



Assessment of Fossil Fuel Subsidies in Canada

A case study of the
Trans Mountain Pipeline

IISD REPORT

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Assessment of Fossil Fuel Subsidies in Canada: A case study of the Trans Mountain Pipeline

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Written by Thomas Gunton

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Head Office

111 Lombard Avenue, Suite 325
Winnipeg, Manitoba
Canada R3B 0T4

Tel: +1 (204) 958-7700

Website: iisd.org

X: [@IISD_news](https://twitter.com/IISD_news)

About the Author

Dr. Gunton is currently Professor and Founding Director of the Resource and Environmental Planning Program at Simon Fraser University. Dr. Gunton has over 40 years of professional experience, including holding the positions of Deputy Minister of Environment, Lands and Parks, Deputy Minister of Cabinet Policy Secretariat, and Deputy Minister of Finance (Treasury Board) for the Government of British Columbia. He has also held senior positions with the Government of Manitoba, including Assistant Deputy Minister of Energy and Mines, where he was in charge of major energy and mineral project development and evaluation, Economic Analyst in the Ministry of Economic Development. Dr. Gunton has worked for many private and public sector clients providing advice on project development and planning and has acted as an expert witness before various quasi-judicial agencies, including the National Energy Board, the Ontario Energy Board, and the BC Arbitration Panel, providing evidence on natural resource markets and pricing. Dr. Gunton has published over 90 refereed articles in peer-reviewed scientific journals dealing with topics including benefit-cost analysis of major resource projects and over 100 technical reports for private and public sector clients on resource and environmental issues and project development.



Executive Summary

This report evaluates a potential fossil fuel subsidy provided to the Canadian oil industry through the Government of Canada's expansion and continued operation of the Trans Mountain Pipeline (TMP) using the government's new fossil fuel subsidies assessment framework as the basis for analysis. Although subsidies may arise from many aspects of purchasing, selling, and operating the pipeline, this analysis focuses on a subsidy associated with charging tolls below what would normally be charged by a private company to expand and operate a pipeline project of this nature.

This subsidy results from the current tolls failing to recapture the full cost of the project's expansion (CAD 34.2 billion), resulting in a subsidy to Canada's oil industry in the range of CAD 8.7 billion to CAD 18.8 billion.

The magnitude of this subsidy is determined by comparing what the government charges for the transportation of oil through TMP to what a private sector firm would charge to generate

sufficient revenue to cover the project's full operating and capital costs. The theoretical private sector rate, or marketplace benchmark, and resulting subsidy are estimated by two commonly accepted methods for determining what pipeline tolls should be: 1) a cost-of-service analysis and 2) a discounted cash flow (DCF) analysis. The cost-of-service analysis concludes the subsidy is CAD 18.8 billion, equivalent to a cost to Canadian taxpayers of CAD 1,255 per household. The DCF analyses show the subsidy could range between CAD 8.7 billion and CAD 18.7 billion, equivalent to a cost to taxpayers of between CAD 581 and CAD 1,248 per household. These estimates differ due to variability in assumptions regarding the future quantity of oil transported and operation costs.

The report's analysis also shows that the government's investment in TMP meets the criteria for what constitutes a subsidy under Canada's fossil fuel assessment framework, as well as the World Trade Organization's definition of subsidies. Amongst other criteria, the investment confers a benefit to the oil sector by setting tolls below the marketplace costs of transporting the oil—as a result, “government revenue that is otherwise due is foregone or not collected.” In addition, the study shows that the subsidy is inefficient based on the Government of Canada's criteria.

The TMP opened in May of this year, and the tolls have not yet been finalized, so at this point, none of the subsidy should be considered a sunk cost. The entire cost of the subsidy can still be recovered by a combination of increasing tolls and/or applying a cost-recovery levy to oil shipments going forward. The most feasible of these options would be the application of a levy, which has a historical precedent in Canada—a solution of this nature was imposed by Alberta and incorporated into tolls approved by the National Energy Board to deal with potential losses on Trans Canada natural gas shipments in the 1980s. A levy in the range of CAD 1.00 to CAD 2.00

The entire cost of the subsidy can still be recovered by a combination of increasing tolls and/or applying a cost-recovery levy to oil shipments going forward.



per barrel of oil transported from Western Canada over a 10-year period would be sufficient to recover the entire cost of the subsidy and the loss to the Canadian taxpayer.

The TMP expansion has been justified on the grounds that it will further Canada's public interest by supporting the expansion of the oil sector and obtaining higher prices for Canadian oil. However, it is important to note that these rationales, even if correct, are not justifications for providing subsidies according to the Government of Canada's fossil fuel subsidies framework. Further, a more comprehensive analysis shows the project's expansion will result in an overall negative impact for Canadians when considering the high costs of construction, the environmental costs of greenhouse gas emissions associated with the pipeline, and the risks of oil spills, which far exceed any potential benefits of alleged higher oil prices.

Burdening Canadian taxpayers with the cost of providing a large subsidy to the oil sector to cover transportation costs is contrary to Canada's fossil fuel subsidies framework and contrary to basic principles of public equity. It is recommended that the Government of Canada fulfill its commitment to terminate inefficient fossil fuel subsidies by phasing out this subsidy.

Table ES1. Estimates of Trans Mountain Subsidy

	Range (CAD)	Mid-point estimate (CAD)
TMP Subsidy	8.7 billion to 18.8 billion	13.8 billion
TMP Subsidy per household	581–1,255	918



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1.0 Introduction

In 2021, the Government of Canada issued mandate letters for the Minister of Environment and Climate Change and the Minister of Finance that directed the ministers to review and eliminate inefficient fossil fuel subsidies by the end of 2023 (Office of the Prime Minister of Canada, 2021a, 2021b). One potentially significant fossil fuel subsidy that has not been assessed as part of this review is the Government of Canada's financial support for the Trans Mountain Pipeline (TMP). Federal financial support for the TMP includes both public financing for the purchase and construction of TMP and subsidies arising from foregone revenue from charging transportation tolls that are less than transportation costs. The purpose of this policy paper is to assess the potential fossil fuel subsidies provided to TMP by using the Government of Canada's new fossil fuel assessment framework (Government of Canada, 2023). The report begins with a summary of the Government of Canada's framework to identify inefficient fossil fuel subsidies. The framework is then used to assess subsidies provided to TMP.



2.0 Government of Canada Fossil Fuel Subsidy Policy

In 2009, the Government of Canada committed in a G20 agreement to phase out “inefficient” fossil fuel subsidies that “encourage wasteful consumption, distort markets, impede investment in clean energy sources, and undermine efforts to deal with climate change” (G20, 2009, para. 29). In 2021, the Government of Canada’s Minister of Environment and Climate Change and the Minister of Finance were directed in their mandate letters “to accelerate [Canada’s] G20 commitment to eliminate fossil fuel subsidies from 2025 to 2023 and develop a plan to phase out public financing of the fossil fuel sector, including by federal Crown corporations” (Office of the Prime Minister of Canada, 2021a, para. 13; 2021b, para. 13). Canada also committed to ending financial support for international unabated fossil fuel projects by the end of 2022 at the 2021 United Nations Climate Change Conference (Signatories to the Statement on International Support for the Clean Energy Transition, 2021).

The G20’s delivery on the commitment to phase out fossil fuel subsidies has been slow. Fossil fuel subsidies provided by G20 countries were estimated to be USD 1 trillion in 2022, more than four times higher than the average recorded over the previous decade (International Institute for Sustainable Development [IISD], 2023). While much of the increase was due to potentially time-limited consumer subsidies to help cushion the impact of higher energy prices, the overall increase in subsidies is contrary to the stated objective of G20 countries to phase them out. In Canada, federal and subnational fossil fuel subsidies are estimated to have increased from USD 2.0 billion in 2015 to USD 4.4 billion in 2022 (IISD & Organisation for Economic Co-operation and Development [OECD], 2024). These are conservative estimates, however, because they do not include potential subsidies provided to TMP.

Recently, the Government of Canada has taken new measures to deliver on its commitment to eliminate fossil fuel subsidies and phase out public financing of the fossil fuel sector. In December 2022, the Government of Canada ended financial support for all unabated international fossil fuel projects (Government of Canada, 2022) and in July 2023, released a new policy framework to deliver on its commitment to end all inefficient fossil fuel subsidies by the end of 2023 (Government of Canada, 2023).

