



ISSUE BRIEF

US Oil Export Outlook

Prospects and Constraints

MARCH 2016 AMRITA SEN

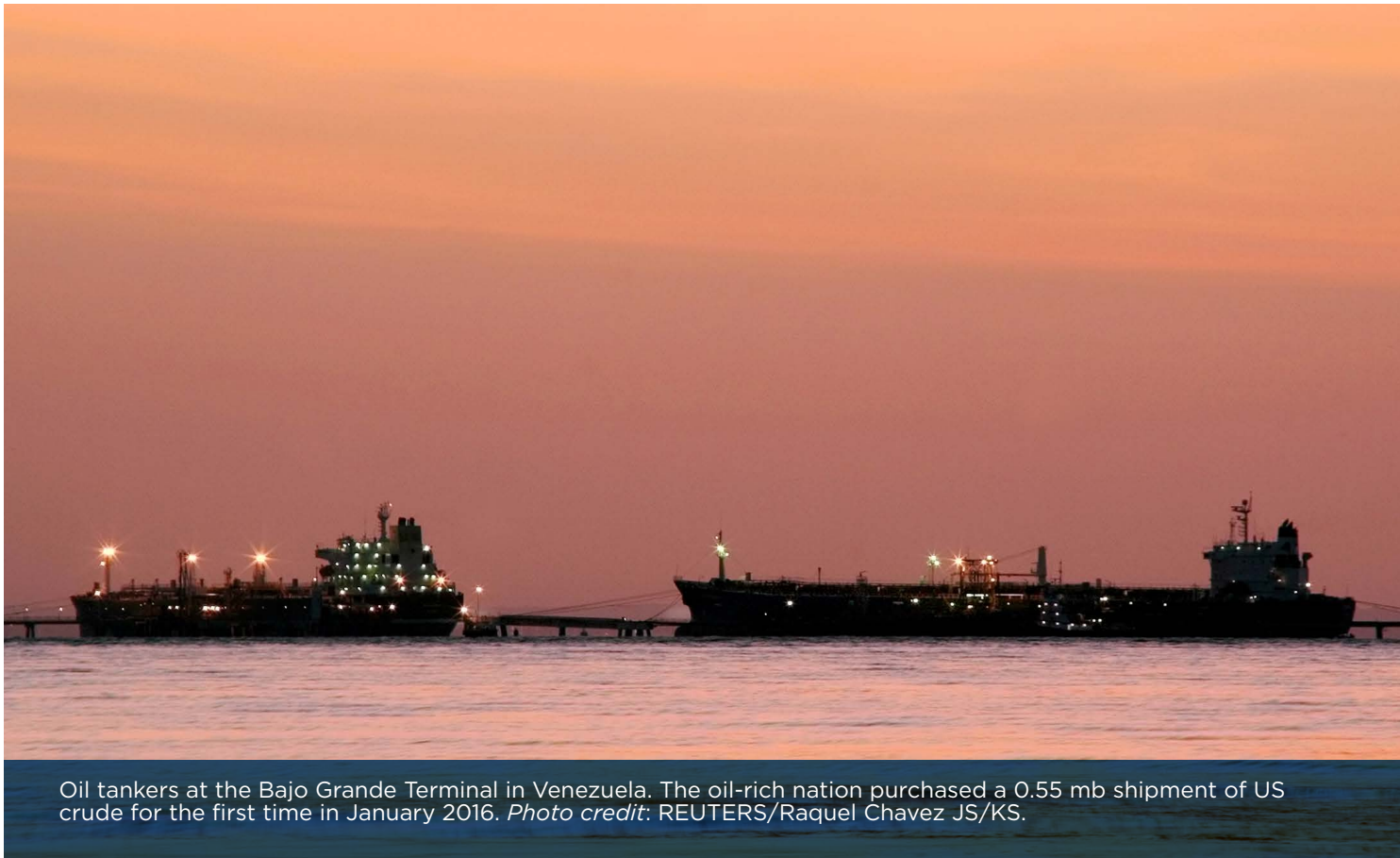
The influence of oil on the global psyche is pervasive. This is hardly surprising given the impact oil prices have on so many aspects of the world—from worldwide financial markets, where oil and gas companies are among the biggest listed firms, to industry and manufacturing, where energy (including oil) is a significant input cost. Individual consumers experience these prices every time they visit the gas station or buy an airline ticket. These prices also play an ongoing role in global politics, contributing to the importance of the Middle East region. For the United States, in recent years, the price of oil had been primarily shaped by imports and domestic price differentials, based around the West Texas Intermediate (WTI) crude oil price, the main US baseline price. For over forty years US exports of crude oil were banned except in limited circumstances, which played an important role in setting domestic oil prices. But following the rapid growth in US shale production in recent years and persistent lobbying by US oil producers, that ban was overturned in December 2015.

