Global Economic Policy Lab

Keystone XL Profitability Analysis: 2023-2030

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- President Biden revoked the Presidential Permit for Keystone XL on his first day in Office.
- Premier Kenny claimed over CAD$32B in lost revenue and loss of CAD$1.5B in project investment.
- GEPL forecasts that due to an average WCS oil price USD$50.95 till 2030, cancelling Keystone XL saves the Canadian taxpayer USD$19.2B over the next decade.
- Oil prices will remain low in the long-term due to carbon taxes, clean energy transitions, and widening production/consumption spread.

Few infrastructure projects grabbed as many headlines in the last fifteen years as the proposed fourth stage of the Keystone Pipeline System, Keystone XL. Owned by TC Energy, it intended to transport crude oil from Alberta to the US Gulf Coast. Proponents of the pipeline argued that transportation upgrades are essential to the competitiveness and prosperity of the Canadian economy. Opponents raised concern over the fragility of natural ecosystems on route, indigenous land rights, and climate change. In line with regulatory sparring from successive US presidents since 2008, President Biden delivered the knock-out blow to Keystone XL, revoking the pipeline's Presidential Permit on his first day in office.

President Biden's action prompted an immediate response from Alberta Premier Jason Kenney. Premier Kenney claimed CAD$30B in lost revenue and CAD$2.4B reduction in Canada's annual GDP. Business and political opposition in Alberta stems from the provincial government's now needless CAD$1.5B project investment. It is unclear how the Alberta Government arrived at this economic valuation. The story of opacity extends to many of the financial arrangements made with TC Energy to support the pipeline's development.

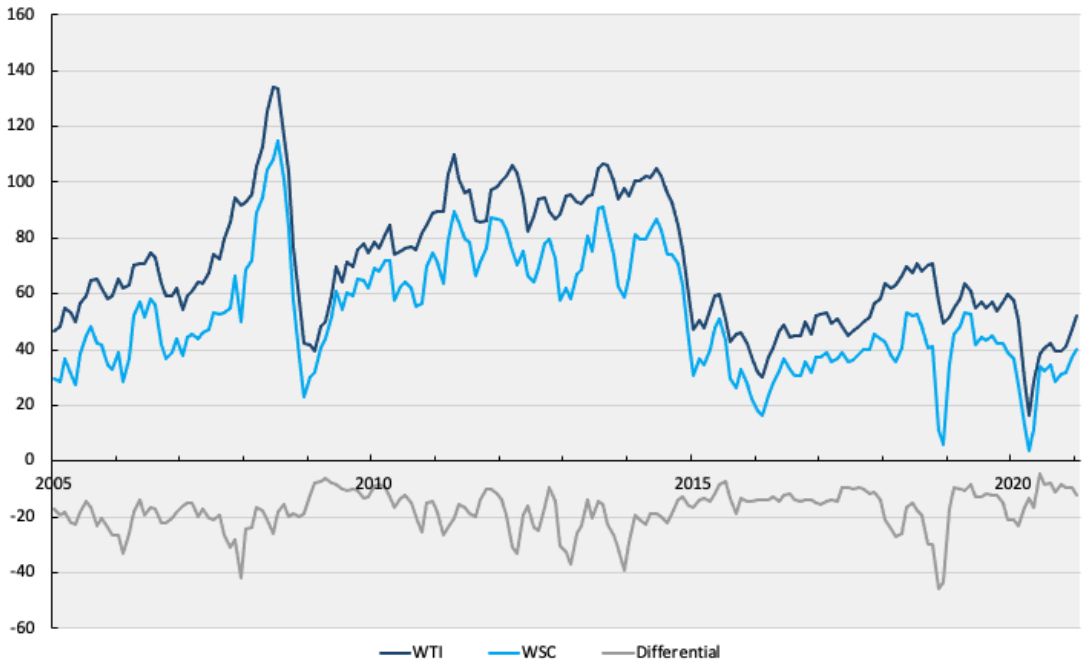
We test how profitable Keystone XL would really be for Canada.

Oil Price Differentials and Keystone XL's Access to the Gulf Coast

Knowledge of global oil prices and their underlying dynamics is critical to assessing Keystone XL's financial viability. Three main features determine prices in the oil market: (1) product quality, (2) marketability, and (3) logistics. Quality refers to the type of crude oil, light or heavy, and is the least significant price factor. Marketability refers to supply and demand in the region of sale. Logistics refers to the transportation costs of getting the oil to its purchaser. The industry refers to differences between these prices as oil price differentials.