The new 2023 fossil fuel subsidies assessment framework outlines the Government of Canada’s process for identifying inefficient fossil fuel subsidies for elimination. The first step (Figure 1) is to identify fossil fuel subsidies using the World Trade Organization (WTO) definition of subsidies, which states

[A] subsidy shall be deemed to exist if:

- a. (1) there is a financial contribution by a government or any public body within the territory of a Member (referred to in this Agreement as “government”), i.e., where:



- i. a government practice involves a direct transfer of funds (e.g., grants, loans, and equity infusion), potential direct transfers of funds or liabilities (e.g., loan guarantees);
- ii. government revenue that is otherwise due is foregone or not collected (e.g., fiscal incentives such as tax credits);
- iii. a government provides goods or services other than general infrastructure, or purchases goods;
- iv. a government makes payments to a funding mechanism, or entrusts or directs a private body to carry out one or more of the type of functions illustrated in (i) to (iii) above which would normally be vested in the government and the practice, in no real sense, differs from practices normally followed by governments;

or

(2) there is any form of income or price support in the sense of Article XVI of GATT 1994; and

a benefit is thereby conferred. (Government of Canada, 2023, Annex 1)

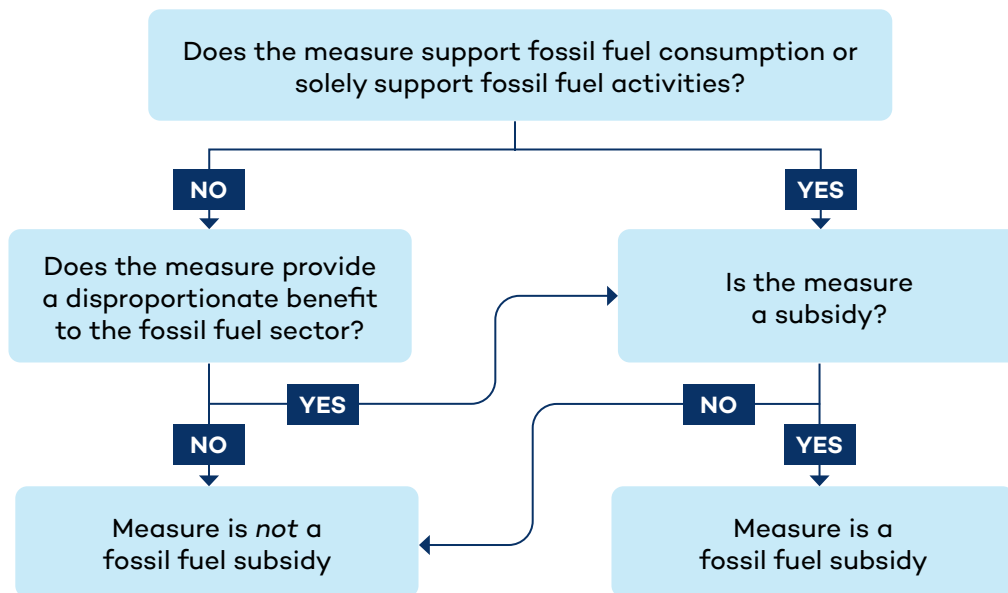
The second step in the assessment process is to determine whether the fossil fuel subsidy is inefficient. The fossil fuel subsidy assessment framework (Government of Canada, 2023) categorizes all fossil fuel subsidies as inefficient and subject to elimination unless they meet one or more of the following criteria:

- enable significant net greenhouse gas (GHG) emissions reductions in Canada or internationally in alignment with Article 6 of the Paris Agreement
- support clean energy, clean technology, or renewable energy
- provide an essential energy service to a remote community
- provide short-term support for emergency response
- support Indigenous economic participation in fossil fuel activities and/or
- support abated production processes, or projects that have a credible plan to achieve net-zero emissions by 2030.

This Government of Canada framework is used to assess subsidies provided by the government's financial support to TMP.



Figure 1. Steps used to identify whether a measure is a fossil fuel subsidy in Canada



Source: Government of Canada, 2023.



3.0 Trans Mountain Pipeline Overview

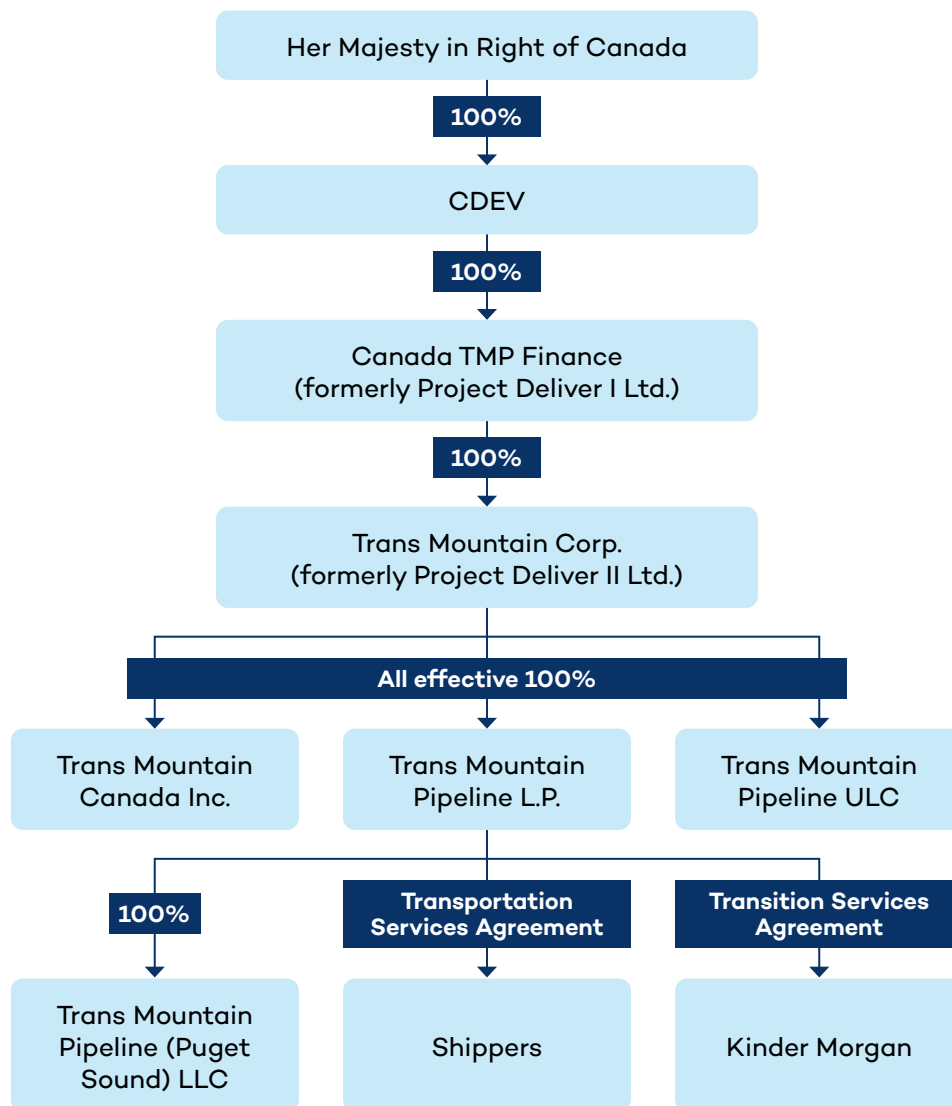
TMP was built in the early 1950s and ships oil and refined products from Alberta to British Columbia and refineries in Washington State. In 2013, Kinder Morgan, the then-owner of TMP, applied to the National Energy Board (NEB) for approval to expand the pipeline from 300,000 barrels per day capacity to 890,000 barrels per day to accommodate projected expansion of oil production in Alberta and to gain access to markets in Asia (Trans Mountain Pipeline ULC [TMC], 2013). To underpin the expansion, Kinder Morgan negotiated long-term 15–20 year take-or-pay transportation contracts in 2012 with 13 oil companies for 80% of TMP capacity, with the remaining 20% allocated to spot shipments (TMC, 2023b, p. 6). The framework for setting transportation tolls on TMP was approved by the NEB in 2013 based on these contracts, and the Government of Canada approved the expansion in 2016 (NEB, 2019).

In April 2018, Kinder Morgan announced that it was suspending construction of the TMP expansion due to increasing financial risks. The Government of Canada commenced discussions with Kinder Morgan about the future of TMP expansion and, in May 2018, announced that it had agreed to purchase TMP for CAD 4.4 billion (Parliamentary Budget Office [PBO], 2019). The ownership structure is outlined in Figure 2.