The lifting of the US crude oil export ban opened the market to global buyers, thereby raising demand for US crude oil and immediately increasing WTI benchmark prices—albeit from relatively low levels as prices had already collapsed, and the start of 2016 has seen prices fall again. However, large-scale exports beyond a few “test cargoes”¹ are not currently economically feasible as WTI prices are not sufficiently lower than Brent crude—the most commonly used international oil benchmark—which is based on oil extracted from the North Sea and therefore costs less to ship globally. Moreover, from a production standpoint, there may be logistical challenges preventing a quick ramp-up in volumes.

However, midstream companies will be quick to expand export terminals, associated storage, and pipelines. The Corpus Christi crude

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¹ Individual cargoes purchased outside of any long-term deals, used to establish how a particular type of crude reacts in a refinery.



Oil tankers at the Bajo Grande Terminal in Venezuela. The oil-rich nation purchased a 0.55 mb shipment of US crude for the first time in January 2016. *Photo credit: REUTERS/Raquel Chavez JS/KS.*

terminal in Texas can already load 1 million barrels of oil per day (mb/d) of crude and condensates—a type of ultralight oil. Although much of these volumes are currently moving to domestic refineries on barges, the start-up of the Bayou Bridge pipeline will take on this domestic load—reducing the need to ship oil internally across the Gulf, and thus opening up dock space for exports.² In addition, Louisiana will receive 0.35 mb/d of crude from Texas by pipeline, freeing up crude from Corpus Christi for exports. The Houston port in Texas is also starting to export crude.

The United States has a variety of crude oil grades and these are priced differently across the country, reflecting localized supply, demand, and infrastructure factors. For example, WTI is priced at the Cushing storage hub in Oklahoma, and is determined by crude demand and supply there. WTI prices are taken into

account when pricing Magellan East Houston (WTI MEH) crude at the Magellan East Houston terminal, prices which also incorporate the pipeline tariff paid to get the oil there. Now that exports are allowed, WTI MEH and Midland, Texas (WTI Midland) prices will get a boost as a result of both the lifted ban and the freed-up dock space at Corpus Christi. Louisiana may not join the export party just yet given the cost of adding outgoing pipeline capacity to the Louisiana Offshore Oil Port, even if the flow of the Capline pipeline, which originates in St. James, Louisiana, and transports US Gulf Coast crude and imported crude to US refineries, ends up being reversed to bring more crude to the state. Still, the United States could theoretically export 0.7-0.8 mb/d of crude overseas.

Even so, the lack of loading docks in the United States that can receive “very large crude carriers,” known as VLCCs, will keep the transportation costs for US exports high, making the distant Asian market an uneconomical, and thus unlikely, destination for

² “Yearly Reports,” Port of Corpus Christi, <http://www.portofcc.com/index.php/general-information-155/yearly-statistics>.

US crudes. Latin America (including Mexico) will be the biggest eventual recipient, followed by Europe, although a lack of import infrastructure and dilapidated refineries will keep Latin America's intake closer to 0.2-0.3 mb/d, accounting for only roughly 30-35% of total US exports, with US crudes mostly displacing African light crudes. This report examines the potential export routes and destinations, along with the infrastructure, that are likely to support the export build out.

Near-Term Impact of Lifting Ban on Exports

In December 2015, Congressional Democrats and Republicans reached a deal to repeal the forty-year US crude export ban as part of the \$1.1 trillion omnibus bill to extend government funding. As US production started rising rapidly in 2008, resulting in a glut of light sweet crude, domestic oil producers put significant pressure on the government to lift the ban. But the Barack Obama administration was unlikely to pursue a repeal of the ban, given the President's commitment to combating climate change and promoting renewables and, generally, green energy. Yet, almost out of nowhere, it became a reality. The legislative package also gave US independent refiners a small tax break, allowing them to count only 25 percent of transport costs when calculating a tax deduction for "domestic production activities" (i.e., processing US crude), rather than the full transport costs.

The rapid increase in momentum to lift the export ban led the oil futures market to enthusiastically price in the imminent possibility of exports. This supported WTI prices against other crude prices, and also buttressed arbitrage opportunities between WTI and all other related international crudes in December 2015 and January 2016.³ WTI became more expensive than Brent for every monthly futures contract that would be trading through June 2016 at some point during both months.⁴ Given the market had previously been

3 Arbitrage is the practice of taking advantage of a price difference between crude grades in two or more different markets.

