Joint Economic Committee
Republicans
Representative Kevin Brady
Chairman

REPUBLICAN STAFF ANALYSIS

Keystone XL—A Key Addition to North America's Infrastructure

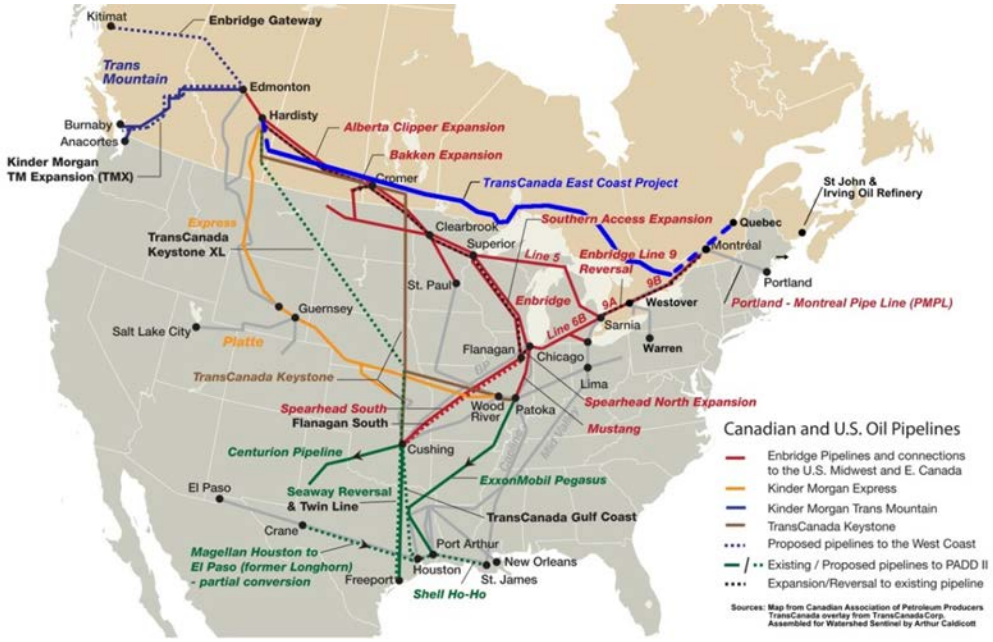
The Pipeline would directly link the World's largest Refining Center to the World's third-largest Oil Reserves

February 10, 2015

INTRODUCTION AND SUMMARY

The Keystone XL pipeline is as important an infrastructure project as there has been in a long time. It would connect the world's largest refining center on the U.S. Gulf Coast to the world's third largest crude oil reserves in Canada and the second-largest U.S. reserves along the way. It would feed into one of the world's largest crude oil trading hubs in Cushing, Oklahoma where the internationally important West Texas Intermediate (WTI) benchmark price is determined. And, it would interconnect with a U.S. pipeline network that could offer potential alternative routing options.

Figure 1



However, President Obama has said that "Allowing the Keystone pipeline to be built requires a finding that doing so would be in our nation's interest. And our national interest will be served only if this project does not significantly exacerbate the problem of carbon pollution." This position focuses the decision on the higher rate of greenhouse gases (GHG) that oil sands production generates compared with most conventional crude oil

There is meaningful relief for the United States from overseas oil dependence:

- ***Canada (not Saudi Arabia) is the largest source of imported oil by far.***
- ***U.S. domestic oil production has surged.***

Adapting infrastructure now is a priority.

- ***Pipelines are the cleanest, safest way to ship crude oil over land and railroads are not.***
- ***Holding up the Keystone XL has boosted railroad expansion, which defeats the objective of lowering GHG emissions.***
- ***The U.S. State Department's study of Keystone found no reason to block the construction permit.***

production and implies that the Keystone project with a Canadian throughput capacity of 730,400 barrels per day (b/d) holds sway over Canadian oil sands output.[1]

The Keystone project does not control how much oil will be produced from the Canadian oil sands.

The rate of Canadian oils sands production, meanwhile, has increased by 780 thousand barrels per day (b/d) since 2008 when TransCanada first applied for the federal permit to build the Keystone XL.[2] In this year's State of the Union Address, the President proudly touted the relatively high level of U.S. domestic oil production, which has increased by nearly 4 million b/d since 2008. The U.S. and Canadian crude oil transport infrastructure has been expanding and adapting to accommodate the crude oil production increases, and the President even appeared personally on March 22, 2012 in Cushing, Oklahoma to show support for construction of the southern leg of the Keystone that reaches to the Gulf of Mexico.

The White House is singling out a segment of the Keystone project for its supposed effect on GHG emissions, which it does not fully explain nor place in the proper context.

These developments are at odds with the White House singling out the remaining segment of Keystone needed to complete its path based on a decision criterion that could override the benefits, no matter how large, due to any increase in GHG emissions, no matter how small, given that the term "significantly exacerbate" is not quantified. The White House has not even explained exactly how the pipeline would make a significant difference to Canadian oil sands output nor why it would necessarily cause any increase in GHG emissions. Oil shipments via pipeline as opposed to rail, for instance, may reduce emissions more than an increment in oil sands output might raise them. The failure to provide a full explanation is all the more striking given that the State Department's environmental impact statement found:

The State Department's findings do not support the President's position on the Keystone XL.