Western Canadian Select (WCS), the benchmark price used for Alberta's oil sand projects, sells at a near USD$10 discount compared to the American benchmark West Texas Intermediate (WTI). At present Midwestern refineries operating close to capacity receive WCS via pipelines outside of the Keystone System. As a result, oil sold here faces a steep discount due to poor marketability. In contrast, the US Gulf Coast (USGC) is the world's largest market for heavy, crude oil, offering far superior marketability to the Midwest. However, Western Canada currently has limited pipeline access to this oil market. As a result, Albertan oil sand projects have been sending oil they cannot sell at a reasonable price in the Midwest to the USGC via rail - a significantly more expensive transportation method than pipelines.

Figure 1. Historical Oil Price Comparison, $USD/b



Source: EIA, Alberta Energy, GEPL calculations

The Keystone XL pipeline, if constructed, would carry a maximum of 830,000 barrels per day (BPD) of heavy crude from Alberta's oil sands to refineries in the USGC for final sale. This would remedy the poor marketability and logistics of WCS by providing access to a more favourable market at a lower cost than the current rail transit method. Potentially, this project could have reduced the price differential between WCS and WTI by improving market access to the USGC.

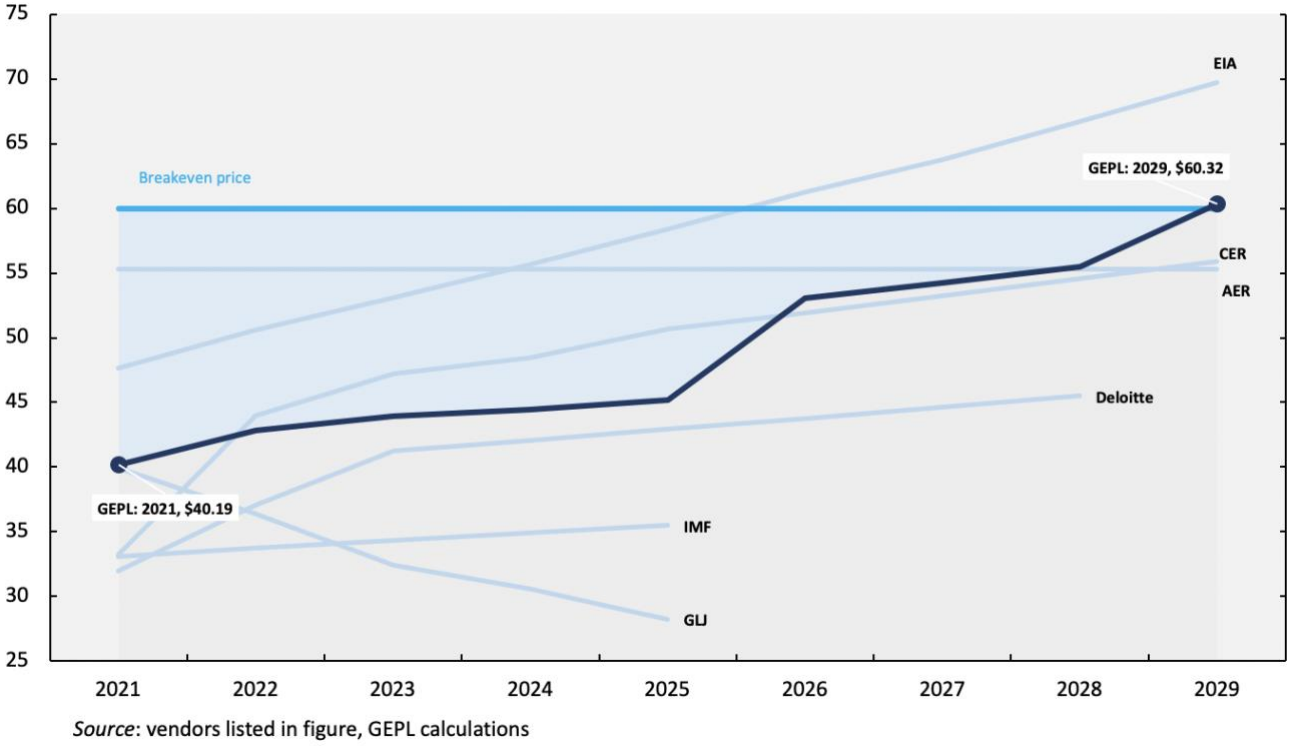
Breakeven Pricing for Oil Sands Projects

The profitability of the Keystone XL pipeline further depends on the breakeven price of oil production in Alberta. Different types of oil extraction have vastly different breakeven price levels. According to the Alberta Energy Regulator, 80% of Alberta's oil sands require in-situ extraction. Our analysis considers the price per barrel (/bbl) necessary to support in-situ bitumen extraction from oil sand projects in Alberta.