4 "WTI-Brent Financial Futures Quotes," CME Group, <http://www.cmegroup.com/trading/energy/crude-oil/wti-brent-ice-calendar-swap-futures.html>; Monthly futures contracts are pre-arranged agreements for the delivery of WTI or Brent crude.

short-selling WTI timespreads, a clear round of short-covering was underway to take advantage of the price differential, but the sustained premium of WTI to Brent was surprising.⁵

After all costs are included, WTI crude needs to be \$2.50-3.00 per barrel cheaper than Brent in order for exports to be economically feasible. But lifting the ban should put a floor, or lower limit, on the spread, or difference, between WTI-Brent prices, as WTI cannot weaken too far relative to Brent before traders take advantage of arbitrage opportunities. However, market structure matters more than WTI-Brent arbitrages for exports. The precise terms of domestic physical crude transactions vary considerably depending on the counterparty, and producers are allegedly offering significant discounts to entice buyers in the hope they

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can secure long-term deals. Indeed, the specific supply deals can differ considerably from one another. The economics also vary markedly by player. For example, a committed shipper on the Marketlink pipeline with space to spare might see the pipeline tariff as an already sunk cost, and would therefore view the cost to ship to the US Gulf Coast as limited to terminal and pipeline loss allowance.⁶ Similarly, for a shipper importing a cargo using a time-charter tanker that would otherwise ballast (travel at ship weight alone)

back to origin, loading the same tanker with US crude could make good economic sense. So, as long as the WTI contango pays for transport, US crude exports can occur even if WTI is only marginally less expensive than Brent, especially if the cost of crude without added transport costs at the destination is trading at a premium to Dated Brent.⁷

5 Short-selling a timespread involves buying loaned contracts at a certain price, with the understanding that they will eventually be sold back to the lender, or "covered," whatever the price difference.

6 Plains All American Pipeline, L.P., defines loss allowance as the following: "As is common in the pipeline transportation industry, our tariffs incorporate a loss allowance factor that is intended to, among other things, offset losses due to evaporation, measurement and other losses in transit. We utilize derivative instruments to hedge a portion of the anticipated sales of the allowance oil that is to be collected under our tariffs." See Plains All American Pipeline, L.P., US Securities and Exchange Commission Quarterly Report, Form 10-Q, filed May 8, 2009.

7 Investopedia defines contango as "a situation where the future spot price is below the current price, and people are willing to

Currently, there is significant interest in securing WTI test cargoes as refiners from around the world want to test the crude quality. Test cargoes, such as those booked by the oil company Vitol destined for its Switzerland refinery, loaded in late December and early January.⁸ There are a few other cargoes heading to Japan and China and there have also been a few cargoes to Venezuela, which is taking US crude to the tune of 30-40 thousand b/d to use as diluents, while commodity-trading company Trafigura has sent a US crude cargo to Israel. However, large-scale exports have not yet occurred. In fact, the only pure crude export cargoes so far are the ones to Venezuela and Israel, while the others are largely condensate cargoes with a splash of crude (Japan/Europe), or Canadian re-exports (China). So with US crude exports now allowed, separating out the exact composition of the crude being exported will become challenging, at least until lagged data are released.

Overall, lifting the export ban is bearish for WTI in the near term, as its boost on prices may result in more imports heading to the United States, while not leading to any meaningful volume of crude exports and curtailing refinery throughputs—the volume of crude being processed over a given period. Exports are likely to keep the differential between the Louisiana Light Sweet (LLS) grade and Brent, as well as WTI-Brent spreads, narrow structurally—this is to say, narrow due to structural market changes brought about by the lifting of the export ban rather than temporary market factors. They will also provide an uplift to Midland, Texas, price differentials as more Midland crude is likely to head to the US Gulf Coast for export given the improved connectivity. WTI MEH crude prices may

also get a boost, given Houston and Corpus Christi are likely to be the main ports for exports, and will probably become the key benchmark for pricing US exports. Nevertheless, US crudes still need to trade at discounts to international benchmarks for exports to make financial sense.

Limited Export Infrastructure Available Today, but Fixes Are Underway

Even if exports were to make economic sense today, logistical challenges may prevent a quick ramp-up in production. For the past forty years, the majority of the US Gulf Coast's dock infrastructure has been geared to receive rather than to deliver crude. Reversing this process would likely require significant logistical alterations to pipelines, lightering routes—where volumes are unloaded from a larger vessel to smaller ones for transport to shore, when docking space for larger vessels is not available—docking practices, and storage tanks. Many midstream firms have been preparing for crude and condensate exports from the Gulf for some time and, given the large decline in US imports over the last few years, dock overcapacity exists today that could probably be repurposed fairly quickly, but not overnight. For instance, US Gulf Coast crude exports are limited to Average Freight Rate Assessment (Aframax) and Panamax vessel sizes, which cover 0.6 million barrel (mb) cargoes.⁹ Gulf Coast logistics facilities (excluding the Louisiana Offshore Oil Port) do not have the capability to load larger cargoes for Suezmax ships and VLCCs.