- It is unlikely for the project to have a substantial impact on the rate of development in the oil sands;
- It is unlikely for the project to have a substantial impact on the amount of heavy crude oil refined in the Gulf Coast area, and
- The total annual GHG emissions (direct and indirect) attributed to the alternatives are from 28 to 42 percent *higher*.[3]

The Keystone approval process has not been an exercise in objective cost-benefit analysis, improving market functions, or the democratic process. The White House has not acknowledged the benefits of completing the Keystone nor given a full account of what the "national interest" entails in

[1] The Keystone XL requires a Presidential Permit from the State Department because it would cross an international border. The Administration denied the initial application over environmental concerns; TransCanada filed another permit application in May 2012 that is pending. The quote is from a speech at Georgetown University on June 25, 2013.
[2] Per data compiled by the Canadian Association of Petroleum Producers (CAPP) for "Crude Oil, Forecasts, Markets & Transportation," June 2014.
[3] *Final Supplemental Environmental Impact Statement for the Keystone XL Project*, Executive Summary, United States Department of State Bureau of Oceans and International Environmental and Scientific Affairs, January 2014, pp. ES-16, 34.

this case. The White House gives the impression that it invokes a common association of oil sands with higher GHG emissions[4] out of political expediency but is withholding approval of the pipeline for other reasons that it has no obligation to justify objectively.[5] Although President Obama has never disavowed State's GHG finding, he has already announced that he will veto legislation to allow completion of the Keystone XL.

THE KEYSTONE PROJECT IN CONTEXT

Federal policy and market reality. The United States imports about 3 million barrels of crude oil per day from OPEC. In order for the United States to reduce its dependency on distant overseas sources, it must increase domestic production and connect this additional production to domestic refineries. Accessing nearby sources in North America also makes supply far less vulnerable to disruption and keeps more oil payments in the North American economy.

Having developed technologies to produce more oil from shale formations in the United States and from oil sands in Canada, the next necessary step is to extend the transport infrastructure to where the reserves are, if feasible by accessing them directly via pipeline. The Keystone XL will bring crude oil from Alberta, Canada and the Bakken region in North Dakota to the oil trading hub in Cushing Oklahoma and the largest refining center in the world on the U.S. Gulf Coast. The throughput capacity would be 730,400 b/d from Canada and 99,600 b/d, 12 percent of total capacity (830,000 b/d), from North Dakota.

Willfully hindering improvements to North America's crude oil supply infrastructure will benefit overseas suppliers and OPEC in particular.

A policy that hinders efficient oil infrastructure in North America in the belief that alternative fuels will substitute for oil and reduce GHG emissions ignores the production costs and supply elasticities of alternative fuels relative to overseas oil, particularly in the Persian Gulf. Persian Gulf oil producers, especially Saudi Arabia, have by far the lowest cost and the highest supply elasticity in the word, meaning a high degree of flexibility in terms of the rate and extent by which they can increase oil output (or lower it again). The supply of alternative fuels has the highest production costs and is the most inelastic.

Willfully interfering with North America's crude oil supply infrastructure improvements therefore directly benefits competing oil producers oversees, not producers of alternative fuels whose supply responses take a long time and are small relative to the size of the market, if they can respond at all.

[4] State estimates that oil sands crudes emit 17 percent more GHGs on a lifecycle basis than the average crude oil refined in the United States in 2005, although the GHG intensity of reference crudes may increase in the future as more of the world crude supply requires extraction by increasingly energy-intensive techniques.
[5] Political campaign donations may play a role in just how strong the Administration's commitment has become to opposing the pipeline. See, "The Tom Steyer Democrats," Review & Outlook, *The Wall Street Journal*, Nov. 20, 2014.

The result is a combination of larger market shares for overseas oil imports and higher oil prices. The federal government does not make a point of interfering with foreign oil tankers offloading their cargo at our shores and imposes no oil import quotas or oil import tariffs of consequence.[6] But by forestalling a privately financed domestic infrastructure project to serve North American oil producers, the federal government does hinder them in their competition with overseas suppliers.

The Keystone XL surpasses the alternatives with respect to every pertinent aspect of the national interest: national security, environmental protection, public safety, and efficiency.

In terms of national security, environmental protection, public safety, and efficiency piping crude oil from Canada is far superior to shipping it via tanker from the Persian Gulf halfway around the world or loading it onto railroad cars out of Canada. These national interest considerations should determine the federal permit decision. It is clear that the Keystone pipeline proposal scores high on all counts compared with the alternatives. The benefits of a stationary, buried, largely unseen conduit are continuity and speed of shipment, avoidance of spill prone intermodal cargo transfers, minimal need for human intervention, and minimal risk of environmental exposure.

TransCanada has addressed concerns regarding routing details and leak prevention,[7] which, strictly speaking, are not national but state and local concerns where the appropriate authority for dealing with them resides and the specifics are best addressed. Federal agencies ordinarily have no authority to site oil pipelines, even interstate oil pipelines. The Nebraska Supreme Court recently settled a disputed routing decision by that state's governor, removing even that as a reason for holding up federal approval for the Keystone XL.

The Administration is thwarting the best option for shipping crude oil from Canada because that is the only option it can veto.

Pipelines are the most efficient and safe way to ship crude oil over land and the Keystone XL is probably one of the best pipelines ever designed. The alternatives are railroad cars, river barges, and ocean tankers, not windmills and solar panels. The fact that the federal government happens to have a say in whether this particular project goes forward but does not control the alternatives should not lead it to reject what is the best option.

