

Climate Impacts of the Keystone XL Tar Sands Pipeline



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Tar sands refinery and tailings pond in Alberta, Canada

The proposed Keystone XL tar sands pipeline would pump up to 830,000 barrels per day of the world's dirtiest oil from Canada's Boreal forest straight through the heart of America's breadbasket to refineries on the Texas Gulf Coast. Building the 875-mile northern segment of Keystone XL would lead to a dramatic increase in the carbon pollution that worsens the effects of climate change. Hence, construction of the pipeline fails the all-important carbon test the president laid out in his June 2013 climate address to the nation, when he said Keystone XL's permit would be approved only if the pipeline "does not significantly exacerbate the problem of carbon pollution."¹

The fact is that Keystone XL's construction would send market signals that would reverberate across North America's economy in ways that are dangerous to our climate. The pipeline would increase the profitability of producing tar sands, which would accelerate the pace and expand the scale of carbon-heavy tar sands development in Alberta. In fact, Keystone XL is a necessary ingredient in the oil industry's pursuit of its aggressive plans to triple tar sands production by 2030. Production and transport of tar sands oil would

expand, further exposing years of broken climate promises from Canada, a nation whose tar sands expansion plans are directly incompatible with its own stated policies of working toward carbon emission reductions. And construction of Keystone XL would undermine some of the most ambitious and hard-won U.S. climate policies. As a single, discrete decision, denial of a Presidential Permit for Keystone XL is one of the most effective ways the United States can move forward on climate.



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THE KEYSTONE XL TAR SANDS PIPELINE: A BAD BET FOR AMERICA

President Obama rejected TransCanada's initial proposal for the risky Keystone XL pipeline in January 2012.

TransCanada subsequently began construction of the segment of the pipeline from Cushing, Oklahoma to the Texas Gulf Coast. In May 2012, the pipeline company reapplied for a permit for the Northern segment of Keystone XL that would run from Alberta to Steele City, Nebraska, connecting the southern route with the tar sands. This permit is currently under consideration by President Obama and his State Department, who must determine if building the tar sands pipeline is in the national interest. In addition to its significant climate impact, Keystone XL would:

- Expand destructive extraction of tar sands bitumen in Alberta's Boreal forest, disrupting millions of acres of sensitive wildlife habitat, creating vast lakes of toxic waste, threatening the health of indigenous communities and causing the loss of millions of migratory birds.²
- Threaten American farms, communities and some of the most sensitive water sources in the country with tar sands spills such as the ones which devastated communities near the Kalamazoo River in Michigan and in Mayflower, Arkansas.³
- Serve as an export pipeline through the United States, not to it. State Department analysis confirms that the majority of tar sands crude will be exported internationally after it is processed in Gulf Coast refineries.⁴

The pipeline dramatically increases carbon emissions. It is not in our national interest, and its permit should be denied. In greater detail, here are the facts about Keystone XL and carbon pollution:

- **From the tar sands mine or drilling operation to the automobile gas tank, tar sands greenhouse gas emissions are 81 percent greater than those of conventional oil.**

This is according to both the U.S. State Department and the Environmental Protection Agency.⁵ If Keystone XL were built, these already high emissions could worsen. Tar sands extraction methods would shift away from destructive strip-mining methods toward the even more carbon-intensive in situ drilling method, which requires injection of hot steam underground so melted tar sands bitumen can be pumped up to the surface.

- **Because it destroys the Boreal forest carbon sink while also piling up petroleum coke, tar sands development has broader climate impacts that are rarely considered.**

Boreal wetland ecosystems sequester massive amounts of carbon, but if Keystone XL is approved, rapid development of Alberta's ancient peatlands could release 11 million to 47.3 million metric tons of CO₂e into our atmosphere—a figure that has been excluded from tar sands emissions estimates.⁶ Additional emissions linked to the pipeline's construction could come from burning petroleum coke, a dirty tar sands by-product used as an inexpensive, high-carbon coal substitute in countries including India and China. These significant factors are not yet fully incorporated in estimates of the carbon intensity of tar sands crude.

- **Keystone XL would add more carbon to our atmosphere over its 50-year project timeline than the combined tailpipe emissions of every single car in America over an entire year.** That's a lot of cars. It's also a lot of carbon pollution—as much as 1.2 billion metric tons of it.⁷

The Keystone XL tar sands pipeline would increase climate emissions by 24.3 million metric tons CO₂ per year. That's equivalent to Americans driving more than 60 billion additional miles per year.⁸

TAR SANDS FROM KEYSTONE XL WOULD LIKELY REPLACE LESS CARBON-INTENSIVE CRUDES BEING PROCESSED ON THE GULF COAST.