Enterprise Products Partners, the largest publicly traded midstream company in the United States, has invested heavily in its Houston Ship Channel facility and has introduced pipeline connectivity to its docks from its Enterprise Crude Houston Oil (ECHO) terminal, providing a direct route to waterborne markets for US and Canadian crude oil.¹⁰ Enterprise and other firms located at Corpus Christi have ample experience moving large volumes of processed condensate overseas—likely a far more complex task than exporting crude given the requirements for segregation and storage currently imposed on US condensate exports. If and

pay more for a commodity at some point in the future than the actual expected price of the commodity." So here, the cost of transport would be covered by the future price the crude will fetch in an export market. See "Contango," Investopedia, <http://www.investopedia.com/terms/c/contango.asp#ixzz41CpMakVT>; Reuters defines Dated Brent as "a market term for a cargo of North Sea Brent blend crude oil that has been assigned a date when it will be loaded onto a tanker. Cargoes that have been assigned loading dates are referred to as dated cargoes, wet cargoes or wet barrels. Cargoes without loading dates are known as paper barrels and are traded for speculative or hedging purposes. Dated Brent prices are used, directly and indirectly, as a benchmark for a large proportion of the crude oil that is traded internationally." See "Dated Brent," Reuters Financial Glossary, http://glossary.reuters.com/?title=Dated_Brent.

8 Joe Carroll, "Swiss Oil Trader Vitol Biggest Buyer So Far for US Shale Crude," *Bloomberg Business*, December 30, 2015, <http://www.bloomberg.com/news/articles/2015-12-30/conocophillips-beats-rivals-in-race-to-export-u-s-shale-crude>.

9 For further information on ship size and capacity, see "Ship Sizes," Maritime Connector, <http://maritime-connector.com/wiki/ship-sizes/>.

10 Arjun Sreekumar, "Enterprise to Expand Echo Crude Storage Terminal in Houston," *Motley Fool*, May 7, 2013, <http://www.fool.com/investing/general/2013/05/07/enterprise-to-expand-echo-crude-storage-terminal-i.aspx>.



Oil drilling rigs in Dickinson, North Dakota in January 2016. *Photo credit: Andrew Cullen/Reuters.*

when US export arbitrages become economic, there will certainly be the option to move this material out of the Gulf, but these movements are likely to incur higher terminalling costs and experience some initial logistical challenges. This further supports the argument that WTI needs to be around \$2.50-3.00 cheaper than Brent before exports become economic.

Ultimately, US midstream companies, especially those with the expertise to handle large volumes of storage and port expansion capacity in the Gulf Coast, will be the key beneficiaries of the export ban lifting. In this regard, both Houston and Corpus Christi are likely to become critical export hubs.

Two Key Port Hubs: Houston and Corpus Christi

The main reason for Houston's and Corpus Christi's likely prominence is their abundance of oil storage capacity. According to various port authorities, oil storage capacity is set to rise by 10 mb year-over-year

by the end of 2016 to 50 mb.¹¹ Both ports already blend significant volumes of crude and condensates from various US basins and Canada and sell them to eastern Canada and to other parts of the United States, per US Energy Information Administration data.¹²

More specifically, Enterprise has been exporting large volumes of condensates from its Houston Ship Channel terminal and boasts over 20 mb of usable storage capacity at the port. For instance, Enterprise provided the logistics and terminalling services for Vitol to load a 0.6 mb crude cargo from its Houston terminal in the first week of January.¹³ There is another 6-8 mb

11 "Texas Ports 2015-2016 Capital Program, Executive Summary," Port Authority Advisory Committee, <https://ftp.dot.state.tx.us/pub/txdot-info/tpp/giww/port-capital-plan-2015-16.pdf>.

12 US Energy Information Administration, "Petroleum & Other Liquids: Exports by Destination," http://www.eia.gov/dnav/pet/pet_move_expc_a_EPCO_EEX_mbbldpd_m.htm.

13 "Vitol Books 2nd Crude Cargo for Export after US Lifts Bans," *Shipping Herald*, December 31, 2015, <http://www.shippingherald.com/vitol-books-2nd-crude-cargo-for-export-after-u-s-lifts-ban/>.