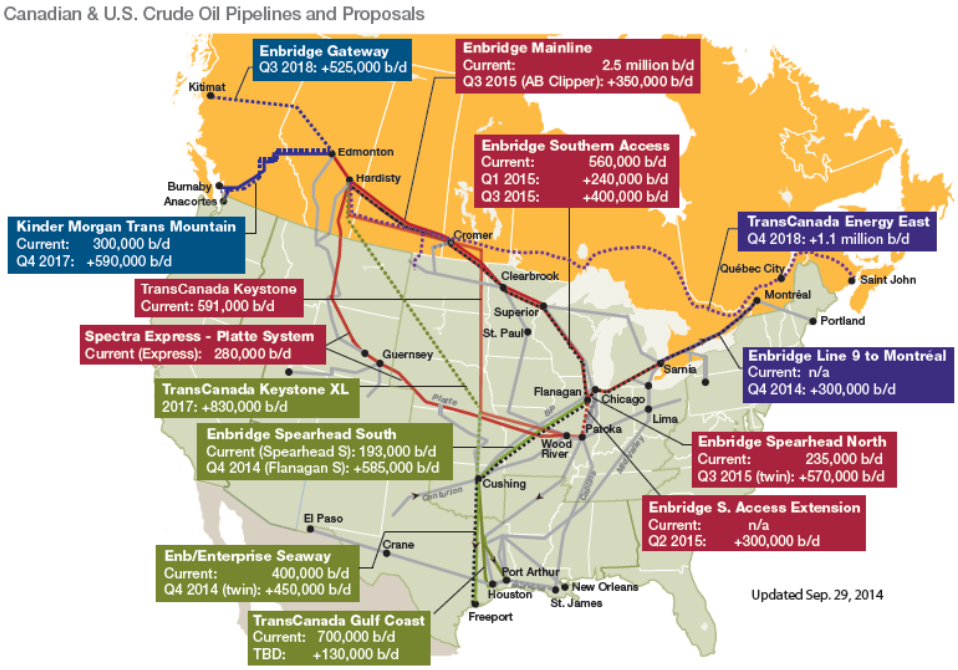
<u>Keystone XL is not a standalone facility</u>. A central fallacy of the White House stance is that the Keystone XL decision can limit how much crude oil is produced from the oil sands. Opponents of the Keystone XL project and the frequent depiction of the pipeline's proposed route by itself on a map of North America[8] can engender the false impression that the Keystone XL is to the Canadian oil sands regions what the Alaska pipeline is to the North Slope of Alaska—the only way out for crude oil. That notion could not be further from the truth. Figure 1 shows the trunk route options via pipeline from Edmonton and Hardisty, Alberta near the oil sand regions. A crude oil and

[6] A *de minimis* rate of 5.25¢ or 10.5¢ per barrel applies depending on the grade of oil.
[7] The Keystone project would incorporate 59 Special Conditions developed by the Pipeline and Hazardous Materials Safety Administration (PHMSA).
[8] See map in Appendix.

refined products pipeline network exists in North America as does an extensive network of freight railroads and inland waterways that can connect the oil sands with the outside world. As of 2013, there were crude oil pipelines totaling 60,911 miles in length in the United States, to which 8,174 miles had been added only during the last five years. Total U.S. liquids pipeline mileage was 192,396 miles.[9]

The proposed Keystone XL is a 36-inch pipe with a planned throughput capacity of 830,000 b/d of which 730,400 b/d would be available for oil shipments from Canada. At 36 inches, Keystone would be among the larger diameter trunk lines but by no means the largest. Multiple 36-inch crude oil and refined products pipelines have existed for decades in the United States and Canada. The Alaska pipeline, by contrast, has a 48-inch diameter and at one time carried over 2 million b/d of crude oil.

Figure 2: Expansion Plans for Existing and New Pipelines



Source: "Crude Oil, Forecasts, Markets & Transportation," CAPP, June 2014.

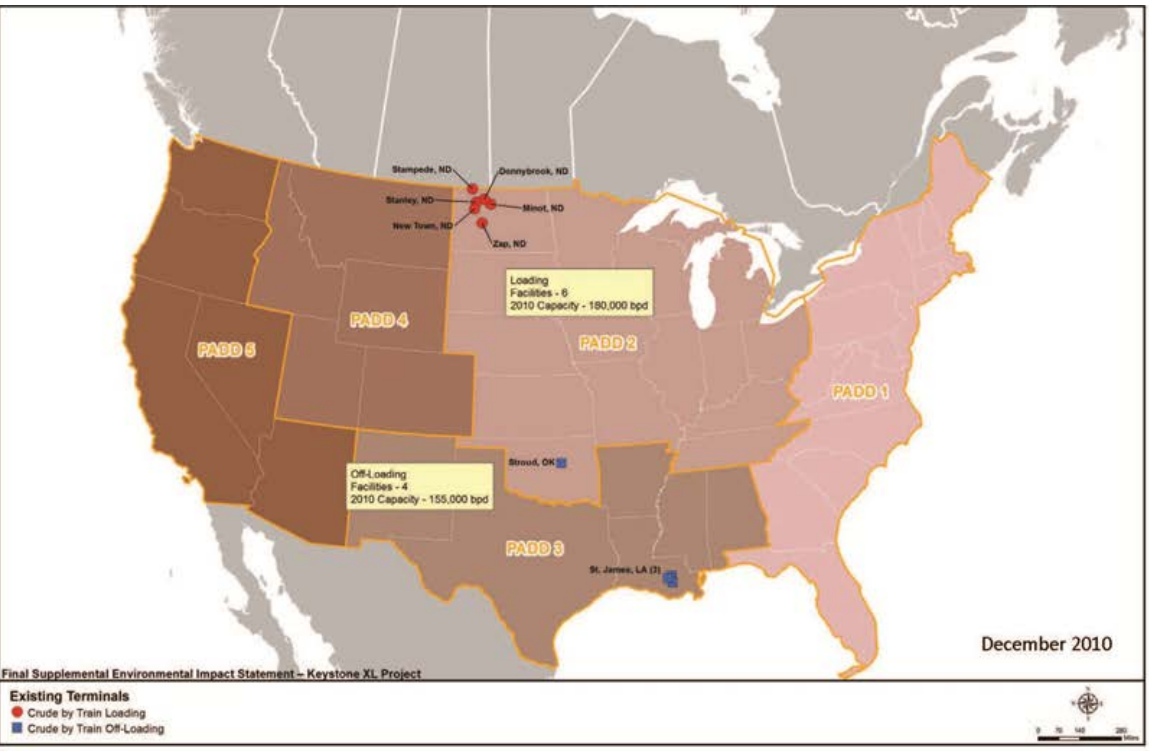
There are plenty of alternative ways to ship crude oil out of Canada in place and under development.