While many refineries on the Gulf Coast are able to process heavy crudes, without Keystone XL they have turned to lighter, less carbon-intensive domestic crude oils as heavy crude imports from Venezuela and Mexico have declined.⁹ In fact, Department of Energy data show that refineries on Texas's Gulf Coast are processing lighter crudes than they have in more than a decade.¹⁰ They are also operating closer to their maximum capacity than they have in years.¹¹ If Keystone XL is approved, tar sands crude is likely to displace crudes that are significantly less carbon-intensive.

- **Rejecting Keystone XL propels America forward on climate.** As a single, discrete decision, rejecting Keystone XL would avoid carbon emissions on a scale similar to some of the most ambitious carbon emission-reduction programs currently under way in the United States. In one stroke of the pen, Keystone's rejection would save this country 18.7 million to 24.3 million metric tons of CO₂e per year—a benefit comparable to the annual savings from new U.S. heavy-duty truck emission and efficiency standards (28.4 million metric tons).¹²

■ **Keystone XL is the linchpin on which rests the pace of tar sands production and the scale of tar sands expansion plans.** The tar sands industry falsely claims that because of multiple options for transporting tar sands oil, tar sands expansion—with or without Keystone XL—is inevitable. But the fact is, if the Presidential Permit is denied and Keystone XL is not built, there would be fewer tar sands mines and drilling projects. Here are three reasons why:

□ Tar sands companies are currently constrained in their ability to deliver tar sands oil to the limited number of refineries that are both equipped to process tar sands and have port access to lucrative overseas diesel markets.¹³ In fact, export pipelines from the tar sands region are expected to reach capacity before 2015. Without Keystone XL's access to Texas Gulf Coast refineries—which have the heavy crude refining capacity and port access oil companies crave—much of the tar sands will remain landlocked.¹⁴

□ Keystone XL is the largest of the proposed tar sands pipelines and the farthest along in the permitting process.¹⁵ Even if all the other proposed new export pipelines were built (which is highly unlikely, given the wide range of obstacles they face), they could not supply the export capacity needed to meet the tar sands industry's goal of tripling tar sands production by 2030.¹⁶ Additionally, rail is not an economical option for supporting significant expansion of tar sands production, and tar sands oil has largely been absent from the current crude-by-rail boom.¹⁷

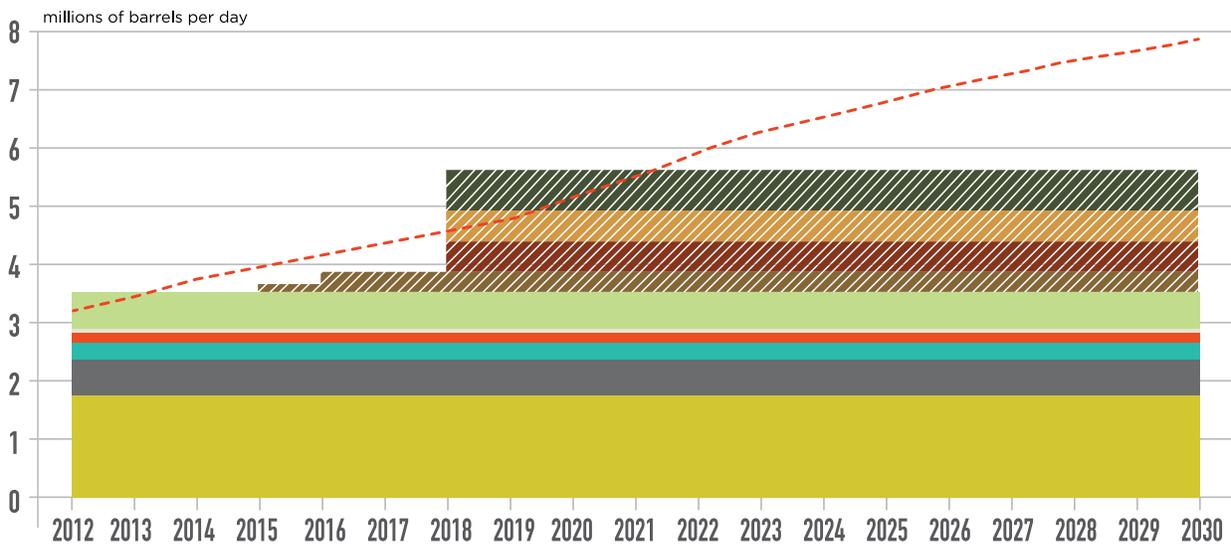
□ The pipeline would link tar sands crude to international oil markets, giving the industry access to higher oil prices on the international market and increasing the profitability of tar sands projects. This would greatly encourage overall expansion.