In-situ oil projects report a range of breakeven prices with yearly variation. Analysis conducted by the Canada Energy Research Institute projects the breakeven price for in-situ bitumen at USD$63.50/bbl. Alternatively, a 2019 economic study by the Alberta Government proposed a spread of breakeven prices from USD$45-$85/bbl. The US Department of State's 2019 Final Supplemental Environmental Impact Statement for the Keystone XL Pipeline estimated a range between USD$47-66/bbl. Given these estimates, we conservatively assume USD$60 as the breakeven price for new oil sand projects in our financial analysis.

GEPL WCS Oil Forecast (2021-2029)

Figure 2. WCS 10-Year Price Projection, $USD/bbl



Source: vendors listed in figure, GEPL calculations

Table 1. WCS Price Projections, $USD Breakeven Price: $60									
	2021	2022	2023	2024	2025	2026	2027	2028	2029
Deloitte	31.94	37.01	41.22	42.04	42.90	43.76	44.61	45.51	
Alberta Energy Regulator	33.25	44.00	47.20	48.42	50.67	51.95	53.24	54.57	55.92
Canada Energy Regualtor	55.28	55.28	55.28	55.28	55.28	55.28	55.28	55.28	55.28
GLJ	39.95	36.37	32.43	30.59	28.22				
IMF	33.05	33.74	34.32	34.88	35.48				
EIA	47.68	50.60	53.07	55.67	58.40	61.23	63.74	66.71	69.76
Breakeven	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00
Munk GEPL Price Forecast	40.19	42.83	43.92	44.48	45.16	53.05	54.22	55.52	60.32

Economic benefits of the pipeline, if realized, will materialize over the medium- to long-term. Currently, the market is experiencing a sustained period of low oil prices. Numerous factors influence this, including pandemic induced economic slow-down, massive oversupply, growing preferences for clean fuels, and output decisions from oil producers. To evaluate Keystone XL's profitability, we forecasted Western Canadian Select's BBL price between 2021-2029 (Figure 2; Table 1). We developed a composite pricing model based on the medium-term outlooks of various industry authorities: Deloitte, Alberta Energy Regulator, Canada Energy Regulator, GLJ, International Monetary Fund, and Energy Information Administration.

Our simple profitability model has three core assumptions:

1. A constant WCS discount rate of 26.3% based on the average price differential with respect to WTI from 2005 to 2020
2. A constant USD/CAD exchange rate of 0.745 based on the central bank's average for 2020
3. Keystone XL begins to operate at full capacity in 2023 (830,000 barrels per day)

Table 2. Operating Losses *Breakeven Price $60.00*							
	2023	2024	2025	2026	2027	2028	2029
Barrels per day (Thousands)	830	830	830	830	830	830	830
Projected Oil Price (USD$)	43.92	44.48	45.16	53.05	54.22	55.52	60.32
Daily Loss at Capacity (Millions USD$)	13.35	12.88	12.32	5.76	4.80	3.72	-0.26
Annual Loss (Billions USD$)	4.87	4.70	4.50	2.10	1.75	1.36	-0.10
Total Loss by 2029 (Billions USD$)	**19.19**						

We predict the average price of WCS/bbl to be USD$50.95 from 2023-2029. At our breakeven price assumption of USD$60.00, we forecast losses of USD$19.19 Billion by 2030 (Table 2). The first profitable year will be in 2029, where the project would turn an operating profit of USD$100 million. WCS would need to be priced 17.76% higher for the project to break-even under these pricing assumptions.

Persistent low oil prices are a double-edged sword. On the one hand, Canadian producers require cheaper ways to get oil to the market and reduce the price differential between WCS and WTI - something that

Keystone XL promised. On the other hand, low prices make vast investments in oil transportation infrastructure unprofitable and unattractive.

Our model's losses are likely to be inflated because Canada would not pump oil at capacity under these pricing circumstances. However given GEPL's WCS price forecast, it makes more financial sense to operate within Canada's existing oil transportation infrastructure: Railway, Enbridge 3, and the Transmountain Pipeline.

