methodology used in PBO’s previous report, which included cash flows for 40 years after TMEP’s in-service date.

Canada Development Investment Corporation. (2020). *2019 Annual Report*. Retrieved from https://www.cdev.gc.ca/wp-content/uploads/2020/05/CDEV-2019-Final-Art-English_03.31.2020_2.pdf

12. Canada Development Investment Corporation. (2018). Minister’s Letter of Expectations. Retrieved from https://www.cdev.gc.ca/wp-content/uploads/2018/12/Ministers_Letter_August-27_-2018.pdf

13. Canada Development Investment Corporation. (2019). *Divestment of Ridley Terminals Inc. Closes*. Retrieved from <https://www.cdev.gc.ca/divestment-of-ridley-terminals-inc-closes/>

14. Trans Mountain Corporation. (2019). *Backgrounder: Trans Mountain Expansion Projection Construction Accelerating*. Retrieved from <https://www.transmountain.com/news/2020/backgrounder-trans-mountain-expansion-project-construction-accelerating>
15. Canada Development and Investment Corporation. (2020). *Third Quarter Report – September 30, 2020*. Retrieved from <https://www.cdev.gc.ca/wp-content/uploads/2020/11/CDEV-Q3-2020-Quarterly-Report-Final.pdf>
16. Canada Development Investment Corporation. (2020). *CDEV Annual Public Meeting*. Retrieved from <https://www.cdev.gc.ca/cdev-annual-public-meeting/>
17. Trans Mountain Corporation. (2020). *Backgrounder: Trans Mountain Expansion Projection Construction Accelerating*. Retrieved from <https://www.transmountain.com/news/2020/backgrounder-trans-mountain-expansion-project-construction-accelerating>
18. Canada Development Investment Corporation. (2020). *Third Quarter Report – September 30, 2020*. Retrieved from <https://www.cdev.gc.ca/wp-content/uploads/2020/11/CDEV-Q3-2020-Quarterly-Report-Final.pdf>
19. In December 2013, Kinder Morgan Canada submitted an application for the Trans Mountain Expansion Project. The application estimated construction costs of \$5.4 billion and a December 2019 in-service date.

Global News. (2018). *Timeline: Key dates in the history of the Trans Mountain pipeline*. Retrieved from <https://globalnews.ca/news/4239520/trans-mountain-pipeline-timeline/>

In its 2015 Third Quarter earnings call, Kinder Morgan disclosed the Trans Mountain Expansion Project construction costs had increased to \$6.8 billion.

Financial Post. (2015). *Trans Mountain pipeline costs rise to \$6.8 billion, but Kinder Morgan says project worth the price*. Retrieved from <https://financialpost.com/commodities/energy/transcanada-pipeline-costs-rise-to-6-8-billion-but-kinder-morgan-says-project-worth-the-price>

In May 2017, Kinder Morgan estimated \$7.4 billion in construction costs for TMEP. In November 2017, the company's master construction schedule submitted to the National Energy Board projected TMEP would enter service in September 2020.

Global News. (2018). *Timeline: Key dates in the history of the Trans Mountain pipeline*. Retrieved from <https://globalnews.ca/news/4239520/trans-mountain-pipeline-timeline/>

National Energy Board. (2017). TMEP Level 1 Master Schedule (Filing A87461-3). Retrieved from <https://docs2.cer-rec.gc.ca/ll-eng/llisapi.dll/fetch/2000/90464/90552/548311/956726/2392873/2981674/3347304/A87461-3 UPDATED Nov TMEP Level I Schedule - Sep 2020 In Service Condition 62 - A5W4T9.pdf?nodeid=3346865&vernum=-2>

In February 2020, Trans Mountain Corporation and the federal government estimated \$12.6 billion in TMEP construction costs and a December 2022 in-service date.

- CTV News. (2020). *Cost of Trans Mountain expansion jumps from \$7.4B to at least \$12.6B*. Retrieved from <https://www.ctvnews.ca/politics/cost-of-trans-mountain-expansion-jumps-from-7-4b-to-at-least-12-6b-1.4802172>
20. A return to a cost-of-service tolling framework in the 2040s is one possibility. Others include less than 80 per cent of the pipeline’s capacity committed to similar contract service or an alternative negotiated settlement.
 21. BNN Bloomberg. (2020). *Joe Biden vows to block Keystone XL*. Retrieved from <https://www.bnnbloomberg.ca/commodities/video/joe-biden-vows-to-block-keystone-xl~1961076>
 22. Canada Development Investment Corporation. (2019). *2018 Annual Report*. Retrieved from https://www.cdev.gc.ca/wp-content/uploads/2019/08/Canada-Development-Investment-Corp_2018_FA_ENGLISH_REV_04.08.2019Final.pdf

Canada Development Investment Corporation. (2020). *2019 Annual Report*. Retrieved from https://www.cdev.gc.ca/wp-content/uploads/2020/05/CDEV-2019_Final-Art_English_03.31.2020_2.pdf
 23. This calculation accounts for an allowance for funds used during construction (AFUDC), which consists of capitalized equity returns and interest charges that do not have a direct economic impact during construction.

Canada Development Investment Corporation. (2020). *2019 Annual Report*. Retrieved from https://www.cdev.gc.ca/wp-content/uploads/2020/05/CDEV-2019_Final-Art_English_03.31.2020_2.pdf
 24. PBO estimates the multiplier to vary between 0.9 to 1.8 over the entire period, with an average of 1.4.
 25. Parliamentary Budget Officer. (2020). *Economic and Fiscal Outlook – September 2020*. Retrieved from <https://www.pbo-dpb.gc.ca/en/blog/news/RP-2021-027-S--economic-fiscal-outlook-september-2020--perspectives-economiques-financieres-septembre-2020>
 26. By this claim, the increased oil export takeaway capacity that projects like TMEP provide will encourage upstream oil producers to invest in more oil production, creating knock-on economic impacts.
 27. Parliamentary Budget Office. (2018). *Fall Economic Statement 2018: Issues for Parliamentarians*. Retrieved from https://www.pbo-dpb.gc.ca/web/default/files/Documents/Reports/2018/FES%202018/FES_2018_EN_FINAL.pdf
 28. <https://www.canada.ca/en/environment-climate-change/news/2019/12/government-of-canada-releases-emissions-projections-showing-progress-towards-climate-target.html>
 29. PBO assumed that all cash flows after 2049 are equal to zero. In this scenario, PBO does not scale down the projected cash flows leading up to 2050. While it is unlikely that cash flows would end abruptly, it is highly uncertain how the projected cash flows would wind down. Therefore, for the purpose of this analysis, PBO assumed a less complicated scenario where the cash flows are eliminated after 2049.