Figure 1: Pipeline and tar sands capacity¹⁸

PIPELINE AND TAR SANDS CAPACITY

WESTERN CANADIAN SUPPLY FORECAST (WCSB) VERSUS TAKEAWAY CAPACITY WITHOUT KEYSTONE XL

The Keystone XL tar sands pipeline is a critical part of the industry's plan for tar sands oil production expansion. In the unlikely event that all new proposed pipelines were built, industry would be unable to meet projected supply takeaway needs without Keystone XL.



WCSB PRODUCTION

--- Western Canadian Crude Supply (Tar Sands + Conventional Crude)

EXISTING PIPELINES

■ WCSB Refineries
 ■ Western Corridor
 ■ Express
 ■ Trans Mountain
 ■ Keystone 1
 ■ Enbridge Mainline

PROPOSED PIPELINES

■ TransCanada Energy East
 ■ Trans Mountain Expansion
 ■ Northern Gateway
 ■ Alberta Clipper Expansion

Sources: CAPP, *Crude Oil, Forecasts, Markets and Pipelines*, June 2013; Goldman Sachs, *Getting oil out of Canada: Heavy oil diffs expected to stay wide and volatile*, June 2013.



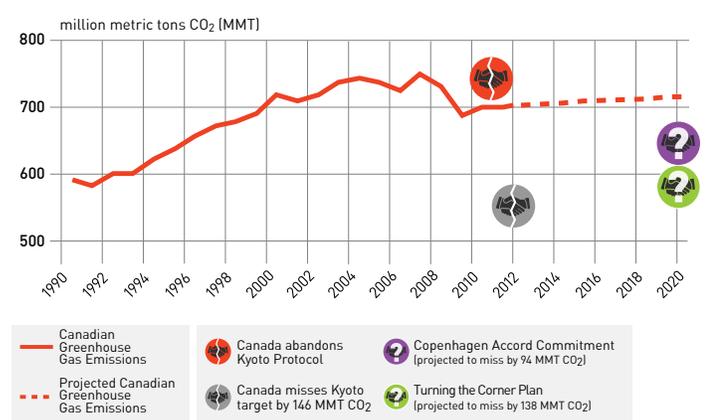
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“The... decision regarding Keystone XL is critical because it constitutes a vital export link for Canadian oil production in the 2015–17 time frame. Should Keystone XL be rejected, Canadian oil sands producers will need to rethink expansion plans, timelines, and export pipeline solutions.”

–RBC CAPITAL MARKETS¹⁹

■ **Given Canada’s track record of untrustworthy climate policies, expecting Canada to reduce tar sands greenhouse gas emissions is unrealistic.** Canada’s climate policies do not counteract significant greenhouse gas emissions growth, nor do they meet the country’s stated international climate targets. In recent years, Canada has repeatedly made firm commitments to reduce its greenhouse gas emissions and has never followed through. Current regulations in Alberta are inadequate, and despite promises from the last four Canadian environmental ministers, the Canadian federal government has failed to introduce rules that effectively limit greenhouse gas pollution from Canada’s oil and gas sector.

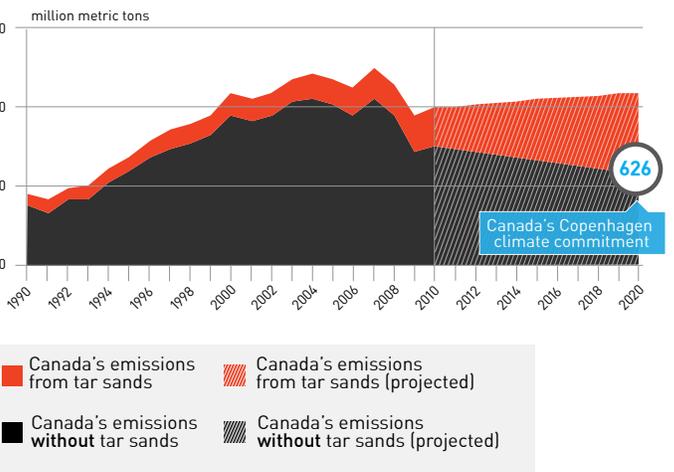
Figure 2: Canada’s Climate Record: Years of Broken Promises²⁰



TAR SANDS: CANADA’S CLIMATE OBSTACLE
Rapidly increasing greenhouse gas emissions from tar sands account for nearly the entire significant gap between Canada’s most recent climate commitment in Copenhagen and the emissions it expects in 2020. (See Figure 3.)