Prior to the transfer of ownership in August 2018, the Federal Court of Appeal quashed the approval of TMP expansion on the grounds that there had been insufficient consultation with Indigenous communities and that the marine environmental impacts were not properly assessed (NEB, 2019). An NEB hearing was initiated to address the court decision, with a report issued in 2019, recommending approval (NEB, 2019). After additional consultation with Indigenous communities, the Government of Canada reapproved the TMP expansion in 2019 (PBO, 2019) and construction resumed with completion in May 2024 following a series of time delays and cost overruns from the original CAD 5.4 billion to the currently estimated cost of CAD 34.2 billion to complete the expansion (TMC, 2024e, p. 23).



Figure 2. Trans Mountain ownership structure



Source: PBO, 2019, p. 5.



4.0 Trans Mountain Pipeline Subsidies

4.1 Calculating the Subsidy Provided to TMP

The Government of Canada's decision to purchase and expand TMP represents a significant financial commitment to the oil sector (Allan, 2022; PBO, 2022). The government paid CAD 4.4 billion for the TMP in 2018 (PBO, 2019) and is investing CAD 34.2 billion to complete the expansion (TMC, 2024d, p. 4).¹ Determining the potential subsidy involved in this investment can be assessed according to the WTO definition set out in the Government of Canada's fossil fuel subsidy assessment framework, in which a subsidy is

(1) a direct transfer of funds (e.g., grants, loans, and equity infusion) and potential direct transfers of funds or liabilities (e.g., loan guarantees) or (2) providing goods or services, in this case through the provision of pipeline transportation services to the oil sector, **whereby a benefit is conferred**. The WTO criteria provide the following guidance in determining if there is a benefit:

In many cases, as in the case of a cash grant, the existence of a benefit and its valuation will be clear. In some cases, however, the issue of benefit will be more complex. For example, when does a loan, an equity infusion or the purchase by a government of a good confer a benefit? Although the SCM Agreement does not provide complete guidance on these issues, the Appellate Body has ruled (Canada – Aircraft) that the existence of a benefit is to be determined by comparison with the marketplace (i.e., on the basis of what the recipient could have received in the market). (WTO, 2023, para.7)

This marketplace benchmark for assessing whether the government is providing a benefit can be calculated by estimating what a private sector firm would charge for the services in a competitive market relative to what the government is charging. For TMP, the marketplace benchmark is the transportation toll a private pipeline company would charge to generate sufficient revenue to cover the full operating and capital costs of TMP, including a return on the capital invested. This marketplace toll revenue can then be compared to the tolls the government is charging to determine if there is a subsidy benefit. If the government toll is less than the market-based toll the private sector would earn, then the government is providing a benefit to the oil sector equivalent to the difference between the government toll and the market-based toll.

There are two methods that can be used to determine the marketplace toll that a private company would charge to cover the costs of providing the pipeline transportation services for TMP: rate base cost-of-service analysis and a discounted cash flow analysis (DCF).

¹ The purchase price of CAD 4.4 billion included CAD 1.1 billion of the cost of the expansion (TMC, 2019, p. 21) so the total government investment is estimated to be approximately CAD 37.5 billion (CAD 34.2 billion + CAD 4.4 billion – CAD 1.1 billion).



4.2 Rate Base Cost-of-Service Analysis

A fundamental principle of utility regulation is to ensure that utilities such as pipelines charge just and reasonable tolls that cover the costs of service of operating the utility plus a market return on capital invested, which is defined as the rate base of the utility (Bonbright et al., 1988; Werner & Jarvis, 2022). The cost of service represents the marketplace cost of providing the service. If the tolls are not sufficient to cover the cost of service, then the user of the utility is receiving a subsidy benefit, and if tolls are above the cost of service, the user of the service is paying an excess price.

In the case of TMP, the tolls are regulated by the Canadian Energy Regulator (CER). The toll methodology for TMP was approved by the CER's predecessor, the NEB, in 2013 based on negotiated transportation contracts with 13 oil companies. The contracts were designed to cover TMP's operating costs plus a 12%–15% return on the capital costs of the expanded pipeline (TMC, 2012). Based on the contracts, TMP was required to provide the estimated capital costs of expansion when the NEB issued the Certificate of Public Convenience and Necessity (CPCN) to approve the construction of the pipeline. The tolls would be set based on the original toll structure approved in 2013 for the forecast CPCN capital cost estimate (TMC, 2023b). Capital cost increases incurred during construction above the CPCN estimate would be passed on to the shippers in increased tolls based on the CAD 0.07 per CAD 100 million of additional costs if they were in the uncapped category of expenditures, while capped costs would be borne by TMP. These toll contracts were approved by the NEB on the assumption that they would provide just and reasonable tolls without being discriminatory and would meet the fair return standard to ensure that Kinder Morgan earned a market return on its investment (NEB, 2013, pp. 26–28).

Following the issuance of the initial CPCN, Kinder Morgan provided the contracted oil companies in 2017 with a revised capital cost estimate of CAD 7.4 billion for determining tolls (TMC, 2023b, Attachment 3, p. 4). However, Kinder Morgan decided not to proceed with the expansion in 2018 due to concerns that the toll contracts would not compensate for the increasing risks and costs of the expansion and subsequently sold TMP to the Government of Canada. If Kinder Morgan had retained ownership, it would only have proceeded with the expansion if it had reduced project risks and ensured that it would cover its costs and earn its normal private sector return on its investment. The “de-risking” would have required a revision of the contracts consistent with standard utility practice to ensure that incurred capital costs were included in the rate base for determining tolls, along with some indemnification for other risks that could delay project completion.

The new Government of Canada owners, however, decided not to make any effort to revise the sharing of risks between the oil company shippers and TMC. Instead, the Government of Canada proceeded with construction without providing shippers with an updated capital cost estimate after the issuance of the new CPCN in 2019 and without attempting to revise the transportation contracts to reduce its risks and to follow standard utility regulatory practice to ensure that the capital costs of the expansion would be included in the rate base for determining tolls.



The failure to follow standard private sector utility practices to update the capital cost estimates from the outdated 2017 CAD 7.4 billion estimate (and failure to renegotiate the transportation contracts to de-risk the TMP expansion project to ensure a market return on investment by including capital costs in the rate base for determining tolls) resulted in the TMP 2023 toll application omitting CAD 16.2 billion of the capital costs from the rate base (Table 1). If the standard utility marketplace benchmark of earning a market return on the capital cost of the expansion was used, the base fixed TMP toll would be based on the full capital costs of the project. Based on the 2023 estimated costs of CAD 30.6 billion used in the toll application, the base fixed marketplace toll that a private investor would charge should be CAD 22.22 per barrel instead of CAD 10.88 per barrel, and the net present value (NPV) of total toll revenue received by TMP would increase by CAD 16.2 billion to cover the capital costs of the expansion project (Table 1). Based on the updated 2024 capital costs of CAD 34.2 billion, the fixed base marketplace toll should be CAD 24.53 per barrel instead of CAD 11.37 per barrel. The toll application, therefore, requests approval for tolls that are less than one-half the cost of transporting the oil. The omission of the CAD 18.8 billion in capital costs from the rate base represents the quantum of the subsidy benefit provided by the Government of Canada under the WTO subsidy definition using the marketplace benchmark.²

² Oil companies may conclude that they are not receiving a benefit using TMP because the proposed TMP tolls are higher than other pipelines. However, while the cost of transportation on other pipelines may be relevant to determining whether the higher-cost TMP expansion should have been built, there is still a subsidy on TMP because the tolls are below the marketplace cost of providing the service. Oil companies may also conclude that the contracts negotiated with Kinder Morgan in 2012 are a marketplace determination of the allocation of risks and the fact that costs are now higher than expected does not mean there is a subsidy and does not justify a hindsight revision to increase tolls to cover the higher costs. This argument may have had some validity if Kinder Morgan had not shelved the expansion, but once the expansion was shelved due to higher risks, the terms of risk sharing in the original contracts were no longer the standard for determining the marketplace determined tolls because the private investor was unwilling to construct the project on these terms, and the decision of the Government of Canada to proceed without revising the risk sharing is a departure from private marketplace behaviour and represents a decision to subsidize the oil companies using TMP. While the terms of renegotiated contracts that a private sector company may have agreed to as a condition of proceeding are uncertain, a private sector company like Kinder Morgan would have not proceeded unless it was confident of earning its target rate of return on its entire investment.

