



The Keystone XL pipeline will lead to a surplus of heavy crude oil on the Gulf Coast that will be exported

In his historic climate speech in June, President Obama said, "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."¹

This speaks to a key area of controversy in the Department of State's assessment of the pipeline's impacts, which, in a draft released earlier this year, concludes that the pipeline will not lead to an increase in tar sands production and therefore no net increase in climate disrupting Greenhouse Gases (GHGs).² The apparent rationale given in the draft report is that other transport infrastructure will find a way to get tar sands oil to markets and that Canadian heavy oil delivered to the Gulf Coast will simply replace other heavy oil imported from elsewhere.

Neither of these is accurate. State's analysis is both simplistic and out of date. A closer look at what is actually going on in the North American oil market shows clearly that the project will enable tar sands production to increase and therefore increase emissions.

This briefing reveals for the first time that if Keystone XL is built, there will be a surplus of heavy oil in the Gulf Coast market that will force Canadian tar sands crude oil to be regularly exported from the United States. Far from the pipeline replacing heavy oil imports from Latin America and elsewhere, it will compete with these sources both in the Gulf Coast and global markets.

Keystone XL will clearly enable tar sands oil to reach markets beyond the United States, giving the pipeline a unique role in facilitating tar sands production growth and leading to increased GHG emissions.

¹ "Remarks by the President on Climate Change," June 25, 2013. <http://www.whitehouse.gov/the-press-office/2013/06/25/remarks-president-climate-change>

² U.S. Department of State, Keystone XL Pipeline Project, "Draft Supplementary Environmental Impacts Statement," March 1, 2013. <http://keystonepipeline-xl.state.gov/draftseis/index.htm>

State's simplistic and out of date market analysis

The State Department's draft Supplementary Environmental Impact Statement made the following assertions about the impact of America's tight oil boom on the Gulf Coast market for Canada's tar sands heavy oil:

*The increase in domestic production of light crude is expected to result in a substantial reduction in imports of light crude oils rather than a reduction in demand for heavy, sour crude oils, including from Canada.*³

And:

*Although refiners can be expected to make adjustments in their operations to take advantage of the increased supply of light crudes on the markets, shutting down their heavy crude upgrading units would likely be the most inefficient and expensive option.*⁴

It also stated the following regarding the potential for KXL crude to be exported from the United States:

*...under the current market outlooks, [crude exports are] unlikely to be economically justified primarily due to transportation costs.*⁵

But a more careful look at what is really going on in Gulf Coast refineries today reveals a dramatically different picture. Gulf Coast refiners now find themselves in a buyer's market, creating a very different dynamic to that discussed in the State Department's draft statement.

The tight oil boom and the Gulf Coast crude oil surplus

When the Keystone XL pipeline was first proposed in 2007, the North American oil market could not have been more different than it is today. These changes have come about predominately because of the tight oil boom that is sweeping oil production in North America.

Tight oil is the production of oil from shale and other relatively impermeable rock using hydraulic fracturing (fracking) and horizontal drilling. This has its own implications for climate change as well as substantial local impacts, but it is also having a huge impact on refining markets that is only now coming to light.

The Department of State's most recent analysis noted that the growth in tight oil production is turning out to be more significant than its previous assessment had judged. However, because tight oil is a light sweet oil (low density and low sulfur) and tar sands oil is generally a heavy sour oil (high density, high sulfur), State concluded that tight oil would not impact the market for heavy sour oil on the Gulf Coast

³ 1.4 Market Analysis, page 1.4-20. <http://keystonepipeline-xl.state.gov/documents/organization/205654.pdf>

⁴ 1 Op. Cit. Page 1.4-21

⁵ Op. Cit. Page 1.4-16

and therefore they viewed the tight oil boom as immaterial to Keystone XL's role in the Gulf Coast market.

Today it is becoming clearer that the tight oil boom is forcing those heavy oil refineries to completely rethink their crude sourcing strategies, and this has huge implications for KXL.⁶

One clear manifestation of this is that major heavy oil refineries in the KXL delivery zone are already doing something that most industry observers, including the State Department's KXL team, never thought they would do. They are converting refineries back to light oil processing, even though they spent billions in the last few years increasing the capacity of those same refineries to process heavy oil.