Table 1. Texas Port Area Expansion Plans

Port	Project Description	Estimated Cost (millions of dollars)	Engineering Status	Environmental Permit Status
Beaumont	Construct overpass directly to the port bypassing rail and improve access to the port	10	Preliminary	Complete
Brownsville	Construct a new liquid bulk terminal - Oil Dock No. 6	22	Complete	Complete
Corpus Christi	Construct a fifteen-acre expansion of the La Quinta terminal enabling more oil vessels to dock	12	Preliminary	Complete
Houston	Construct a new rail spur for the Bayport terminal	13	In design	Complete
Port Mansfield	Perform maintenance dredging to twelve feet to enable vessel access	8	Preliminary	Preliminary
Port Arthur	Construct a new rail spur and cargo laydown yard	7	Preliminary	Complete
Victoria	Construct a new liquid bulk barge terminal	8	Preliminary	Preliminary
Total		80		

Sources: Texas Port Authority; Energy Aspects estimates.

of storage capacity at Enterprise's ECHO terminal, the majority of which is reserved for operational purposes.¹⁴

The South Texas Port of Corpus Christi has also emerged as a critically important hub, as it is well-connected by pipelines to the Eagle Ford basin in southern Texas and it boasts considerable crude and condensate storage (estimated to be north of 20 mb), and multiple midstream company marine docks (see table 1). The volume of crude and condensate being shipped out of Corpus Christi averaged 0.68 mb/d between January and November 2015, five times the average daily volume over the entirety of 2014, according to data published by the Texas Port Authority.¹⁵ The marine terminal has

an export capacity of 1 mb/d with waterborne traffic congestion limiting terminal throughput. Exports peaked in August 2014 at 0.76 mb/d and although they eased to 0.67 mb/d in November 2015 as domestic production started falling and WTI-Brent spreads narrowed, they remain high.¹⁶

Currently, the bulk of this volume heads to domestic refineries but with the export ban lifted, barrels have already started to head to overseas markets, such as those in China, Japan, and Europe. The first US crude export cargo loaded from NuStar's North Beach terminal in Corpus Christi on December 31, 2015. Therefore, Corpus Christi, much like Houston, will

14 "Enterprise Products Partners to Participate in RBC Capital Markets MLP Conference," *Business Wire*, December 20, 2013, <http://www.businesswire.com/news/home/20131120005994/en/Enterprise-Products-Partners-Participate-RBC-Capital-Markets>.

15 "Texas Ports 2015-2016 Capital Program," Port Authority Adviso-

ry Committee, op. cit.

16 "Cargo Reports by Commodities Activity Reports," Port of Corpus Christi, <http://www.portofcc.com/index.php/general-information-155/statistics/monthly-reports/76-section-business-development/589-cargo-reports-by-commodities-5>.

continue to expand its marine dock facilities; there are plans to do the following:

- The port of Corpus Christi is proposing an expansion to accommodate more and larger oil vessels.¹⁷
- Plains and Enterprise also plan to build a new marine terminal on the Corpus Christi ship channel by 2017 that would provide access to international shipping routes.¹⁸

Other ports in Texas are also expanding rapidly. For instance, the Port of Brownsville, Texas, recently completed a six-hundred-foot-long marine cargo dock and storage yard, the first new cargo facility at the port in sixteen years (see table 1 for a full list of proposed Texas port expansions).¹⁹ Outbound shipments from Flint Hills port in Ingleside, Texas, have also risen.²⁰ Meanwhile, even though the Cheniere crude stabiliser will no longer be built following the lifting of the export ban, the new marine terminal at Ingleside that was part of the overall stabiliser infrastructure plan may still go ahead.²¹ If the terminal does go ahead, the original plans for it to be built with initial storage of 3 mb and up to two marine docks capable of handling Aframax-size vessels and barges may still be used.²²

17 "Texas Ports 2015-2016 Capital Program," Port Authority Advisory Committee, op. cit.

18 "Plains All American, Enterprise Products to Expand Eagle Ford Takeaway, Build New Export Facility," *Oil & Gas 360*, November 4, 2014, <http://www.oilandgas360.com/plains-american-enterprise-products-expand-eagle-ford-takeaway-build-new-export-facility/>.

19 "Texas Ports 2015-2016 Capital Program," Port Authority Advisory Committee, op. cit.

20 "Port of Ingleside," Marine Traffic, http://www.marinetraffic.com/pl/ais/details/ports/276/USA_port:INGLESIDE?lang=pl.