**Table 1.** TMP capital costs and base fixed toll estimates

	Cost and fixed toll estimates in Trans Mountain 2023 toll application (CAD)	Updated cost and fixed toll estimates 2024 (CAD)
Total cost of TMP expansion	30.9 billion	34.2 billion
Cost used to set tolls	14.7 billion	15.4 billion
Cost not covered by tolls	16.2 billion	18.8 billion
Interim fixed base toll	10.88/b	11.37/b
Full cost-recovery fixed base toll	22.22/b	24.53/b
Subsidy benefit on tolls	11.34/b	13.16/b

Sources: Total 2023 cost estimate of CAD 30.9 billion is from TMC (2023b, p. 13).

The CAD 14.7 billion used to set fixed tolls is the sum of the CPCN-approved cost of CAD 7.4 billion plus the CAD 7.3 billion of uncapped costs incurred subsequent to the CPCN estimate (TMC, 2023b, Attachment 3, Table 3-10). The CAD 16.2 billion cost not covered by tolls is the difference between total costs of CAD 30.9 billion and the CAD 14.7 billion used to set tolls. Interim fixed base toll is from TMC (2023b, Attachment 3, Table 3-1). Full cost-recovery toll is the interim toll of CAD 10.88 plus CAD 0.07 per CAD 100 million of the capital costs of CAD 16.2 billion not included in the rate base for determining tolls. These tolls are the fixed cost portion and do not include the variable toll required to cover operating costs, which vary from about CAD 0.55 to CAD 0.95 per barrel depending on type of oil and delivery location (TMC 2023b, Attachment 1). The updated 2024 cost and toll estimates are from TMC (2024d, p. 4-5), which estimates capital costs at CAD 34.2 billion, with CAD 0.7 billion of the CAD 3.3 billion increase from the 2023 CAD 30.9 billion estimate being uncapped and resulting in an increase in the interim fixed base toll to CAD 11.37. The full cost-recovery toll is the interim toll of CAD 11.37 plus CAD 0.07 per CAD 100 million of the capital costs of CAD 18.8 billion (CAD 34.2 billion – CAD 15.4 billion) not included in the rate base for determining tolls. The actual overrun and allocation between capped and uncapped costs will be determined based on final cost estimates, which may vary from the TMC update estimate. Toll rates also vary from the base toll by product and destination.

4.3 Discounted Cash Flow Analysis

4.3.1 Methodology Overview

A second method to estimate potential subsidies is to conduct a DCF analysis that estimates the NPV of the Government of Canada's investment in TMP. A DCF analysis is a financial feasibility study that estimates the revenues and costs of a project by year, including a return on the capital invested, to determine if a project will generate a profit or loss for the investor. A private investor will only undertake a project or provide a service if the anticipated NPV is greater than or equal to zero, which means that revenue covers all operating and capital costs, including a market return on invested capital. The NPV, therefore, provides a marketplace benchmark to determine if the government is incurring a loss on the project by charging tolls that do not cover its cost and thus providing a subsidy benefit under the WTO definition. If the NPV is negative, then the



government is providing the transportation services below cost, and there is a subsidy equal to the negative NPV.

4.3.2 DCF Based on PBO Model

The PBO (2022) built a DCF model to estimate the NPV of the Government of Canada's investment in TMP in 2022 based on confidential financial data (Table 2). However, many of the parameters, such as project capital costs and completion date, have changed since the PBO's analysis. Therefore, the PBO analysis needs to be updated using data in the sensitivity analysis provided in the PBO report.³

PBO's assumptions for its reference case and revised updated assumptions are summarized in Table 2. The updated assumptions include using the current capital cost estimate of CAD 34.2 billion (TMC, 2024a) and an in-service completion date of May 1, 2024 (TMC, 2024f) instead of the CAD 21.4 billion estimate and the December 31, 2023 start date that was forecast at the time the PBO report was completed.⁴ The increased capital costs will result in higher tolls that reduce the competitive position of TMP to attract spot purchases relative to other pipelines (Table A1). Therefore, the updated parameter on pipeline capacity utilization assumes a decline in spot volumes for the 20% of uncontracted capacity, instead of the near full utilization assumed in the PBO reference case. Two spot volume scenarios are used in the updated estimate: a reduction of 50% and a reduction of 100% in spot volumes, which translates into an 8% and 16% decline in volume, respectively, on the assumption that the forecast used by PBO assumes a 96% pipeline utilization rate.⁵ The updated assumption for the post-contract parameter is that the long-term contracts are not renewed on the same terms when they expire in 2044 due to the weaker market conditions for oil shipments and competition from other lower-cost pipelines.⁶ Unfortunately, the only alternative scenario that PBO provides for non-renewal of the contracts is one in which the tolls are based on cost of service, with no reduction in volumes. Given the likely decline in Western Canadian oil production and shipments over the operating life of TMP (see Appendix A), it is likely that TMP shipping volumes will decline, and tolls will decline after the contracts expire in 2044, but it is not possible to estimate the impact of these changes with the sensitivity ratios provided in the PBO report. The final major parameter in the PBO model is the discount rate. The PBO reference case uses a nominal discount rate of 7.8%, which is at the lower end of

³ While the sensitivity analysis results provided by the PBO can be used to update the NPV estimates, there is the limitation that the sensitivity information provided by the PBO is based on changing only one parameter at a time. Changing multiple parameters at the same time, such as higher discount rates combined with higher capital costs, can compound the impact of the changes, which can reduce the accuracy of the NPV estimates.

⁴ These capital cost and completion assumptions are the current estimates as of July 2024 and any further increases in capital costs will increase the net loss.

⁵ The PBO estimates assume that TM pipeline is near full without defining what nearly full means, so it is assumed that this means the pipeline operates at 96% of design capacity, which is the maximum capacity utilization used in TMP scenarios (TMP, 2024d).

⁶ See Appendix A for more discussion of factors impacting the TMP.



the range of discount rates used in project evaluation.⁷ Therefore, a sensitivity analysis is included using a nominal 12% discount rate, which is the low end of the discount rates used in project evaluation by Kinder Morgan (Allan, 2022; TMC, 2012).

The results show that the NPV based on these updated assumptions using the PBO's DCF model vary from a negative CAD 8.7 billion to negative CAD 18.7 billion (Table 2). These estimated net losses using updated assumptions are significantly higher than the earlier 2022 PBO reference case estimated loss of CAD 600 million. The negative NPV results show that the tolls for TMP are well below the level that would be charged by a private investor to cover costs, indicating that the government is providing a significant subsidy by charging less than the private marketplace would charge for the transportation services.

Table 2. NPV estimates based on PBO model

Project parameter	PBO assumptions	Updated assumptions	PBO's NPV adjustment ratios (CAD billion)	Change in NPV (CAD billion)
Capital costs (CAD billion)	21.4	34.2	0.8/10% change in cost	(4.8)
In-service date	December 2023	May 2024	1.2/year of delay	(0.4)
Pipeline capacity utilization	Near Full (96%)	88% to 80% full	0.5/5% reduction in volume	(0.8) to (1.6)
Post-contract assumptions	Long-term contracts renewed	Long-term contracts not renewed	2.1 less if contracts not renewed	(2.1)
Discount rate	7.8%	7.8% and 12%	1.1/0.5% change in rate	0 to (9.2)
NPV (CAD billion)	(0.6)			(8.7) to (18.7)

Sources: PBO assumptions and PBO adjustment ratios are from PBO (2022). Updated capital cost assumptions are from TMC (2024e, p. 23), and updated completion date is from TMC (2024c). The NPVs of (CAD 8.7 billion) to (CAD 18.7 billion) are the sum of the changes in the NPV plus the original PBO NPV estimate of (CAD 0.6) billion.

4.3.3 Simon Fraser University (SFU) DCF Based on TMC Forecasts

A limitation of using the PBO model to undertake a DCF analysis of TMP is that details of the model assumptions and data inputs are not provided, which makes it difficult to assess its validity and to test a full array of sensitivity analyses, such as lower oil shipping volumes and tolls after 2044, and to accurately test the impact of different discount rates due to the compounding

⁷ See Appendix A for discussion of discount rates.



effect of multiple sensitivity assumptions. To address these constraints, a DCF model has been constructed that allows for more varied and accurate testing of parameters.

The DCF model is constructed using financial data published by TMC. The model is similar to the models used by PBO (2022) and by Toronto Dominion Securities (2018) in their valuations of TMP. The model uses historical financial data on capital costs and revenues as reported by TMC in its annual financial reports and recent financial forecasts provided by TMC to the CER (TMC, 2024d). Details on the data sources and assumptions are outlined in Appendix A.