The conversions do not preclude heavy oil refining in these refineries but instead give them the flexibility to optimize which crudes to process according to their needs. No longer is a heavy oil refinery just a heavy oil refinery. Many refineries will soon have the ability to increase light oil processing when it is profitable to do so, and visa-versa. This sets these refineries up to play suppliers against each other, thereby creating a buyer's market for Gulf Coast refiners.

One refining executive, the Senior Vice President of refining for LyondellBasell, which operates a 268,000 barrels per day (bpd) heavy oil refinery in Houston, told a recent investor conference that the flood of light oil from the U.S. tight oil boom is "the biggest thing to happen in our careers."⁷ This explains why the company just completed work to enable the refinery to switch to light oil for 50 percent of its capacity.⁸

The chief executive of leading independent refiner Valero, Bill Kleese, recently told an investor conference:

Then you have the Gulf Coast situation... the world has changed dramatically with all this light sweet oil. Valero was convinced four, five, six years ago that the future was processing of heavy sour oil. That's why we have the cokers... If you were going to build a grassroots refinery today,⁹ you would not build a coking refinery. You would build a light-sweet refinery.¹⁰

Tight oil may already be reducing heavy oil refining on the Gulf Coast

The latest data shows a decline in heavy oil imports into Gulf Coast refineries since 2011. Figure 1 below shows that the heaviest oil imports (<22 API) were almost back to 2008 levels in 2012, while heavy to medium oil imports (<25 API) fell below 2008 levels. U.S. heavy oil production has not increased so this must be an effect of reduced heavy oil processing at Gulf Coast refineries. Refinery utilization was near

⁶ Lorne Stockman, "U.S. oil boom threat to tar sands much greater than State acknowledges," Oil Change International, May 16, 2013. <http://priceofoil.org/2013/05/16/u-s-oil-boom-threat-to-tar-sands-much-greater-than-state-acknowledges/>

⁷ LyondellBasell Industries' "CEO Hosts Investor Day (Transcript)," LyondellBasell Industries N.V. (LYB), March 13, 2013, <http://seekingalpha.com/article/1272051-lyondellbasell-industries-ceo-hosts-investor-day-transcript>

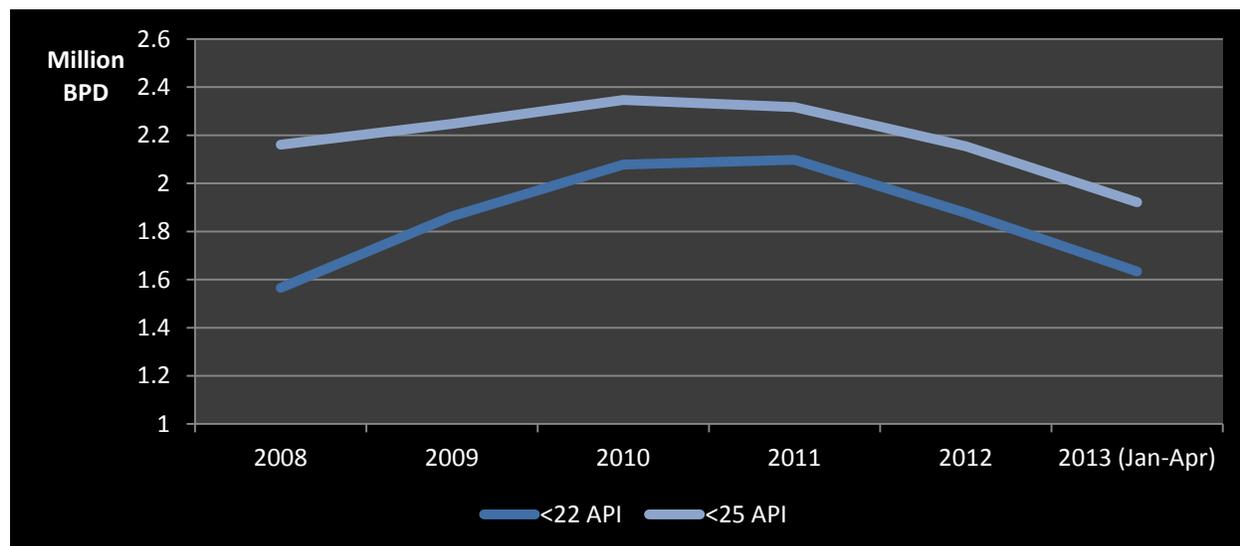
⁸ LyondellBasell, Investor Day presentations, March 13, 2013. <http://www.lyondellbasell.com/NR/rdonlyres/4AC0029D-A790-45CO-8FFB-E7EB19888E81/0/6Refining20130309.pdf>

⁹ Cokers process heavy oil and a 'grassroots' refinery is new refinery built from scratch as opposed to expanding the capacity of an existing refinery.