21 "Texas Ports 2015-2016 Capital Program," Port Authority Advisory Committee, op. cit.; A stabilizer is basically a fractionation column that removes light components from the crude. Sandy Fielden further explains—in "You're a Stabilizer Baby - Eagle Ford Condensate Expert Infrastructure," RBN Energy, July 13, 2014, [https://rbnenergy.com/you-re-a-stabilizer-baby-eagle-ford-condensate-export-infrastructure—that-the-...purpose-of-field-stabilization-of-crude-and-condensate-is-primarily-to-separate-out-lighter-hydrocarbon-gases-such-as-methane-\(aka-natural-gas\)-and-light-\[natural-gas-liquids\]-ethane-propane-from-heavier-hydrocarbon-components-in-order-to-reduce-the-volatile-flammable-liquid-components.-The-resultant-stabilized-liquids-generally-have-a-specific-Reid-vapor-pressure-\(RVP\)-designed-to-meet-pipeline-transportation-requirements.](https://rbnenergy.com/you-re-a-stabilizer-baby-eagle-ford-condensate-export-infrastructure—that-the-...purpose-of-field-stabilization-of-crude-and-condensate-is-primarily-to-separate-out-lighter-hydrocarbon-gases-such-as-methane-(aka-natural-gas)-and-light-[natural-gas-liquids]-ethane-propane-from-heavier-hydrocarbon-components-in-order-to-reduce-the-volatile-flammable-liquid-components.-The-resultant-stabilized-liquids-generally-have-a-specific-Reid-vapor-pressure-(RVP)-designed-to-meet-pipeline-transportation-requirements.)

22 Kristen Hays, "Cheniere Moving Ahead with Condensate Export Terminal in Texas," *Reuters*, June 29, 2015, <http://www.reuters.com/article/cheniere-condensate-exports-idUSL2NOZF1SS20150629>.

Pipeline Expansions and Reversals Also in the Cards

Pipelines that move crude to these ports are also being expanded to transport greater volumes of crude. Pipelines including Double Eagle, Harvest, and the lines operated by Plains and NuStar already bring over 1.3 mb/d of Eagle Ford and other shale play crudes to Corpus Christi (see table 2 for Gulf Coast pipelines); more expansions like the following are in the offing:

- The 0.25 mb/d Cactus pipeline that came online in April 2015 offers a direct route for Permian Basin crude to reach Corpus Christi via the western Eagle Ford crude gathering hub in Gardendale, Texas.²³ The pipeline is currently undergoing an expansion that will increase its capacity to 0.33 mb/d by mid-2016.
- The Cactus pipeline flows into the Eagle Ford Joint Venture pipeline, which moves crude and condensate from Gardendale to refineries in Three Rivers, Texas, and Corpus Christi and to other markets via marine transport facilities at Corpus Christi. As part of their commercial joint venture, Plains and Enterprise have also been constructing a new fifty-five-mile-long crude gathering pipeline system connecting production areas in Karnes County, Texas, and Live Oak County, Texas, to the Three Rivers terminal. They have also been building additional storage and pumping capacity at Three Rivers.²⁴

In theory, the US ports of Houston and Corpus Christi could open up over 1 mb/d of capacity for exports. However, as previously discussed, the majority of the crude moving through Corpus Christi is now headed to domestic refineries, like those in Louisiana. Therefore, referring to the potential capacity for exports is misleading here. That said, there are a few key pipelines set to start-up in 2016, which will help reduce the need to transport crude overland across the Gulf Coast. The 0.35 mb/d Bayou Bridge pipeline starts-up in the first quarter of 2016 and will deliver crude from Nederland, Texas, to Lake Charles, Louisiana, significantly reducing the volume of oil needed to be barged from Corpus Christi to Louisiana.²⁵ The pipeline may be extended all

23 *Oil & Gas Journal* Editors, "Plains All America to Expand Cactus Pipeline Takeaway Capacity," *Oil & Gas Journal*, November 25, 2014, <http://www.ogj.com/articles/2014/11/plains-all-american-to-expand-cactus-pipeline-takeaway-capacity.html>.

24 "US Crude Oil Pipeline Projects: Kinder Morgan Acquiring Hiland Crude," *Reuters*, January 21, 2015, <http://uk.reuters.com/article/us-usa-pipeline-oil-factbox-idUSKBN0KU2SX20150121>.