A wide range of scenarios are tested (see Table A2). Two of these scenarios have been selected to provide the range of the most likely outcomes (Table 3). Scenario 1 assumes that TMP's average capacity utilization is 89% during the period covered by long-term contracts (2024–2044). After the long-term contracts expire in 2044, Scenario 1 assumes that capacity utilization declines to 79% to reflect a modest decline in Canadian oil production, and the tolls are reduced to be competitive with the Enbridge pipeline to maintain TMP's market share. Scenario 1 generates a negative NPV of CAD 11.3 billion. Scenario 2 assumes that TMP is unable to attract spot shipments due to its tolls being higher than alternative pipelines, and when the contracts expire in 2044, the tolls are reduced to be competitive with the Enbridge pipeline, and the volume of shipments declines proportionally with the decline in Western Canadian oil production under the CER net-zero scenario. Scenario 2 generates a negative NPV of CAD 17.9 billion. As in the case of the PBO DCF analysis, the SFU DCF analysis shows that there is a significant loss on TMP operations because tolls are set below the cost of providing the transportation services.

Table 3. NPV estimates of TMP

	Scenario 1	Scenario 2	Mid-point estimate
NPV (2023 CAD billion)	(11.3)	(17.9)	(14.6)

Source:

Note: The more optimistic Scenario 1 (which is Scenario 2e in Table A2) assumes an average 89% capacity to 2044, a modest decline in average utilization to 79%, and a modest decline in tolls to remain competitive with other pipelines from 2044 to 2063. The more pessimistic Scenario 2 (which is Scenario 2h in Table A2) assumes an average 79% capacity utilization from 2024 and 2044, and in 2044, the tolls decline to levels of alternative pipelines and volumes decline proportionate to the decline in Western Canadian oil shipments under the CER net-zero scenario. NPVs are calculated in constant 2023 CAD using a 7% real discount rate as recommended in the Government of Canada cost-benefit guidelines (Treasury Board of Canada Secretariat, 2023). Additional scenario results are provided in Table A4.

4.4 Impact of Sale of TMP on the Subsidy

The Government of Canada has stated that it intends to sell TMP as soon as it is operational (Mundy, 2023). If TMP is sold, the subsidy will continue by charging tolls that do not cover the cost of expanding TMP. The new owner, however, will cover their costs with the below-market tolls because the price that they pay for TMP will be determined by the purchaser's forecast of



the NPV of the net cash flow from the purchase date onward, which will result in the toll revenues being sufficient to cover the operating costs and the return on the purchaser's acquisition cost. While the actual purchase price is uncertain and will vary depending on the purchaser's forecast of future cash flow, assessment of risk and desired return on investment, the estimates of likely purchase prices compared to the Government of Canada's net cost of TMP provided in Table A5 in the Appendix A show that the government will incur a significant loss on its investment in the range of CAD 8.9 billion to CAD 18.0 billion, while oil companies will continue to receive a subsidy in the form of tolls below the cost of building TMP expansion.

4.5 Subsidy Estimate Summary

The alternative methods used to assess potential subsidies provided to the oil sector by TMP all show that there is a significant subsidy benefit (Table 4). While the estimates are not directly comparable due to differences in the approaches, the results of the three different methods show that TMP will have a significant negative NPV because the tolls are below what a private sector company would charge to cover the cost of the transportation services. Further, a sale of TMP to the private sector will continue the subsidy by charging tolls well below cost, and the Government of Canada will absorb the cost of the subsidy as a loss from receiving a sale price below its investment cost in TMP.

Table 4. Subsidy estimate by method

Method	Estimated subsidy (CAD billion)	Estimated subsidy per Canadian household
Cost of service	18.8	1,255
PBO DCF model	8.7 to 18.7	581–1,248
SFU DCF Model	11.3 to 17.9	754–1,195

Source: Estimate per household based on Canadian households in 2021 (Statistics Canada, 2021).



5.0 TMP Subsidy Assessment

Based on the Government of Canada’s fossil fuel subsidy assessment framework, the Government of Canada’s failure to charge tolls that cover the full marketplace costs of financing the purchase and expansion of TMP constitutes an inefficient fossil fuel subsidy. Government ownership of TMP meets criterion (i) of involving a direct transfer of funds (e.g., grants, loans, and equity infusion) and potential direct transfers of funds or liabilities (e.g., loan guarantees) and criterion (iii) of providing goods or services other than general infrastructure and transfers a benefit by providing transportation services below the marketplace cost (Table 5). Further, the subsidy does not meet any of the criteria for an efficient subsidy (Table 6) and is, therefore, deemed an inefficient fossil fuel subsidy based on the Government of Canada’s criteria.

Table 5. Step 1: Assessment of fossil fuel subsidy

Criteria	Meets the criterion
(i) a government practice involves a direct transfer of funds (e.g., grants, loans, and equity infusion), potential direct transfers of funds or liabilities (e.g., loan guarantees)	Yes
(ii) government revenue that is otherwise due is foregone or not collected (e.g., fiscal incentives such as tax credits)	Yes
(iii) a government provides goods or services other than general infrastructure, or purchases goods	Yes
iv) a government makes payments to a funding mechanism, or entrusts or directs a private body to carry out one or more of the type of functions illustrated in (i) to (iii) above which would normally be vested in the government and the practice, in no real sense, differs from practices normally followed by governments or	No
(a) (2) there is any form of income or price support in the sense of Article XVI of GATT 1994, and	No
(b) a benefit is conferred.	Yes

Source: Criteria for defining subsidies from Government of Canada, 2023, Annex 1.

**Table 6.** Step 2: Assessment of fossil fuel subsidy as inefficient

Criteria	Meets the criterion
1. Enable significant net GHG emissions reductions in Canada or internationally in alignment with Article 6 of the Paris Agreement.	No
2. Support clean energy, clean technology, or renewable energy.	No
3. Provide an essential energy service to a remote community.	No
4. Provide short-term support for emergency response.	No
5. Support Indigenous economic participation in fossil fuel activities. ⁸	No
6. Support abated production processes, or projects that have a credible plan to achieve net-zero emissions by 2030.	No

Source: Criteria for defining subsidies from Government of Canada, 2023.

⁸ TMP provides economic benefits to Indigenous communities through benefit agreements, but these agreements are not a direct result of or contingent on the provision of a subsidy for TMP and, therefore, the subsidy cannot be justified on the basis of supporting Indigenous participation. Further, the value of the Indigenous agreements is estimated by TMC (2023b, p. 20) to be CAD 660 million, which represents in the range of only 4% and 8% of the value of the subsidy, so providing the subsidy to TMP is not a cost-ineffective way of supporting Indigenous participation.



6.0 Other Considerations in Evaluating Subsidies

The Government of Canada's financial support for TMP has been justified on the grounds that TMP expansion is necessary to further Canada's national interest by providing a tidewater export facility to increase the price for Canada's oil exports and to expand the Canadian oil sector. According to this rationale, any subsidies provided to TMP could be offset by higher returns to Canada from a stronger oil sector. This public interest rationale for TMP is not listed as a criterion for justifying fossil fuel subsidies in the fossil fuel assessment framework and cannot, therefore, be used to justify the subsidy for TMP under the Government of Canada's fossil fuel subsidy policy. However, this public interest objective has been part of the rationale for supporting the TMP expansion and is worth reviewing.

The standard method for determining whether a government investment or policy is in the public interest is cost-benefit analysis, which assesses all economic, social, and environmental costs to determine if the project or policy is in the public interest (TBCS, 2018, 2023). A cost-benefit analysis of the TMP expansion extends the narrower project DCF financial analysis summarized in Table 3 by including all the additional economic, social, and environmental costs and benefits to estimate the overall net benefit to Canada. A comprehensive cost-benefit analysis is not within the scope of this study. However, a comprehensive cost-benefit study of the TMP expansion was completed using Government of Canada cost-benefit guidelines (Gunton et al., 2021). The results of this study have been updated in Table 7 to include the recent cost estimates for the TMP expansion. The results show that under all likely scenarios, the TMP expansion results in a significant net cost to Canada with a base case net cost of CAD 23.1 billion (Table 7). One of the costs highlighted in the study is the environmental risks of oil spills, which are estimated to have a probability for a pipeline spill of 99.9% and a 43% to 75% chance of an oil tanker spill over a 50-year operating period. The upper bound costs of a major pipeline spill could range between CAD 0.5 and CAD 1.5 billion, and tanker spill damage costs could range between CAD 2.3 and CAD 4.7 billion (Gunton and Broadbent, 2015).⁹ Further, the TMP expansion will increase Canadian GHG emissions, thus increasing future climate impact costs and undermining Canada's climate policy. Therefore, there is no merit to the argument that the subsidy for TMP can be justified or offset by other public interest benefits, such as job creation or higher returns on Canadian oil

⁹ The estimated cost of oil spills in the CBA is lower than these damage costs estimates because the cost in the CBA is the expected value defined as the probability of a spill times the median damage cost estimate discounted to the base year.



production.¹⁰ Further, even if the TMP provided a net benefit to Canada, this does not justify providing a fossil fuel subsidy to the oil sector under the Government of Canada's fossil fuel subsidy policy.