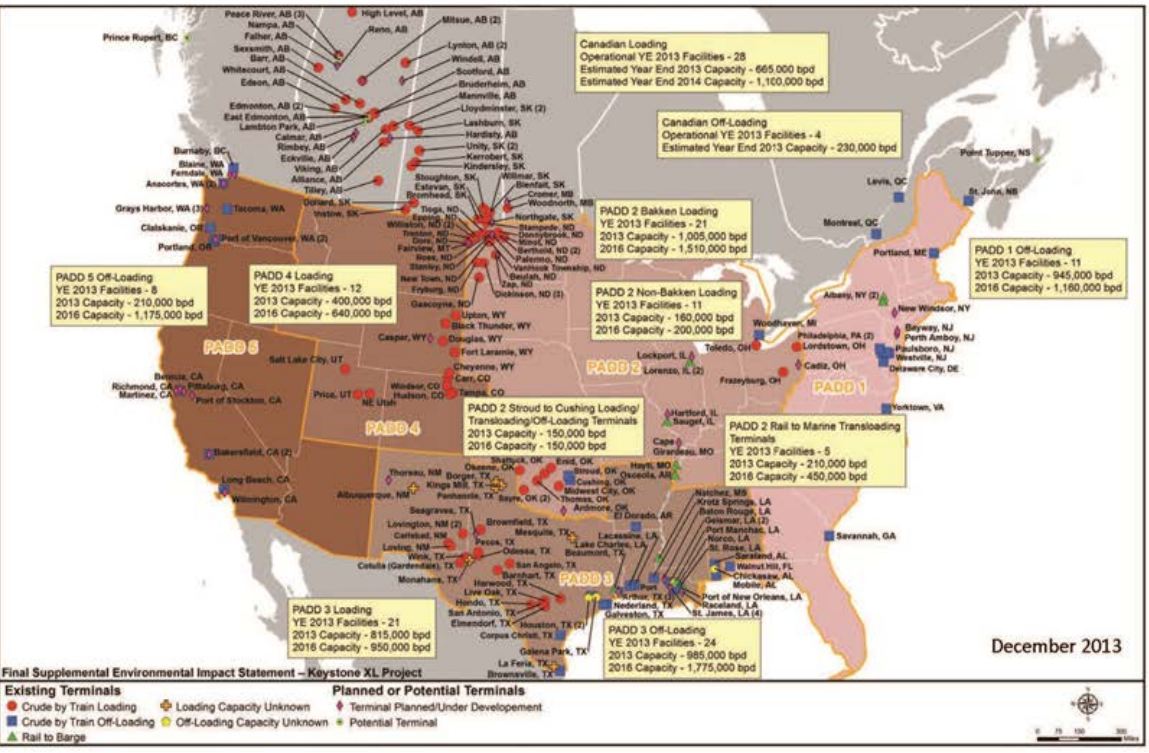
The Keystone would be one of many ongoing and planned additions to the North American petroleum infrastructure, which includes extensive networks of refined petroleum products and natural gas pipelines. The remaining contested 875 miles from the Canadian border to Steele City in Nebraska would connect to the segments already operating in the United States and to which the President lent his support with a personal appearance. It would thereby enhance route diversity, supply flexibility, and

[9] See map in Appendix. Source: American Petroleum Institute (API) website. There also exists an extensive natural gas pipeline network. Petroleum pipelines can be converted from their original purpose to carry crude oil, refined products, or natural gas. Their direction of flow also can be reversed.

the efficiency of shipments from the world's third-largest oil reserves of 167 billion barrels in Canada to the world's largest refining center on the U.S. Gulf Coast. The Keystone XL would be an important addition to the transport capability out of the oil sands region but it is not vital.

Figure 3: Crude by Train Loading and Off-Loading Facilities, 2010 and 2013





ce: Esri 2013. Sources for all facilities are presented in Appendix C, Supplemental Information to Market Analysis.

: These estimates do not include a facility being constructed in Edmonton, Alberta, with a design capacity of 250,000 bpd (100,000 bpd expected to be operational by the end 014) that was announced immediately before the Final Supplemental EIS was completed.