¹⁰ Valero Conference Transcript: Citi Global Energy and Utilities Conference 15 May, 2013. Subscription Only.

record highs in 2012, although it did drop off some in the first four months of 2013.¹¹ Based on numerous statements made recently by various refining executives, some of this decline is likely to be attributable to increased light oil processing at these refineries.¹²

Figure 1: Gulf Coast heavy oil imports¹³



Source: EIA, Company Level Imports Archive¹⁴

The tight oil boom may be only just beginning. While the EIA's Reference case forecast sees tight oil supply declining after 2020, its High Resource case sees it continuing to grow well into the 2030s and beyond (see Figure 2). The State Department pointed to the Reference case as an indication that tight oil would have no long term impact on Gulf Coast refining markets.¹⁵ But so far, production growth has followed the High resource case more closely than the Reference case, as Figure 2 also shows, suggesting that it is too early to say what the long term impact of tight oil might be.

¹¹ EIA, "Gulf Coast (PADD 3) Percent Utilization of Refinery Operable Capacity (Percent)."

<http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=MOPUEP32&f=M>

¹² See Section B of Sierra Club et al, June 24, 2013. "Request for Supplemental Environmental Impact Statement for the TransCanada Keystone XL Pipeline Based on Significant New Information."

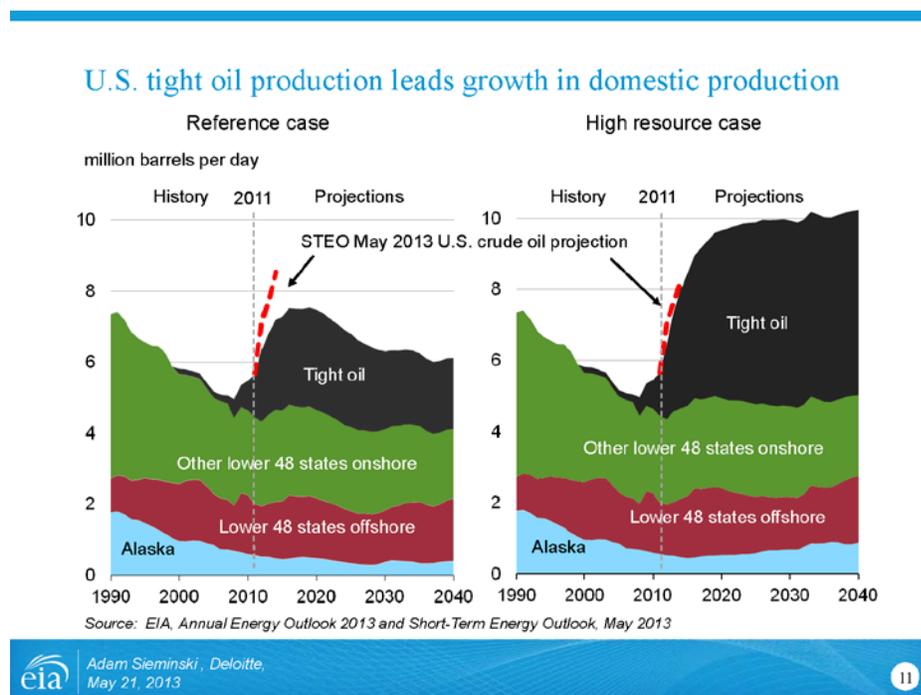
http://www.sierraclub.org/pressroom/downloads/SEIS_FINAL_062413.pdf

¹³ Note that the EIA classifies anything at or below 22 API as heavy oil but the State Department used <25 API for its assessment as this is a common cut off point for crudes that require secondary processing using cokers. See page 1.4-19 in the Market Analysis section of the draft SEIS. <http://keystonepipeline-xl.state.gov/documents/organization/205654.pdf>

¹⁴ <http://www.eia.gov/petroleum/imports/companylevel/archive/> (Accessed 1 July, 2013)

¹⁵ 1.4 Market Analysis, page 1.4-22 <http://keystonepipeline-xl.state.gov/documents/organization/205654.pdf>

Figure 2: EIA slide on tight oil role in U.S. oil production growth



Source: EIA, Outlook for Shale Gas and Tight Oil Development in the U.S.¹⁶

While tight oil's intrusion on Gulf Coast refining capacity will likely vary over time, there are other factors that, combined with the tight oil boom, are indicating that building Keystone XL will lead to a surplus of heavy crude oil on the Gulf Coast.