Table 7. Cost-benefit analysis of the TMP

Item	Base case (CAD million)	Sensitivity analysis range (CAD million)
Unused oil transportation capacity on other pipelines due to TMP expansion	(8,141)	(4,176) to (8,141)
Oil price netback increase	0	2,522
Employment	429	429 to 644
Tax revenue	300	300 to 1,436
Electricity	(80)	No Sensitivity
GHG emissions from construction and operation of TMP and marine traffic in defined study area	(246)	(1,279) to (246)
Other air emissions	(121)	No sensitivity
Oil spills	(690)	(1,533) to (61)
Passive use damages from oil spill	0	(2,148) to 0
Sum of net social, economic, environmental costs and benefits	(8,549)	(12,594) to (82)
TMP pipeline operations net cost	(14,584)	(17,909) to (11,258)
Total net cost to Canada	(23,133)	(30,503) to (11,340)

Source: Gunton et al., 2021. All dollar amounts from Gunton et al. (2021) have been updated from 2021 CAD to 2023 CAD using the Canadian consumer price index. The TMP pipeline operations net cost is updated using the data from Table 3 in this report with the base case using the mid-point estimate and the sensitivity estimates using the Scenario 1 and Scenario 2 estimates.

¹⁰ Several studies commissioned by TM (Conference Board of Canada, 2015; TMP, 2023a) purport to show that TMP expansion generates significant benefits for Canada. These studies, however, are economic impact assessments, not cost-benefit studies and they do not assess costs in their analyses and therefore they do not measure the net benefit (benefits-costs). For an analysis of the limitations of economic impact assessment as a measure of benefits see Gunton et al. (2020) and Joseph et al. (2020). Another study by Muse Stancil (2015) alleges there are significant benefits resulting from Canadian producers receiving higher oil prices by using a tidewater port accessing world oil markets. This issue is analyzed in Gunton et al. (2021), who conclude that the TMP expansion is unlikely to result in higher oil prices and any potential benefits of higher oil prices resulting from the TMP expansion are more than offset by other costs as indicated in Table 7.



7.0 Policy Options

The analysis shows that the Government of Canada is providing an inefficient fossil fuel subsidy to the oil sector by charging tolls for transportation on TMP that do not cover the marketplace costs of providing the service. The Government of Canada committed to ending all inefficient fossil fuel subsidies in 2023 and should, therefore, phase out the TMP subsidy consistent with its fossil fuel subsidy policy. The following policy options are offered for consideration:

Do nothing: One option is for the Government of Canada to continue the subsidy for TMP. This option, however, is inconsistent with the Government of Canada's stated policy of eliminating inefficient fossil fuel subsidies, and it would saddle Canadian taxpayers with the cost of providing a subsidy to the oil sector of between CAD 8.7 and CAD 18.8 billion.

Raise tolls to economic levels: A second option is to increase transportation tolls to the levels required to recover the costs of the TMP and generate an NPV equal to zero. Based on the cost-of-service analysis submitted by TMP to the CER, the base rate fixed toll should increase from CAD 11.37 per barrel to CAD 24.53 per barrel (plus the variable toll) to include the full capital cost in the rate base and eliminate the subsidy (see Table 1). Given that TMP has just started operating, raising the toll could recover the full subsidy provided.

While this approach would be the most straightforward way of eliminating the subsidy and is consistent with standard regulatory practice, there are complications. First, because the Government of Canada neglected to update the capital cost estimates in accordance with the contract provisions after the second issuance of the CPCN in 2019 and revise the terms of the contracts to reduce the risks, revising the TMP toll application to increase tolls to cover the full costs of service would face legal impediments related to the transportation contracts that TMP has with the oil companies. Consequently, increasing the tolls to cover the cost of service would require a decision by the CER to revise the interim tolls requested in TMP's applications (TM, 2023b) and set tolls based on the cost of service, as is common practice in utility regulation. Absent the CER taking this action, the Government of Canada would have to issue a directive and/or undertake legislative action to direct the CER to approve tolls based on the cost of service. The second challenge is that setting the tolls at the cost of service would raise tolls even higher than alternative pipelines and would further undermine the competitive position of TMP. Spot shippers would not use TMP, and oil companies who signed the long-term contracts would likely attempt to void the contracts and use other pipelines, which could result in even higher losses for TMP.

Set a levy on oil shipments: A third option is to set a special TMP cost-recovery charge on oil producers. The charge could take the form of a volumetric per barrel or ad valorem levy on Western Canadian oil production or oil shipments on Western Canadian Sedimentary Basin pipelines to recover the subsidy provided to the oil companies on TMP. This type of approach was used in the 1980s when Trans Canada Pipelines faced serious financial difficulties resulting from signing long-term take-or-pay contracts with natural gas producers that it could not honour due



to weaker-than-expected market conditions. Alberta passed the Take-or Pay Cost Sharing Act in 1986 that imposed a levy on natural gas shipments to consumers that covered the potential losses of Trans Canada on its take-or-pay contracts and allowed it to make its regulated return on the operation of its pipeline (Black, 1989; Hancher, 1997). Following Alberta's example, a similar "TMP cost-recovery" levy could be applied to oil shipments on TMP or to all oil pipeline shipments from Western Canada to cover the entire loss on the government's investment in TMP and in effect remove the subsidy to oil producers. A levy in the range of CAD 1.00 to CAD 2.00 per barrel over 10 years¹¹ (beginning in 2025) applied to all Western Canadian oil shipments would be sufficient to cover the full loss to the taxpayer on TMP. Given that the reports commissioned by TMC conclude that all Canadian oil producers would benefit from the TMP expansion (Muse Stancil, 2015), applying a levy to all Western Canadian oil shippers who allegedly receive a benefit from the expanded pipeline could be justified as a way of covering the losses. The specific structure and magnitude of a TMP cost-recovery levy would require additional research and discussions with the oil and pipeline sector and other stakeholders.

¹¹ A levy of CAD 1.00 to CAD 2.00 per barrel applied to all Western Canadian oil supply shipments based on the CER (2023) Total Supply Available for Export – Current Measures, scenario from 2025 to 2034 would generate an NPV of between CAD 10.7 and CAD 21.4 billion (2023 CAD), using a discount rate of 7%. The levy could be adjusted in terms of amount and end date to recover the loss on TMP.



8.0 Conclusion

The Government of Canada has committed to eliminating inefficient fossil fuel subsidies and public financing of the fossil fuel sector. To date, the government has not assessed potential subsidies provided through the purchase and expansion of TMP in the context of its fossil fuel subsidies assessment policy. This report has addressed this omission by using the Government of Canada's fossil fuel assessment framework to review potential subsidies provided to the oil sector through the TMP. The analysis concludes that

1. The failure to set tolls to cover the costs to expanding and operating TMP constitutes an inefficient fossil fuel subsidy based on the Government of Canada's fossil fuel assessment framework criteria and there is no public interest rationale for this subsidy.
2. The magnitude of the subsidy ranges between CAD 8.7 and CAD 18.8 billion, which is equivalent to between CAD 581 and CAD 1,255 per Canadian household.
3. There are several options for phasing out this subsidy, with the most feasible option being to set a TMP cost-recovery levy on oil production or oil shipments from Western Canada to require oil companies to cover the full costs of TMP.



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Appendix A. Discounted Cash Flow Analysis of the Trans Mountain Pipeline

Conducting a discounted cash flow (DCF) analysis of the Trans Mountain Pipeline (TMP) requires forecasting future revenues and costs for each year for the operating life of the pipeline and calculating the net present value (NPV) based on the following formula:

$$NPV = \sum_{t=0}^T \frac{CF_t}{(1+r)^t}$$

CF_t = net cash flow in period (year) t

T = number of periods (years)

r = discount rate

Assumptions regarding the following five key parameters significantly impact the estimated NPV for TMP: capital costs; completion date; volume of shipments; tolls for shipments; and discount rate.