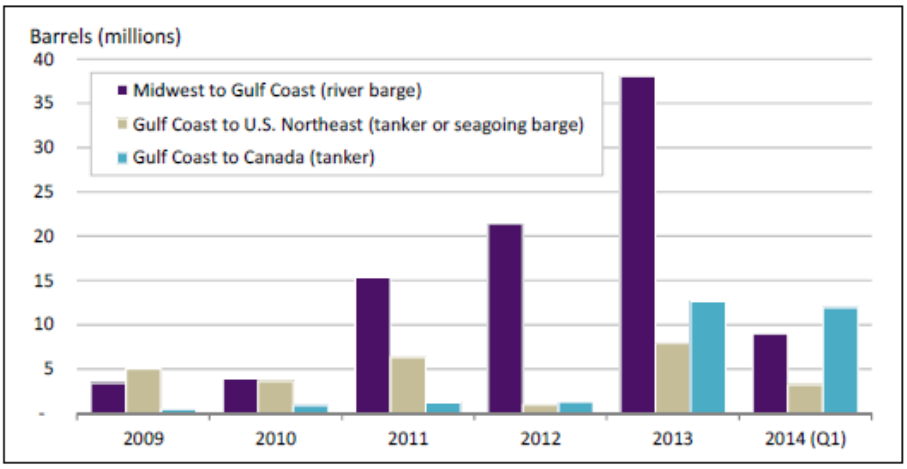
The Canadian Association of Petroleum Producers (CAPP) forecasts Western Canadian oil supply to grow from 3.5 million b/d to 4.7 million b/d by 2018

and to 6.2 million b/d by 2024. The current capacity on the four existing trunk pipelines out of Alberta is 3.7 million b/d. Not counting Keystone, additional capacity of 2.6 million b/d is planned by 2018 for a total of 6.3 million b/d—ample capacity to accommodate oil sands production growth.

Rail and waterborne shipments. Significant investments are increasing rail transport capacity for crude oil out of the Western Canadian Sedimentary Basin (WCSB). Figure 3 illustrates the increase in rail loading and unloading terminals from 2010 to 2013. Rail-loading facilities in the WCSB are estimated to have a capacity of approximately 700,000 bpd of crude oil, and by the end of 2014, this will likely have increased to more than 1.1 million b/d. Approximately 900,000 to 1 million b/d is in areas that produce primarily heavy crude oil (both conventional and oil sands), or is being connected by pipelines to those areas.[10]

The quantity of oil moving by barge on the Mississippi River and its tributaries increased ten-fold from 2009 to 2013, and tanker shipments between the Gulf Coast and Atlantic Canada have grown at an even faster rate.

Figure 4: Waterborne Crude Oil Movements between Selected Regions



Source: U.S. Energy Information Administration,

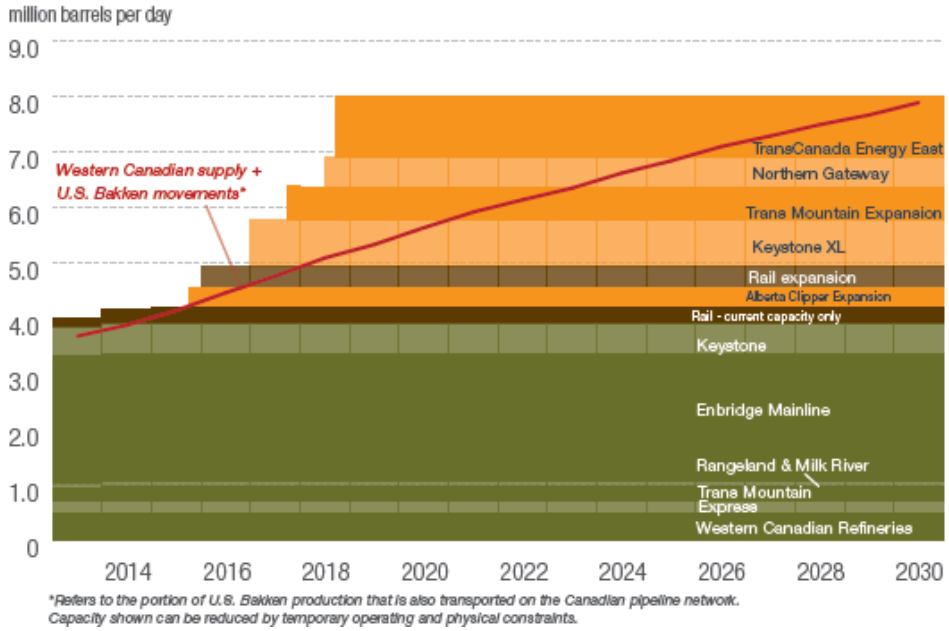
Keystone would hold a small market share. The extent and diversity of possible expansion options for crude oil shipments demonstrate that the United States cannot permanently bottle up Canadian oil sands by denying the Keystone pipeline. The Canadian oil sands reserves are too large and valuable not to find outlets and the Keystone is not large enough anyway, given its capacity relative to the potential increases in their rate of production. In particular, railroads offer the fastest option for expanding shipping capacity, and while their operating costs are higher, incremental capacity additions do not require a large upfront investment, which blunts

[10] *Final Supplemental Impact Statement for the Keystone XL Project,* Chapter 1, Market Analysis, p. 1.4-3.

the strategy of withholding pipeline capacity to stunt the growth of oil production.[11]

Figure 5 demonstrates that Keystone's proposed addition of capacity does not have a controlling influence over the Western Canadian crude supply. Its throughput capacity devoted to the oil sands amounts to 9 percent of the existing plus planned pipeline capacity. Keystone's absence may increase shipping costs for a time but it will not choke off supply growth.