Foreign refinery ownership on the Gulf Coast: a market closed to Canada

Many proponents of the Keystone XL pipeline assert that bringing Canadian heavy oil into Gulf Coast refineries will simply replace heavy oil that is already being imported from Latin America and the Middle East. In particular, a reduction in dependence on Venezuelan oil is often cited as a foreign policy benefit.¹⁷

But refinery analysts Turner, Mason & Company recently calculated that 1.4 million bpd of refining capacity on the Gulf Coast is owned by state-controlled oil companies that supply oil from the fields they

¹⁶ At Deloitte Energy Conference, May 21, 2013. http://www.deloitte.com/assets/Dcom-UnitedStates/Local%20Assets/Documents/Energy_us_er/us_er_2013ConfPrsntDay1_Domestic2_May2013.pdf

¹⁷ Ben Geman, "Keystone pipeline backers say Snowden bolsters case." The Hill, July 8, 2013. <http://thehill.com/blogs/e2-wire/e2-wire/309601-keystone-backers-say-snowden-offer-bolsters-case>

operate in their home countries to those refineries.¹⁸ They call this the ‘minimum structural import level’ meaning that no matter how much oil is produced in North America, 1.4 million bpd will continue to be imported from these countries into the Gulf Coast. This is because refining their own oil in their refineries brings increased profits and a strategic advantage to both those companies and their related states.

1.1 million bpd of this “minimum structural import level” is made up of heavy oil capacity. Table 1 shows the breakdown by crude grades of the refining capacity owned by these companies and Table 2 lists the companies, their nationalities and the refineries they either own or co-own.

Table 1: Minimum Structural Crude Import Levels (adapted from RBN Energy and Turner, Mason & Company)¹⁹

Location	Crude Grade	Volume (bpd)
Gulf Coast	Heavy	1,100,000
Gulf Coast	Medium	85,000
Gulf Coast	Light Sour	105,000
Total		1,390,000

Table 2: Gulf Coast refineries owned or partly owned by foreign national oil companies

Company	Nationality	Refinery	Crude oil Capacity (bpd)	Location	Ownership %
Citgo	Venezuela	Citgo Lake Charles	425,000	Lake Charles, LA	100
Citgo	Venezuela	Citgo Corpus Christi	165,000	Corpus Christi, TX	100
Petroleos Mexicanos	Mexico	Deer Park Refining	340,000	Deer Park (Houston), TX	50
Saudi Aramco	Saudi Arabia	Motiva Port Arthur	600,000	Port Arthur, TX	50
Saudi Aramco	Saudi Arabia	Motiva Norco	233,500	Norco, LA	50
Saudi Aramco	Saudi Arabia	Motiva Convent	235,000	Convent, LA	50

Sources: Company websites.

¹⁸ Sandy Fielden, RBN Energy LLC, “Charge of the Light Brigade – Refinery Impact from Displacement of Crude Oil Imports,” June 26, 2013. <http://www.rbnenergy.com/charge-of-the-light-brigade-refinery-impact-from-displacement>

¹⁹ http://www.rbnenergy.com/sites/default/files/styles/extra_large/public/field/image/Table1.png?itok=nMO277ju

The 1.1 million bpd of heavy oil refining capacity owned by these companies covers 51 percent of the heavy oil imported into the Gulf Coast region (PADD3) in 2012. This means that only 49 percent of total PADD3 heavy oil imports in 2012 are available for Canadian suppliers to compete for, just over 1 million bpd.

Additionally, heavy oil is supplied to the Gulf Coast market from countries that do not own refining capacity on the Gulf Coast, including Kuwait, Colombia, Ecuador and others.²⁰ The non-committed heavy oil capacity on the Gulf Coast is currently being supplied by these producers and it seems absurd to assume that when Canadian heavy oil arrives on the Gulf Coast these producers will just pack up and go home. As many of these producers have far lower production and transport costs than their Canadian tar sands competitors, they are in a good position to compete in the world's biggest refining market.