Capital Costs and Completion Dates

Estimated capital costs have gone through a series of upward revisions from the original estimate of CAD 5.4 billion (Parliamentary Budget Office [PBO], 2020, p. 12) to the current estimate of CAD 34.2 billion (CDIV, 2024, p. 18). Estimated in-service dates have gone from the original estimate of 2017 (Trans Mountain Pipeline ULC [TMC], 2013) to the actual in-service date of May 1, 2024 (TMC, 2024f). While there may be further revisions to capital costs, future revisions should be relatively small now that TMP expansion is complete.

Volume of Shipments and Tolls

The revenue estimate in the DCF for TMP is based on the volume of shipments times the toll per barrel shipped. A key market condition that will impact the volume of shipments on TMP is Western Canadian oil production, which in turn will be determined by world oil demand and the competitive position of Canadian producers. The International Energy Agency's (IEA's) most recent World Energy Forecast (IEA, 2023) assesses three world oil demand scenarios: the stated policies scenario (STEPS), which is based on current climate policies, the announced pledges scenario (APS), which is based on current policies plus announced climate policies and pledges, and the net zero emissions scenario (NZE), which is based on achieving net-zero emissions by 2050. Under all three scenarios, oil demand peaks in the 2020s and remains relatively constant in STEPS, declines by 43% in APS by 2050, and declines by 75% in the NZE scenario by 2050. BP's forecast (2023) has three scenarios like the IEA but with a somewhat higher decline of



25% in the current policies scenario by 2050, a decline of 57% in the accelerated scenario and a decline of 79% in the net-zero scenario.

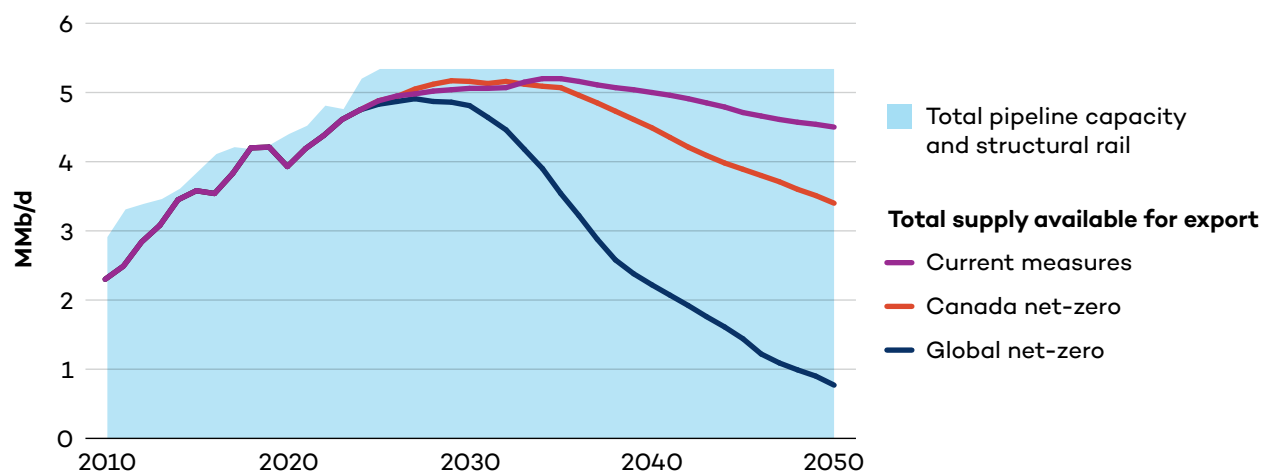
While there remains uncertainty regarding future oil demand, the IEA and BP forecasts show that the financial analysis of TMP needs to incorporate the high probability of declines in oil demand from 2030 to 2050. Canada, as one of the higher-cost world producers (Gunton et al., 2021; ROGTEC, 2021), will be impacted by this decline in world demand, and Canadian oil production and need for pipeline capacity will likely fall over the coming decades. The Canadian Energy Regulator (CER) (2023), for example, provides a scenario under a net-zero climate policy framework that forecasts a decline in Western Canadian oil shipments of 53% from 2024 to 2040 and 84% by 2050. The CER also provides a scenario with Canada being the only country adopting a net-zero climate policy and a scenario that is based on no change in climate policies that show a more modest decline from 2024 to 2050. All three of the CER scenarios show excess pipeline capacity (Figure A1).

An additional challenge facing TMP is that the higher costs of construction have resulted in tolls on TMP being higher than alternative pipelines. TMC estimates show that based on a CAD 30.9 billion construction cost, transportation on TMP would exceed the costs of transportation on Enbridge by between CAD 1.90 and CAD 9.19 per barrel depending on the market destination and contract terms (Table A1). Based on the more recent estimates of construction cost of CAD 34.2 billion, the cost disadvantage faced by TMP would increase by a further CAD 0.49 per barrel to between CAD 2.39 and CAD 9.68 per barrel.

The impact of these market conditions on TMP's future finances can be divided into two periods: the period covered by TMP's long-term transportation contracts from now to 2044 and from 2044 onwards after the expiry of the long-term contracts. During the period to 2044, the tolls and 80% of the volume are set by the long-term contracts, with the remaining 20% of volume available for spot shipments determined by market conditions. Oil companies with long-term contracts covering 80% of TMP capacity will be legally obligated to ship on TMP, but spot shippers will choose the lowest-cost option. Given the toll disadvantage of TMP and assuming there is available pipeline capacity, as forecast by the CER (2023), oil companies are likely to choose the lower-cost option of transportation on Enbridge as opposed to spot shipments on TMP. This makes it very challenging for TMP to attract spot shipments for the 20% of uncontracted capacity with the result that it is unlikely that TMP will be close to fully utilized from 2024 to 2044. When the long-term contracts expire in 2044, TMP will lose its contracted shipments and will be forced to negotiate new tolls for its entire capacity in a market characterized by declining demand for oil pipelines and lower-cost transportation alternatives on other pipelines (Table A1). Under these conditions, TMP will have to reduce its tolls to be competitive with other pipelines, and even with the reduced tolls, TMP will likely experience a decline in shipping volumes due to the forecasted likely decline in world oil demand and Canadian oil production (Figure A1).



Figure A1. Western Canadian oil exports and pipeline capacity



Source: CER, 2023, p. 90.

Table A1. Tolls for alternative Canadian pipelines to selected markets

Pipeline/destination	Type	Toll (CAD)
TMP/LA	Heavy 20yr	14.85
TMP/ LA	Heavy spot	17.65
TMP/China	Heavy 20yr	21.30
TMP/China	Heavy spot	24.10
Enbridge/United States Gulf Coast (USGC)	Heavy 20yr	12.11
Enbridge/USGC	Heavy spot	15.75
Keystone/USGC	Heavy	12.42
Toll Premiums		TMP Premium
TMP China/Enbridge USGC	Heavy 20yr	9.19
TMP LA/Enbridge USGC	Heavy 20yr	2.74
TMP China/Enbridge USGC	Heavy spot	8.35
TMP LA/Enbridge USGC	Heavy spot	1.90

Source: TMC, 2024b, Table 2.15-1, Table 2.15-10, and Table 2.15-11. Tolls are 2023 average toll estimates in Canadian dollars per barrel. TMP tolls include pipeline tolls plus tanker tolls. TMP tolls will be about CAD 0.49 per barrel higher than these estimates because these estimates are based on the CAD 30.9 billion, not the current CAD 34.2 billion cost of the TMP expansion (TMC, 2024a, p. 6).



Discount Rate

A final factor impacting the DCF analysis of TMP is the discount rate, which measures the rate of return required by the investor to undertake the project. There is a variation in discount rates used in project feasibility studies. The Canadian cost-benefit guidelines (Treasury Board of Canada Secretariat, 2023) currently recommend a real discount rate (net of inflation) of 7%, which is based on the estimated returns that the funds would have earned in other investments in the Canadian economy. PBO (2020) uses a nominal discount rate of 8.5% (based on the estimated cost of capital) in its 2020 report and uses a nominal discount rate of 7.8% in its 2022 report (PBO, 2022). In its evaluation of the market value of Trans Mountain for Kinder Morgan, TD Bank uses a nominal discount rate of 6% to value the existing pipeline and a rate of 10% to value the expanded pipeline (Kinder Morgan, 2018). Kinder Morgan's nominal discount rate for evaluating projects is between 12% and 15% (Allan, 2022; TMC, 2012; Kinder Morgan, 2023, p. 64), and TMC estimates that the average return on equity for relevant pipelines is 14.1% (TMC, 2024d, p. 8). A recent study of over 3,000 utilities concluded that the rate of return on the rate base averaged 9.6%, and the rate of return on equity averaged just over 12% (Werner & Jarvis, 2022). These nominal rates vary from 7.8% to 15%, and, as the PBO (2022) report shows, different discount rates can have a significant impact on the estimated NPV.