Our model is limited in that it only provides price forecasts for the next nine years. In reality, oil sands projects can last as long as 50 years. It is plausible that long term economic benefits outweigh the losses that keystone would incur this decade. This is unlikely given the momentum of global climate change policies and carbon taxes.

Scenario Outlook - Long-term Fundamentals Approach

Projecting long-term commodity price is complex - underlying market fundamentals and technical elements dictate pricing. The literature on forecasting oil prices is twofold: one branch looks to speculative future prices under the belief that market participants foresee and influence the real economy; the second approach projects using changes in inventory, production and macroeconomic fundamentals, and exchange rates.

Oil derivatives markets affect the real price of oil in the physical market. Due to oil derivatives' speculative nature and despite the improved understanding of oil markets, oil prices are prone to exogenous shocks. As one study concludes: the one-month oil supply elasticity is nearly 0, such that oil demand shocks are the dominant driver of the real price of oil.

Amid the recent Texas energy crisis, oil prices rallied where WTI futures hiked above USD$60/bbl. Besides WTI commanding a higher price point due to higher quality and closer market access, the differential between WCS and WTI can compress when the latter futures plummet. As WTI falls, the WSC differential tends to tighten - a purely technical movement.

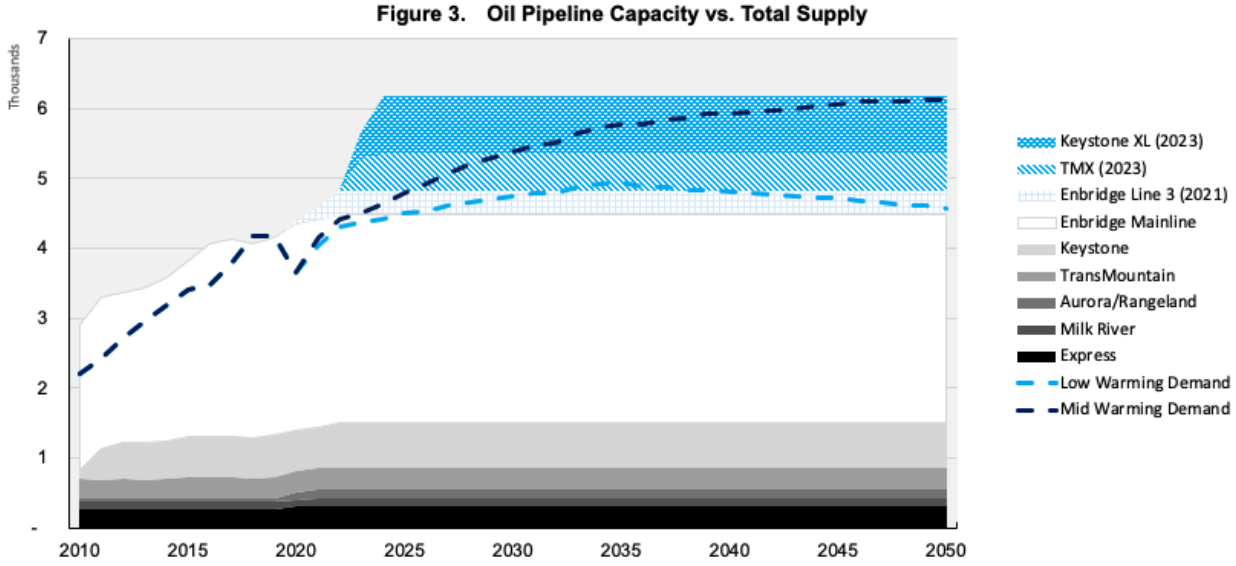
Due to the pandemic, Canadian producers have slashed capital spending and output due to weakened demand. Given Canada's pledge in December 2020 to meet the Paris Agreement's net-zero emissions target by 2050, a low warming scenario is probable. Under this assumption, policymakers will increasingly commit to more stringent and ambitious climate change and energy transition policies. Further, technological developments and growth make decarbonization and renewable energy production more scalable, ultimately

limiting global warming to 1.5 degrees Celsius. Canada's national policies to raise the carbon price by 566%, from CAD$30 to CAD$170 per tonne within a decade, already reflect these imperatives.