25 "Phillips, ETP, Sunoco JV to Build, Operate Bayou Bridge Oil

Table 2. US Gulf Coast Crude Pipelines

Name	Company	Route	Start-Up	Capacity (thousand b/d)
KMCC Crude	Kinder Morgan	Eagle Ford - Galena Park, TX	Q2 12*	300
Helena extension	Kinder Morgan	DeWitt County - Karnes County	Q3 14	100
Sweeny Lateral	Kinder Morgan	DeWitt County - Sweeny Refinery	Q1 14	100
Jones Creek extension	Enterprise	Jones Creek - ECHO	Q1 14	200
Seaway	Enterprise	Cushing, OK - US Gulf Coast	Q1 13	400
Eagle Ford to Houston - Phase 1	Enterprise	Lyssy - Sealy terminal	Q3 12	350
Eagle Ford to Houston - Phase 2	Enterprise	Sealy terminal - Houston	Q1 13	200
ECHO to Nederland	Enterprise	ECHO terminal - Beaumont	Q4 14	780
Seaway Twin	Enterprise	Cushing, OK - US Gulf Coast	Q4 14	450
Eagle Ford	Plains All American	Eagle Ford - Three Rivers	Q1 13	350
Texas Line	Koch	Pettus - Corpus Christi	Q2 13	350
Double Eagle	Kinder Morgan/Magellan	Eagle Ford - Corpus Christi	Q2 13	100
Karnes to Corpus Christi	Koch	Karnes County - Corpus Christi	Q3 13	120
Bridge Tex	Magellan	Colorado City, TX - MEH, TX	Q3 14	300
Longhorn	Magellan	Crane, TX - MEH, TX	Q3 14	275
Eaglebine Express	Sunoco	Hearne, TX - Nederland, TX	Q4 14	60
Keystone Marketlink	TransCanada	Cushing, OK - Port Arthur, TX	Q1 14	700
HoHo reversal - Phases 1-4	Shell	Houston - Nederland and Clovelly	Q1 14	300
Victoria Express	Devon Energy	Eagle Ford - Victoria, TX	Q3 14	100
Rio Bravo pipeline conversion	Energy Transfer Partners	Texas - Corpus Christi	Q4 14	100
South Texas Crude System	NuStar Energy	Oakville, TX - Corpus Christi, TX	Q4 13	100

Sources: Company reports; Energy Aspects estimates.

*Q2 12 stands for the second quarter of 2012. All others in the column follow the same rule.

the way to St. James, Louisiana, in the third quarter of 2017. Sunoco is also expanding its Permian Longview and Louisiana Extension (PELA) pipeline system by 80 thousand b/d, adding PELA II from Longview to Anchorage in the second half of 2016, to link Permian Basin output to Louisiana refineries. This, alongside pipelines constructed by the Texas-based company Energy Transfer Partners (ETP), will potentially mean 0.5 mb/d of new capacity start-up from Texas to Louisiana.²⁶ These projects will free up more of Corpus Christi's dock space for possible crude exports.

Capline Reversal, Louisiana Offshore Oil Port as Export Hub?

Moreover, lifting the export ban may result in the reversal of the 1.2 mb/d Capline pipeline, which currently carries imported oil inland, and the transformation of the Louisiana Offshore Oil Port into a major hub for exporting crude oil.²⁷ While talks of reversing the pipeline surface from time to time, the recent move by Valero to buy a 50 percent stake in the 0.20 mb/d Diamond pipeline that brings crude from Cushing, Oklahoma, to its 0.18 mb/d Memphis, Tennessee, refinery opens up the door for Capline's reversal; the Memphis refinery is currently supplied by Capline but will no longer need to use that route given Valero's decision to use the Diamond pipeline.

Currently, the Louisiana Offshore Oil Port is an import-only terminal. The 1.7 mb/d LOCAP pipeline, which can be expanded to 2.4 mb/d, connects the Louisiana Offshore Oil Port Clovelly storage facility in Louisiana to St. James, Louisiana. The St. James terminal facility has eight storage tanks with over 2.6 mb of capacity.²⁸

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For exports out of Louisiana to work, the LOCAP pipeline would need to be made bidirectional or a parallel pipeline would need to be built. The project would cost billions of dollars, so would be justified only if export volumes pick up materially. In other words, this is unlikely in the near term.

Where Will US Crude Go?

Once Bayou Bridge starts-up, the United States could be able to export a total of 0.7-0.8 mb/d of crude and condensates, prices permitting.²⁹ But the United States still faces a major challenge in that none of its ports have the ability to dock VLCCs, making long-haul exports to Asia unlikely since exports on smaller vessels over longer distances increase costs sharply. Thus, US crude exports are likely to remain within the Atlantic Basin, and primarily head to Latin America, particularly in the near term.