TMP DCF Scenarios

A number of alternative TMP financial scenarios have been developed (Table A2). Scenario 1 is the reference scenario used to generate the other scenarios. The financial data and sources used in the reference scenario (Scenario 1) are provided in Table A3. This reference scenario, which assumes 96% capacity utilization, is highly unlikely due to the escalation in capital costs and tolls that have undermined TMP's competitive position and the forecast decline in world oil demand over the coming decades. Another eight scenarios are developed based on the reference scenario to test alternative assumptions regarding volumes and tolls over the operating life of TMP to 2063. All scenarios are the same from 2018 to 2023 based on financial data reported by TMC (2020, 2022, 2024). For the period 2024 to 2043, there are three alternative assumptions: (1) spot shipments are nearly fully utilized; (2) spot shipments decline by 50%; and (3) there are no spot shipments. From 2044 to 2063 there are several scenarios involving reductions in shipping volumes and tolls. The NPVs for all scenarios are provided in Table A4. NPVs are all calculated for the year 2023 in both constant 2023 dollars (with real discount rates of 7% and 10%) and nominal dollars (with discount rates of 10% and 12%). Under all scenarios, TMP generates a negative NPV ranging from (CAD 7.8) billion to (CAD 24.8) billion.

**Table A2.** Summary of TMP scenarios

Scenario	2018–23	2024–43	2044–68 (post contracts)
1	Actual	TMC CER 4.1b.1 forecast (96% capacity utilization)	Continuation of 2043 net cash flow to end of forecast
2a	Actual	Scenario 1	Scenario 1 with 18% toll reduction to compete with other pipelines after TMP contracts end. Reduction based on ratio between 2023 Enbridge long-term toll to USG (CAD 12.11) to TMP long-term to L.A. (CAD 14.85)
2b	Actual	Scenario 1	Scenario 1 with 43% toll reduction to compete with other pipelines after TMP contracts end. Reduction based on ratio of Enbridge long-term toll to USG (CAD 12.11) to TMP long-term heavy toll to China (CAD 21.30) plus volume decline proportional to the overall decline in Canadian production under the CER net-zero supply scenario, which declines by 34% in 2044 relative to 2024 and declines each year to 16% of 2024 production in 2050, after which it is assumed production volumes remain stable
2c	Actual	Scenario 1 with 50% spot volume reduction (89% capacity utilization)	Scenario 1 with 100% spot volume reduction (79% capacity utilization) to reflect lower demand for pipeline capacity
2d	Actual	Scenario 1 with 100% spot volume reduction (79% capacity utilization)	Scenario 1 with 100% spot volume reduction (79% capacity utilization)
2e	Actual	Scenario 1 with 50% spot volume reduction	Scenario 2c plus 18% toll reduction as per Scenario 2a
2f	Actual	Scenario 1 with 50% spot volume reduction	Scenario 2c plus 43% toll and volume reduction as per Scenario 2 b
2g	Actual	Scenario 1 with 100% spot volume reduction	Scenario 2c plus 18% toll reduction as per Scenario 2a



Scenario	2018–23	2024–43	2044–68 (post contracts)
2h	Actual	Scenario 1 with 100% spot volume reduction	Scenario 2c plus 43% toll reduction and volume reduction as per Scenario 2 b
2i	Actual	Scenario 1 with 100% spot volume reduction	TMP shut down

Source: Author.

Table A3. TMP cash flow assumptions Scenario 1 (CAD million)

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2043
EBITDA	60	194	188	181	187	189	1,407	2,546	2,614	3,979
Capital Investment	4,678	1,057	3,131	4,962	8,467	8,905	2,261	250	50	85
Net Cash Flow	-4,618	-863	-2,943	-4,781	-8,280	-8,716	-854	2,296	2,564	3,894

Sources: 2018 to 2023 EBITDA from TMC (2020a, 2022b, 2024g) and cash capital investments estimated from TMC (2020b, 2022a, 2024e). 2024 to 2043 estimates for EBITDA and capital investments are from TMC (2024d) Scenario CER 4.1b.1. Trans Mountain expansion completion cash cost estimate of CAD 1.9 billion from Canadian Development Investment Corporation (2024, p. 25) has been added to capital costs for 2024. Net cash flow is EBITDA minus capital investment.

Table A4. NPV estimates for scenarios

Scenario	NPV (nominal CAD billions, 10%, discount rate)	NPV (nominal CAD billion, 12% discount rate)	NPV (2023 CAD billion, 7% discount rate)	NPV (2023 CAD billion, 10% discount rate)
1	(9.91)	(16.42)	(7.88)	(18.49)
2a	(14.33)	(19.12)	(13.38)	(21.06)
2b	(10.81)	(16.98)	(9.00)	(19.02)
2c	(11.91)	(20.48)	(10.18)	(19.95)
2d	(14.90)	(20.48)	(13.38)	(22.48)
2e	(12.78)	(18.45)	(11.26)	(20.46)
2f	(15.38)	(20.00)	(14.51)	(21.93)



Scenario	NPV (nominal CAD billions, 10%, discount rate)	NPV (nominal CAD billion, 12% discount rate)	NPV (2023 CAD billion, 7% discount rate)	NPV (2023 CAD billion, 10% discount rate)
2g	(15.77)	(21.02)	(14.46)	(22.99)
2h	(18.54)	(22.71)	(17.91)	(24.60)
2i	(18.92)	(22.94)	(18.37)	(24.82)

Source: Author.

TMP DCF Sale Scenarios

The Government of Canada has stated that it intends to sell TMP as soon as it is operational. The selling price will be determined by the purchaser's estimate of future cash flows, the purchaser's discount rate, and the assessment of future risk. If the purchase was made at the end of 2024, a private sector purchaser would estimate the NPV of the net cash flow from 2025 onward. While it is uncertain what discount rate and cash flow forecast a private purchaser would use to value TMP, it is possible to provide a likely range of estimates using scenarios developed in Table A2. The first scenario uses the more optimistic assumptions of Scenario 2e (Table A2) and a discount rate of 10% using nominal dollars, which is the low end of discount rates used by private sector utility investors such as Kinder Morgan to evaluate investments. The second scenario uses the more pessimistic assumptions of Scenario 2h and a nominal discount rate of 12%, which is in the mid-range of discount rates used by Kinder Morgan. The purchase price under the pessimistic assumptions would be CAD 17.6 billion, while the purchase price under the more optimistic assumptions would be CAD 26.6 billion (Table A5). This provides the likely range of the potential selling price of TMP. The estimate of the net government of Canada investment in TMP is based on the net cash flow data in Table A4 to the end of 2024 carried forward at a 5% rate to reflect the estimated interest costs incurred (Canada Development Investment Corporation (CDEV), 2024, p. 27). Under these assumptions, the net cost of the Government of Canada's investment to the end of 2024 is CAD 35.5 to CAD 35.6 billion. The estimated net cash loss on the Government's investment under these assumptions ranges from CAD 8.9 billion to CAD 18.0 billion.

**Table A5.** Government loss on sale of TMP

	Scenario 1 (2023 CAD billion)	Scenario 2 (2023 CAD billion)
NPV of government investments in TMP up to December 31, 2024	(35.5)	(35.6)
Sale price January 1, 2025	26.6	17.6
Net loss to government	(8.9)	(18.0)

Source: Author.

Scenario 1: NPV of government investment is NPV of net cash flow from the purchase in 2018 to the end of 2024 in nominal CAD using a cost of capital of 5%, and selling price is NPV of net cash flow from 2025 to 2063 based on assumptions of Scenario 2e in nominal dollars using a 10% discount rate.

Scenario 2: NPV of government investment is NPV of net cash flow from the purchase in 2018 to the end of 2024 in nominal CAD using a cost of capital of 5%, and selling price is NPV of net cash flow from 2025 to 2063 based on assumptions of Scenario 2h in nominal dollars using a 12% discount rate.

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Head Office

111 Lombard Avenue, Suite 325
Winnipeg, Manitoba
Canada R3B 0T4

Tel: +1 (204) 958-7700

Website: www.iisd.org

X: @IISD_news



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