Figure 3: Tar Sands: Canada’s Climate Obstacle²¹

Growing tar sands emissions are keeping Canada from meeting its climate commitments.



Despite Canada’s dubious record as a good-faith actor on climate, Prime Minister Harper reportedly wrote President Obama a letter offering another commitment in return for Keystone XL.²² Canada cannot meet its climate obligations while maintaining its policy of unchecked tar sands expansion, a reckless policy in which Keystone XL would play a critical role.

These facts make it clear: Keystone XL fails the president’s climate test. It significantly exacerbates the problem of carbon pollution. It is not in the national interest, and its Presidential Permit should be denied.

Endnotes

- 1 Remarks by the president on climate change, Georgetown University, Washington, D.C., June 25, 2013, www.whitehouse.gov/the-press-office/2013/06/25/remarks-president-climate-change.
- 2 Simon Dyer, *Beneath the Surface: A review of key facts in the oilsands debate*, Pembina, Jan. 28, 2013, <http://www.pembina.org/pub/2404>; Simon Dyer, *Forecasting the impacts of oilsands expansion*, Pembina, June 20, 2013, pg. 8, <http://www.pembina.org/pub/2455>.
- 3 Anthony Swift, *Tar Sands Pipeline Risks: Examining the Facts*, NRDC, Mar. 30, 2013, http://switchboard.nrdc.org/blogs/aswift/tar_sands_pipeline_safety_risk.html.
- 4 State Department, *Draft Supplemental Environmental Impact Statement, Market Analysis*, pg. 1.4-14, March 2013, <http://keystonepipeline-xl.state.gov/documents/organization/205654.pdf>.
- 5 U.S. Department of State, *Keystone XL DSEIS Appendix W*, p. 64, keystonepipeline-xl.state.gov/documents/organization/205563.pdf. See also U.S. Environmental Protection Agency, letter to Assistant Secretary Jose W. Fernandez, U.S. Department of State, April 22, 2013, www.epa.gov/compliance/nepa/keystone-xl-project-epa-comment-letter-20130056.pdf. Well-to-tank emissions include greenhouse gas emissions from production, upgrading, refining, transporting, and dispensing at gas stations; they do not include combustion emissions from vehicles.
- 6 Rebecca Rooney et. al., "Oil Sands Mining and Reclamation Cause Massive Loss of Peatland and Stored Carbon," *Proceedings of the National Academy of Sciences* 109, no. 13 (March 27, 2012): 4933-4937, www.pnas.org/content/109/13/4933.
- 7 The State Department's analysis (based on the 2005 U.S. average) shows that replacing 830,000 barrels per day of conventional crude with higher-carbon tar sands from Keystone XL would increase annual emissions by 18.7 million metric tons CO₂e (Keystone XL DSEIS, p. 4.15-105). This figure is based on analysis by the National Energy Technology Lab (NETL), which State recognized doesn't account for additional emissions from the use of co-products besides gasoline and diesel produced from tar sands crude, such as petroleum coke (Keystone XL DSEIS, p. 4.15-105-106). By request of State, NETL adjusted its framework to include other product emissions and found that they increased the differential in incremental emissions from tar sands compared with the 2005 U.S. average crude oils by roughly 30 percent (Keystone XL DSEIS, p. 4.15-106; U.S. Environmental Protection Agency, *Comments on Draft SEIS*, p. 2, www.epa.gov/compliance/nepa/keystone-xl-project-epa-comment-letter-20130056.pdf). Including these emissions in Keystone XL's incremental emissions increases them from 18.7 million metric tons CO₂e to 24.3 million metric tons CO₂e. Over its estimated 50-year life span (Keystone XL DSEIS, p. 4.15-2), replacing conventional crude with tar sands from Keystone XL would generate 1.215 billion metric tons of increased emissions.