Figure 5: Western Canada Takeaway Capacity vs. Supply Forecast



Source: "Crude Oil, Forecasts, Markets & Transportation, CAPP, June 2014.

SOME DEBATES SURROUNDING KEYSTONE

Does the oil price drop obviate the need for Keystone? The price of crude oil has been declining in recent months, which opponents have taken to mean that there no longer is a need for the Keystone pipeline because Canada will be producing less oil than previously forecast. A falling oil price also could imply that cost savings from shipping via Keystone as opposed to by rail could make a difference in some oil sands production decisions. In other words, the Administration conceivably could attain some leverage over 730,400 b/d of crude oil production, the Keystone's Canadian carrying capacity, that may become uneconomic to produce if it has to be shipped by other means. The Environmental Protection Agency (EPA) has asked the State Department to revisit its conclusions in light of the oil price decline.[12]

[11] See, for example, "Trains Leave Pipeline in Lurch," Ben Lefebvre, *The Wall Street Journal*, May 24, 2013.

[12] Letter from Cynthia Giles, Assistant Administrator for EPA's Office of Enforcement and Compliance Assurance to Amos Hochstein, Special Envoy & Coordinator, International Energy Affairs and Judith G. Garber, Acting Assistant Secretary, Oceans and International Environmental and Scientific Affairs at the State Department, 2/2/2015.

There are a number of problems with this reasoning. First, oil sands output has been growing for many years starting when the price of oil was still below $30 per barrel and gave no indication of a steep, prolonged climb. In 2003, when the oil price was about $30 per barrel, the *Oil & Gas Journal* deemed oil sands technically and economically recoverable and included 174 billion barrels of them in Canada's proven oil reserves. The price then had to cover the cost of shipping as well. Oil sands production costs extend over a wide range. The rise in price that occurred accelerated the rate of output growth and the decline will now slow it again. No one expects the price on the world oil market to settle permanently so low as to arrest the growth in Canadian oil sands production. If the Keystone XL is not built, railroad and other pipeline expansion will continue, albeit perhaps at a slower pace.

Worst of all would be a false sense of security that the oil price will not rise again in the future. Two important forces will continue to exert upward price pressure in the oil market long term, one is demand from emerging economies with literally billions of people who seek motorized transportation and electrification, and the other is OPEC. The cartel restricts exports to elevate the price as much as demand and competition from outside the cartel will allow. OPEC's members, most importantly the traditional swing producer Saudi Arabia, have decided not to support the spot market price for now and instead defend their market share by maintaining production rates and lowering their price. A central goal of this strategy is to discourage the highest-cost suppliers of shale oil, oil sands, and offshore oil from making additional investments.[13] Once projects with large upfront, time intensive investments are abandoned, they may not be reactivated for a long time, allowing OPEC to charge a higher price again.

At $3.3 billion, which the State Department estimated the U.S. portion alone will cost, the Keystone XL is one of those large, time-intensive investment projects. OPEC members Saudi Arabia and Venezuela rank as the second and fourth largest suppliers of crude oil to the United States (Mexico, not an OPEC member, is third) and are in direct competition with Canadian oil sands to supply Gulf Coast refineries. Saudi Arabia and Venezuela produce relatively heavy grades of crude oil and presumably would vote to deny the Keystone construction permit, if they had a say.[14]

Further, from a market and public interest standpoint, better infrastructure helps to safeguard against future supply disruptions and price spikes. If private investors want to proceed with the Keystone XL, then they expect the average price over the life of the asset to generate a revenue stream that will cover its cost. The federal government has no grounds to second-guess

[13] See, for example, "North See Region Pays Price of Oil's Tumble," *The Wall Street Journal*, 1/16/2015.
[14] The American Petroleum Institute (API), which represents U.S. refiners as well as domestic oil producers, supports the project.

their judgment.[15] By denying TransCanada the Keystone permit, the government would be rejecting the economic and national security benefits of private investors' contribution to a safer oil supply based on the dubious proposition that the oil price will not rise again.

The current price of WTI is above $50 per barrel, up from recent lows in the $40 range, and indications are that it may rise further. The oil market is in "contango," meaning that prices for oil delivery at future dates are higher than the spot market price. Millions of barrels are being stored on supertankers for future delivery at higher prices.[16]

Will the Keystone send its cargo overseas? Opponents of the Keystone pipeline claim that it would not augment the U. S. oil supply but traverse the United States only to load its cargo onto tankers in the Gulf of Mexico and sell the oil sands crude overseas. This view misses the central benefit of the pipeline as an addition to U.S. infrastructure, namely that once it is in place, it is not leaving and will be available for U.S. domestic oil deliveries as needed. Private investors are building the United States a pipeline that can supply the nation's refining center directly, what is not to like?