Several Canadian premiers openly question the constitutionality of the Federal Government's carbon tax direction. Before the announced cancellation, Keystone XL's parent organization, TC Energy, claimed it would buy carbon credits from electricity providers to meet net-zero commitments. Canada's oil and gas sector and its largest emitters will face steeper operating costs as we advance, directly impacting long-term profitability. By 2050, Alberta will have to accept federal legislation. Likewise, the low warming scenario will diminish overall oil demand, thereby sustaining low oil prices in the long-term.

Projections to 2050

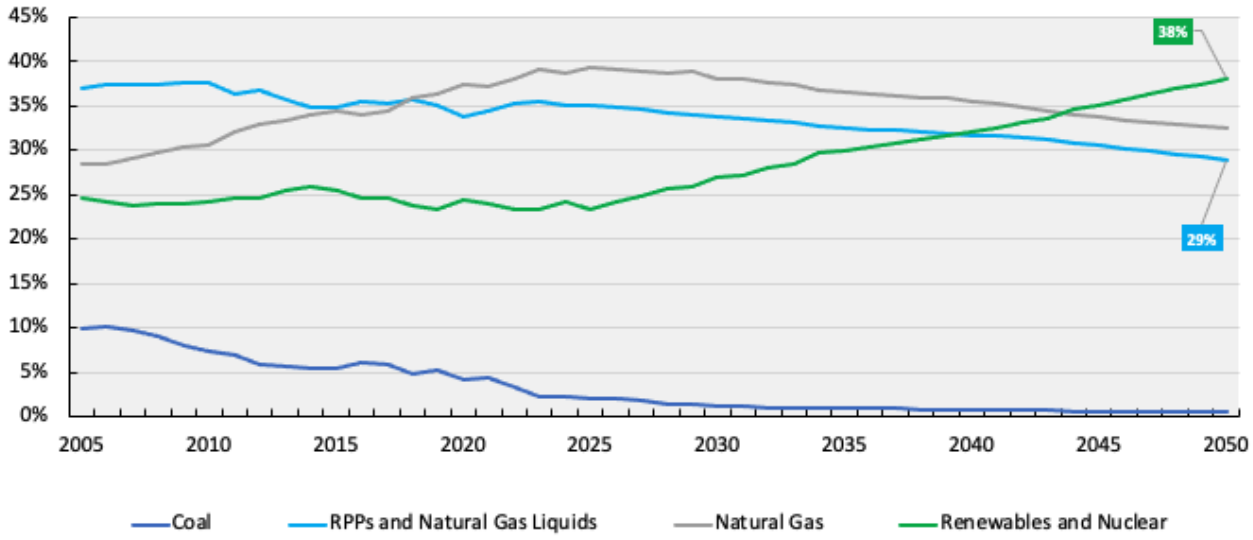
Figure 3. Oil Pipeline Capacity vs. Total Supply



Source: Canada Energy Regulator, GEPL calculations

Canadian oil production capacity exceeds demand (figure 3). Consequently, excess capacity raises concerns for the necessity of Keystone XL's added transport volume. With the addition of Keystone XL Pipeline capacity would grow by 50% from 2020 to 6.2 MMbbl/d in 2050; crude oil available for export grows from 4.2 MMbbl/d in 2019 to a projected 4.9 MMbbl/d in 2035 before declining to 4.6 MMbbl/d by 2050. Keystone XL and other capacity additions would significantly outstrip crude oil availability by 1.3 MMbbl/d.

Figure 4. Share of Energy Use by Type
Low Warming, Canada



Source: Canada Energy Regulator, GEPL calculations

Relative to other oil transport pipelines, Keystone XL will be the most under-utilized given a full capacity that far exceeds TMX or Enbridge lines. In the medium-term, we project Canadian energy production to transition away from fossil fuels towards renewables and nuclear, which will likely grow by 10+% within the projection period. In contrast, refined petroleum products and natural gas liquids drop by nearly 10% within the same timeframe. We expect exports to other developed/OECD countries to decrease, given that most have recommitted to the Paris Agreement emissions targets and, as a result, are steering towards more renewable energy production.

Summary

In essence, based on macroeconomic fundamentals of the widening pipeline capacity/demand spread and low WSC price projections, it would have been a poor fiduciary decision to follow-through on Keystone XL in the short, medium, and long-term. Despite Alberta's claims about the huge losses dealt to the Canadian public by the cancellation of the project, it could turn out to be a blessing in disguise for the taxpayer saving over USD$19 billion this decade. While oil prices are currently low due to the pandemic, and may rebound, we forecast that government policy and changing demand patterns will place continual downward pressure on oil prices.