- 8 Keystone XL's annual emissions of 24.3 million metric tons of CO₂e is the equivalent of 66.3 billion miles based on average fuel economy of vehicles sold in FY 2013. CO₂ emissions from a gallon of motor gasoline is 0.00892 metric ton, the ratio of carbon dioxide emissions to total GHG emissions is 0.985, Environmental Protection Agency, *Greenhouse Gas Equivalency Calculator*, September 2013, www.epa.gov/cleanenergy/energy-resources/refs.html#vehicles. Average fuel economy of vehicles sold in FY 2013 was 24.7 miles per gallon, *University of Michigan, Average Sales-Weighted Fuel-Economy Rating (Window Sticker) of Purchased New Vehicles for October 2007 Through August 2013*, August 2013, www.umich.edu/~umtriswt/EDI_sales-weighted-mpg.html.
- 9 U.S. Energy Information Administration, *PAD District Imports by Country of Origin*, September 27, 2013, www.eia.gov/dnav/pet/pet_move_impcp_a2_r30_epc0_ip0_mbbpld_a.htm.
- 10 U.S. Energy Information Administration, *Texas Gulf Coast Refinery District API Gravity (Weighted Average) of Crude Oil Input to Refineries*, September 27, 2013, www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=MCRAP3B2&f=A.
- 11 U.S. Energy Information Administration, *Texas Gulf Coast Refining District Percent Utilization of Refinery Operable Capacity*, September 27, 2013, www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=pet&s=mopue3b2&f=a.
- 12 Natural Resources Defense Council (NRDC) White Paper: *Climate Impacts from the Proposed Keystone XL Tar Sands Pipeline*, July 2013, p. 6, docs.nrdc.org/energy/files/ene_13072301b.pdf.
- 13 *Ibid.*, p. 8-9.
- 14 *Ibid.*, p. 7-8.
- 15 Nathan Lemphers, *The Climate Implications of the Proposed Keystone XL Oilsands Pipeline*, Pembina Institute, January 17, 2013, p. 5, www.pembina.org/pub/2407.
- 16 NRDC, *supra* note 12, at 7-9.
- 17 *Ibid.*, p. 15-18.
- 18 *Ibid.*, p. 8.
- 19 RBC Capital Markets, *Energy Insights: Keystone XL—Weighing the Outcomes*, February 11, 2013, p. 5.
- 20 Canada's Kyoto Protocol commitment was to reduce its greenhouse gas emissions by 6% below 1990 levels by 2012, or 556 million metric tons CO₂e. Government of Canada, *A Climate Change Plan for the Purposes of the Kyoto Protocol Implementation Act, May 2010*, www.climatechange.gc.ca/default.asp?lang=En&n=4D57AF05-1. Environment Canada, *Greenhouse Gas Emissions Data 1990-2011*, www.ec.gc.ca/indicateurs-indicators/default.asp?n=BFB1B398. The Harper government's Turning the Corner Plan called for a 20% reduction from 2006 levels, from 726 MMT to 582 MMT. Government of Canada, *Turning the Corner, Taking Action to Fight Climate Change*, March 2008, publications.gc.ca/collections/collection_2009/ec/En88-2-2008E.pdf. Canada also committed to reduce its emissions by 17% from 2005 levels, from 737 MMT to 626 MMT, as part of the Copenhagen Accord. Government of Canada, *A Climate Change Plan*. Canada is currently on track to reach 720 MMT CO₂ by 2020. Environment Canada, *Canada's Emissions Trends 2012*, August 2012, p. 4, www.ec.gc.ca/Publications/253AE6E6-5E73-4AFC-81B7-9CF440D5D2C5/793-Canada's-Emissions-Trends-2012_e_01.pdf.
- 21 Tar sands emissions were 15 MMT in 1990, 32 MMT in 2005, and 48 MMT in 2010 and are projected to reach 104 MMT by 2020. Environment Canada, *Canada's Emissions Trends 2012*, August 2012, p. 24, www.ec.gc.ca/Publications/253AE6E6-5E73-4AFC-81B7-9CF440D5D2C5/793-Canada's-Emissions-Trends-2012_e_01.pdf. Tar sands emissions increased 33 MMT from 1990 to 2010. Government of Alberta, *Alberta's Oil Sands*, August 2012, www.oilsands.alberta.ca/ghg.html.
- 22 Jason Fekete, John Manley presses Harper government on Canada-EU free trade talks, *Postmedia News*, Sept. 16, 2013, <http://www.canada.com/business/John+Manley+presses+Harper+government+Canada+free+trade+talks/8919660/story.html>.