If U.S. buyers do not like the price or the contractual conditions, they can buy someone else's oil. That, presumably, is preferable to Canada *requiring* that U.S. buyers take all the oil it can carry over its useful life or whatever volumes oil sands producers decide to load onto it.[17]

The debate over whether some of Keystone's shipments may be sold overseas also loses sight of the fact that the United States is a large net importer of oil from overseas. U.S. overseas imports are 4.5 greater than the Canadian share of the Keystone XL's throughput capacity. Canadian oil sands already have been displacing relatively heavy crude oil from Saudi Arabia, Venezuela, and Mexico, and particularly to the Gulf Coast, only by less efficient means than the Keystone would provide. No one has explained what economic forces would reverse or suspend this trend with a more efficient connection in place from Canada to U.S. Gulf Coast refineries. The State Department found that "while it is possible that some cargos of heavy WCSB crude could be exported, it is unlikely for a range of economic factors that any such trade flows would be significant or durable in the long run."[18] On the other hand, if the federal government wanted to export crude oil to allied nations under duress from oil supply disruptions elsewhere, that would be highly plausible, and the Keystone enhances that capability.

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[15] The same holds true for oil sands production, which involves large, upfront investments and is based on long-term price expectations.
[16] "World's Largest Traders Use Offshore Supertankers to Store Oil; Companies Are Buying Oil Now to Sell Later When Price Rises," *The Wall Street Journal,* 1/19/2015.
[17] And preferable to a legislative mandate forcing them to do so as favored by some in Congress.
[18] *Final Supplemental Environmental Impact Statement for the Keystone XL Project,* Chapter 1, Market Analysis, p.1.4-140.

The rapid adoption of advanced shale drilling technology in the United States has been producing large and growing amounts of light, high-grade oil that is superior to heavy oil but mismatched to the design of much of the domestic refining capacity because it came as a surprise. For the time being, light shale oil is a more likely candidate for export from the United States than heavy crude oil, but market adjustments to optimize the deployment of different crude oil grades are still evolving, for example, with respect to additional refinery modifications. Federal mandates that deny choices certainly would not enhance the market's ability to adjust optimally.

The developments in oil production and infrastructure are enhancing the elasticity of North American oil supply and thereby providing the government with more options in an emergency. One need only envision an obstruction in the Strait of Hormuz to appreciate the benefit of having a direct line into 167 billion barrels of oil reserves up continent.

Is the Keystone good for employment? The project's supporters have emphasized the employment gains from building the pipeline because the labor market has been depressed and the recovery has taken forever. It would have been a good time to create thousands if not tens of thousands of jobs (State estimated 42,100 average annual jobs over a one- to two-year construction period). President Obama downplayed the employment gains saying the project would require only 2,000 temporary jobs and only between 50 and 100 permanent ones.[19] In a way, this is funny because the fewer employees it takes to build and run the pipeline, the more it underscores the superiority of a mode of transportation that essentially runs itself. In another way, it is very regrettable, of course, because the simulative effect of job creation at a most challenging time for the economy was wasted. The labor market has slack even now and would benefit from infrastructure investment as Larry Summers, former director of the National Economic Council, keeps editorializing about. While President Obama professes concern for the unemployed and the middle class, his refusal to grant the Keystone XL permit and his veto threat to block Congress from doing so, indicate greater interest in dispensing government assistance than in productive jobs that the private economy creates independently.

In general, evaluating the desirability of an infrastructure project based on the number of people it employees is dubious, especially if larger numbers are thought of as beneficial.

CONCLUSION

The Keystone XL is clearly more reliable, more efficient, safer, and cleaner than shipping oil sands out of Canada by railroad, barge, and tanker. The White House has presented no defensible basis for its opposition to the

[19] "Interview with President Obama," Transcript, *New York Times,* July 27, 2013.

Keystone XL project, which is especially glaring given the repeated findings of its own State Department that see nothing wrong with approving it.

The intellectual reason (though perhaps not the real reason) for the Administration's refusal to approve construction of the remaining U.S. segment of the Keystone project is the contribution of Canadian oil sands' production to GHG emissions. But the Keystone XL is not a critical path out of Alberta's oil sands regions, and it does not determine how much crude oil ultimately will be produced there. Canadian oil output has been rising without the Keystone (as has shale oil output in the border state of North Dakota where a spur would connect the pipeline to the Bakken region). The rate of output will continue to rise and as it rises, more oil will move by railroad, waterborne means, and expanding the capacity of existing pipelines in the near term and eventually also via other new pipelines. The U.S. State Department found that the shipping alternatives it analyzed actually *raise* GHG emissions.