A pipeline too far

The Seaway pipeline, a pipe that had run from south to north but was reversed in 2012 in order to bring oil to the Texas Gulf Coast, currently has a maximum capacity of 400,000 bpd, although is not currently running at full capacity due to storage constraints at the terminal near Freeport, Texas.²¹ It runs from the bottlenecked pipeline hub in Cushing, Oklahoma to Texas and is being expanded to 850,000 bpd by mid-2014.

TransCanada is building the southern segment of KXL, known as the Gulf Access pipeline, which also runs between Cushing and the Texas Gulf Coast. Combined, these pipelines will drain crude stored at the Cushing hub and deliver it to Texas refineries at a combined capacity of over 1.6 million bpd. Some tar sands crude imported through existing pipelines will be transported in those pipes along with U.S. crude from North Dakota and elsewhere.

But without a new pipeline bringing fresh supplies of tar sands crude over the border from Canada, the amount of heavy tar sands crude that can be supplied is limited. Building the northern section of KXL could increase heavy crude supply by over 700,000 bpd and this additional supply could cause a surplus of heavy oil on the Gulf Coast, requiring regular exports of Canadian heavy oil to balance the market.

The potential for Canadian oil exports from the Gulf Coast was outlined very clearly in a recent webinar hosted by oil industry analysts at Platts. During the June 20 webinar entitled 'Limits to US Oil Industry Progress,' Esa Ramasamy, Editorial Director for Oil Markets at Platts, used the slide in Figure 3 to outline the effect of expected new pipeline capacity into the Gulf Coast by 2015. This includes the expectation that KXL, listed here as the Gulf Coast pipeline, will be built by mid-2015.

²⁰ EIA, Company Level Imports Archive, <http://www.eia.gov/petroleum/imports/companylevel/archive/>

²¹ Reuters, 19 February, 2013, "Update 2 Seaway crude line to run well below capacity – filing."
<http://www.reuters.com/article/2013/02/19/seaway-capacity-ferc-idUSL1N0BJ55I20130219>

Figure 3: Platts webinar slide on impact of new pipelines to Gulf Coast oil market

Current Developments | PLATTS
McGraw Hill Financial

- Seaway and Gulf Coast pipelines will have the capacity to ship about 1.68 million by mid 2015
- Offers additional outlet to Canadian crudes
- Offers USGC refiners relatively cheaper heavy sour crudes
- **Offers another outlet for the export of Canadian crudes**
- Permian crudes: higher pipeline takeaway capacity to Houston and Gulf Coast

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Source: Esa Ramaswamy, “Webinar: Limits to US oil progress,” Platts, June 20, 2013.

<https://event.webcasts.com/viewer/event.jsp?ei=1017631>

In speaking to this slide Ramasamy said:

Both of these pipelines will have roughly 1.7 million barrels per day by mid-2015 and out of the 1.7 million barrels per day close to 90 percent will be heavy sour Canadian crudes. What this does is that it offers the Canadian crudes an outlet that they have been seeking very desperately for the past few years. So the Gulf Coast may end up being the first place where the Canadians export their crudes out of their own country into the U.S. and to other parts of the world.²²

This came as a surprise to audience members and during the Q&A session Ramasamy responded to a question seeking clarification, the questioner intrigued that Gulf Coast refiners would not soak up all the Canadian heavy sour tar sands crude themselves. Ramasamy’s response was this:

There is a limit to how much (heavy crude) the Gulf Coast refiners can soak up. And a lot of that will depend on the price of Canadian crudes that will end up on the Gulf Coast... Bear in mind

²² Esa Ramaswamy, “Webinar: Limits to US oil progress,” Platts, June 20, 2013.
<https://event.webcasts.com/viewer/event.jsp?ei=1017631>

that U.S. Gulf Coast refiners, it takes them only 3 to 5 days to ship crudes from Colombia, Venezuela into the U.S. Gulf Coast and less than 3 days from Mexico to the Gulf Coast.

So U.S. Gulf Coast refiners sit in a very ideal location where they can pick and choose their most economic crudes that offer them the best netbacks. So that's why, there will be opportunities... I mean the U.S. refiners will not always use Canadian crudes. When the Canadian crudes rise in price they will look at other alternatives, and force the Canadian crudes to move out of the Gulf Coast. The Canadian crudes cannot go back up into Canada again. They will have to go out.²³

This analysis of how Gulf Coast markets function, from one of the country's top oil market observers, is in complete contrast to everything the Department of State, TransCanada and various Keystone XL pipeline proponents have been telling the public.