Mexico and Venezuela use smaller vessels, such as Aframax and Panamax ships, to export to the United States. So there is a possibility of a backhaul trade—where a tanker carries another cargo on the return leg of its journey—of around 1.3-1.4 mb/d back to Mexico, Venezuela, and potentially even Colombia (ship owners will take low rates to make the backhaul run), all of which need light sweet crude for either running

directly in their refineries or blending with their heavy crude oil. These would displace light crude imports from the West and North Africa. Yet, there is little to suggest these countries could import more than 0.2-0.3 mb/d of combined volumes. As major oil producers, they lack the necessary import infrastructure and both Mexico and Venezuela have dilapidated refineries, so importing refined products rather than crude is a more attractive option. Of course, US exports to Canada, which have topped 0.5 mb/d, will continue, although with the reversal eastwards of Line 9 to flow from Sarnia, Ontario, to Montreal, Quebec, up to 60 thousand b/d

Pipeline," *Oil & Gas Journal*, July 31, 2015, <http://www.ogj.com/articles/2015/07/phillips-etp-sunoco-jv-to-build-operate-bayou-bridge-oil-pipeline.html>.

26 Kristen Hays, "Exxon Pipeline Reversal Moving Texas Crude to Louisiana," *Reuters*, August 4, 2015, <http://www.reuters.com/article/exxon-mobil-pipeline-reversal-idUSL1N10F2DL20150804>.

27 Flows through the Capline pipeline have been around just 0.3 mb/d since the tight oil boom reduced import needs; "Form 6/6-Q - Annual/Quarterly Report of Oil Pipeline Companies," Federal Energy Regulatory Commission, September 17, 2014, <http://www.ferc.gov/docs-filing/forms/form-6/viewer-instruct.asp>.

28 "Services: Pipeline Management," LOOP, <https://www.loopllc.com/Services/Pipeline-Management>.

29 Amrita Sen, Robert Campbell, Virendra Chauhan, Richard Malinson, Michal Meidan, Dominic Haywood, Andrew Echlin, Rhidoy Rashid, and Olivia Ward, "The Oil World in 2016," *Energy Aspects*, January 12, 2016, <https://www.energyaspects.com/publications/view/the-oil-world-in-2016>.

of US Gulf Coast exports will be displaced from the market in eastern Canada.³⁰

US crude exports may also find a home in Europe, where refiners still process large volumes of light sweet crude from the North Sea, former Soviet Union, and West Africa. However, the Mediterranean refineries are unlikely to be too keen on US crude cargoes unless they are priced extremely competitively, given the grades will be up against prices fueled by the growing competition between Iraq, Saudi Arabia, and Russia—after Iran’s return to the market—and also given the Mediterranean refineries’ increasing palate for medium sour grades. The United States could displace some existing suppliers of the 4.5 mb/d of northwest European crude imports, but again, geographical and logistical proximity to the North Sea, former Soviet Union, West Africa, and even the Middle East suggests US volumes are likely to be small and restricted to oil majors and trading houses moving cargoes to make quick money on arbitrage opportunities.³¹

Some refiners may prefer US crudes given the stable political environment, especially in the context of growing tensions with Russia and rising unrest in the Middle East, but given the poorer quality of US unconventional light crudes (the Bakken Formation in North Dakota notwithstanding), the success of US producers to make inroads into Europe will ultimately depend on US crude prices. In other words, US crudes will have to be discounted for large-scale exports to be competitive in Europe.

Separately, some Canadian medium grade crudes will continue to leave from US ports, classified as re-exports. If anything, as US Gulf Coast export infrastructure gets built out, volumes of Canadian re-exports may pick up as terminalling costs fall.

Still, Not a 2016 Story

Despite all these new potential volumes and destinations, the elephant in the room remains US production. At current price levels, US production

is falling rapidly and, irrespective of the WTI-Brent spreads, there may not be enough excess US crude in 2016 for exports to occur. Indeed, US crude production is likely to fall by over 0.4 mb/d year-over-year in 2016 and the current low price levels could lead to rising numbers of bankruptcies among US independent producers.³² US crude exports can occur only in meaningful volumes once US production of light sweet crude increases again, and that is unlikely before WTI rises sustainably back to the \$60-70 per barrel range. While expectations are for prices to start rising in the second half of 2016, they will rise sustainably only in 2017, and with the time lag associated with production responding to prices, US production is likely to begin to rise only in 2017 even if it stabilises in the second half of 2016.

This paper assumes the United States will not be exporting medium and heavy crude grades given it is still a large importer of nearly 7.5 mb/d of those grades.³³ Of course, arbitrage opportunities may occasionally arise for traders when it makes sense to move a few domestic medium and heavy crude cargoes abroad, but this is unlikely to be a regular feature. Overall, given the current pricing structure and existing infrastructure, the decision to lift the US crude export ban has more symbolic significance than tangible impact on market fundamentals. But, in the coming years, it will provide a floor for US crude prices and once again change trade flows, potentially pushing barrels currently going to Latin America and Africa to longer-haul Asian destinations.

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31 “Database,” Eurostat, <http://ec.europa.eu/eurostat/data/database>.

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