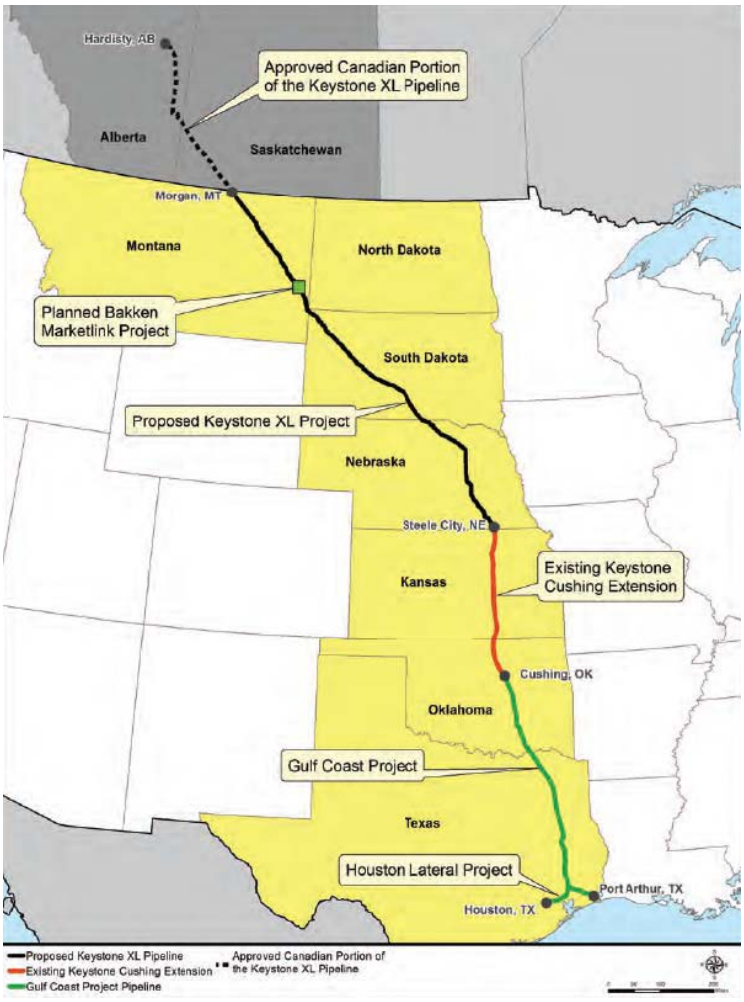
By withholding approval for construction of the remaining segment of the pipeline, the White House is going against every aspect of the national interest that is pertinent here: national security, environmental protection, public safety, and efficiency. The federal government also is favoring overseas over North American oil producers by obstructing this project and is turning down privately financed oil supply flexibility important to the economy and national security. One can add that good relations with an allied neighboring country serve the national interest in many ways, and the deliberate effort to restrict that country's exports is a distinctly unfriendly act.[20]

Prominent environmental groups and activists object to fossil fuel use in general and want to shrink it to zero. The singular pursuit of this objective by some can lead them to positions that negate other important objectives. Indeed, it can even lead them to hinder the reduction of unwanted emissions, as in the case of their opposition to natural gas.

The President seems to have adopted this mindset with respect to the Keystone XL. Contrary to the facts and the analysis of his own State Department, he has elevated the cause of GHG emissions reduction symbolically above all else, even though GHG emissions may be higher than they would be if he approved Keystone's construction. In the process, he also is brushing aside that the public favors the pipeline, that industry supports it, and that labor unions are eager to work on it.

[20] The Canadian National Energy Board (NEB) found that with acceptance of its regulatory requirements and recommendations, Canada's portion of the pipeline would not likely result in significant adverse environmental effects.

APPENDIX


Hardisty, AB
Approved Canadian Portion of the Keystone XL Pipeline
Alberta
Saskatchewan
Morgan, MT
Montana
North Dakota
Planned Bakken Marketlink Project
South Dakota
Proposed Keystone XL Project
Nebraska
Steele City, NE
Kansas
Existing Keystone Cushing Extension
Cushing, OK
Oklahoma
Gulf Coast Project
Texas
Houston Lateral Project
Port Arthur, TX
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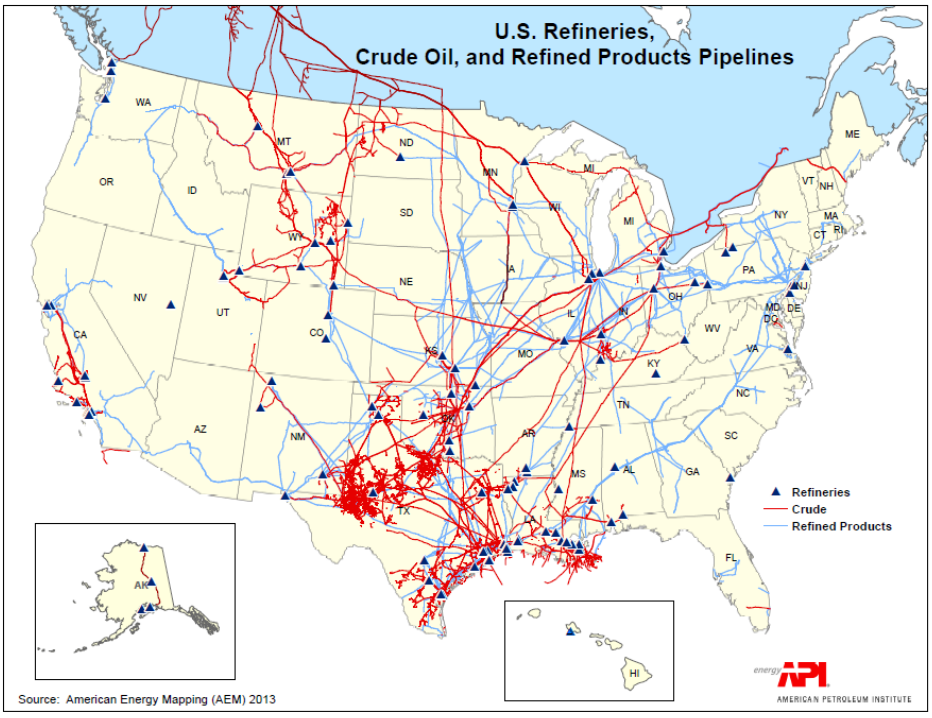
U.S. Refineries,
Crude Oil, and Refined Products Pipelines
Refineries
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Source: American Energy Mapping (AEM) 2013
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