Far from there being a shortage of heavy oil supply to the Gulf Coast that Keystone XL will ameliorate, there will be a surplus. Rather than backing out heavy oil supply from Latin American and Middle Eastern suppliers, Canadian tar sands oil will be forced out to the world market because those suppliers will compete with Canada for market share.

This is the complex reality of the Gulf Coast oil market, in stark contrast to the simplified and convenient fantasy of the State Department analysis and the rhetoric of KXL proponents. If there was any truth to those claims back in 2007, when this project was first proposed, the tight oil boom has thoroughly undermined them and resulted in a market dynamic that is in complete contrast to the one presented at the pipeline's inception.

Canadian crude exports from the U.S.? Yes we can

Export regulations have restricted the export of U.S. crude oil since the 1973 Arab oil embargo. Export licenses are granted for exports to Canada and in some other special cases, but in general U.S. tight oil is restricted to the U.S. market and a handful of refineries in Eastern Canada.

However, foreign crude oil that is simply *passing through* U.S. territory (read: Canadian tar sands crude) can in fact be exported, although a license still has to be granted and to obtain one it has to be proven that the foreign oil has not comingled with U.S. oil.

Currently, foreign crude oil exports through the U.S. are relatively rare but they do occur. A shipment of around 270,000 barrels of foreign crude left the port of Los Angeles in January 2013 for China. The crude was apparently in two batches, one from Ecuador and one from Canada.²⁴

So it is clear that export licenses can and have been issued for Canadian crude passing through the U.S. and there is no reason to believe that they would not be issued for crude moving through Keystone XL. Indeed, the Platts analysis discussed above clearly sees this as a likely outcome if Keystone XL is built.

²³ Ibid.

²⁴ Argus Media, "Rare US west coast to Asia-Pac crude cargo re-exported," April 2, 2013.

How much surplus?

Table 3 shows total heavy oil imports into the Gulf Coast region's refineries in 2012 at an average of 2.15 million bpd. Seaway and KXL's heavy oil import capacity is given as a range according to two recent estimates from Platts²⁵ and Goldman Sachs.²⁶ A pipeline's capacity is usually reduced if it transports heavy oil, and these estimates reflect different calculations for these pipelines' likely heavy oil capacity.

When the minimum structural heavy oil import level indicated by the foreign ownership of Gulf Coast refineries is included, these calculations show a surplus in the range of 90,000 to 410,000 bpd. It is also worth noting, as Figure 1 above illustrates, heavy oil imports fell between January and April 2013 to 1.92 million bpd, a possible result of reduced heavy oil processing resulting from the tight oil surge – a trend that may continue.

Table 3: Gulf Coast heavy oil imports and the potential for surplus (000 bpd)

Gulf Coast Total Heavy Oil Imports 2012	Gulf Coast Minimum Structural Heavy Oil Imports	Seaway Heavy Oil Capacity	Keystone Heavy Oil Capacity	Total Future Heavy Oil Import Capacity (Structural + Seaway + KXL)	Difference between 2012 imports and Future Imports
2,150	1,100	520-720	625-745	2,240-2,560	90-410

Conclusion

Since Keystone XL was first proposed, the North American oil market has been radically altered by fracking, which has unlocked an abundance of light sweet oil. America's tight oil is trapped in the North American market by strict U.S. crude export regulations and therefore is set to offer U.S. refiners a unique opportunity to take advantage of cheap light oil. This fundamentally changes the position of U.S. refiners and enables them to increase their flexibility to refine different quality crudes. The result is a U.S. Gulf Coast market that is much more competitive and flexible than has been described by the State Department's assessment of the pipeline.

Canadian heavy crudes, which are already locked out of over 50 percent of Gulf Coast heavy oil refining capacity, will have to compete with heavy crudes from around the world in a refining market in which refiners have maximum flexibility to play off suppliers against each other.

Keystone XL could end up playing a unique role in enabling tar sands producers to access both the world's key refining center (the U.S. Gulf Coast) as well as global heavy oil refining markets. This makes Keystone XL a key enabler of increased tar sands production and thus is clearly an infrastructure project that increases GHG emissions.

²⁵ Esa Ramaswamy, "Webinar: Limits to US oil progress," Platts, June 20, 2013. <https://event.webcasts.com/viewer/event.jsp?ei=1017631>

²⁶ The Goldman Sachs Inc. Global Investment Research, "Getting oil out of Canada: Heavy oil diffs expected to stay wide and volatile," June 2, 2013. Subscription Only.