Deep Water – The Race to Build VLCC-Ready Terminals

Rising Crude Export Volumes Drive Onshore, Offshore Projects

- **U.S. crude oil exports increased from 590 Mb/d in 2016 to 1.1 MMb/d in 2017 and 1.8 MMb/d so far in 2018, and further gains are likely as U.S. crude production continues to rise.**
- **Very Large Crude Carriers are the most cost-efficient way to transport crude to Asia and some other distant markets, but there is currently only one Gulf Coast terminal capable of fully loading VLCCs: the Louisiana Offshore Oil Port.**
- **To prepare for higher export volumes, there is a race on to develop additional crude storage and marine-dock capacity along the Texas and Louisiana coasts, as well as onshore and offshore terminals that can handle VLCCs.**
- **While more VLCC-ready export capacity is required, that need is not unlimited, and there is a scramble among developers to get their projects to Final Investment Decisions first.**

1. Introduction

More than 524 million barrels of U.S. crude oil were exported in the first 10-plus months of 2018, according to RBN's new *Crude Voyager* report and export volumes — lately hovering around the 1.8 MMb/d mark — are likely to continue increasing next year and in 2020. The export boom is made possible by the lifting of the ban on most U.S. crude exports in December 2015 and is driven by rising production in the Permian, Eagle Ford, SCOOP/STACK and other major plays. The Energy Information Administration (EIA) puts U.S. crude production at 11.7 MMb/d — 11.2 MMb/d in the Lower 48 — and RBN's latest *Gusher* report forecasts that output will rise another 500 Mb/d by April 2019. These production gains are occurring despite pipeline takeaway constraints out of the Permian, and may well accelerate in late 2019 and early 2020 as new pipeline capacity comes online, eliminating bottlenecks between West Texas and the Gulf Coast.

According to *Crude Voyager*, exports out of existing terminals along the Gulf Coast (see Figure 1) averaged 1.83 MMb/d in the four-week period ended November 23 (2018), with Houston-area terminals sending out 648 Mb/d (on average), followed by Corpus Christi-area docks with 569 Mb/d, Beaumont-area facilities with 485 Mb/d, and Louisiana ports with 130 Mb/d.

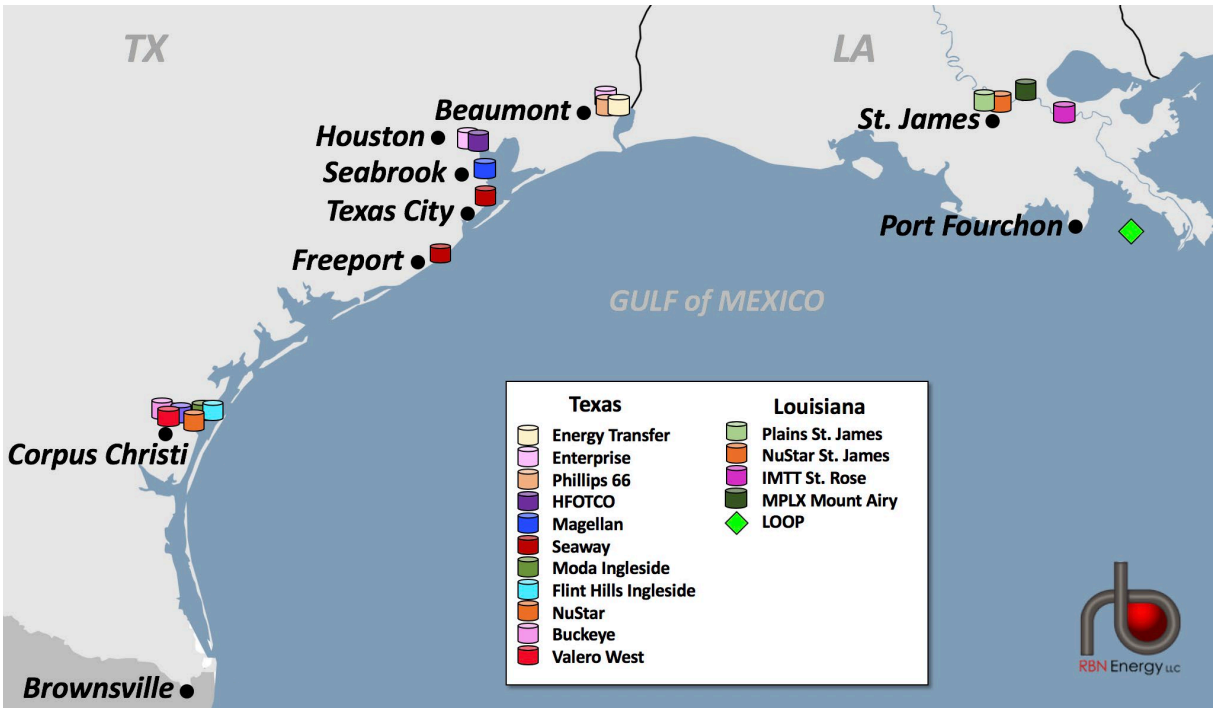

Figure 1 – Existing Gulf Coast Crude Export Facilities; Source: RBN

As a group, these existing terminals — all of them land-based except for the Louisiana Offshore Oil Port (green diamond) — could handle substantially higher volumes of crude exports, and a number of expansion projects are under way to increase the capacity of individual terminals. However, LOOP remains the only Gulf Coast port that can fully load 2-MMbbl VLCCs, which for purely economic reasons have emerged as the transporter of choice for crude exports to Asia – – a primary market for U.S.-sourced oil. In fact, the economic advantage of VLCCs is seen as being significant enough to justify the pursuit of the deepwater terminals discussed in this report.

Generally speaking, the land-based terminals in Figure 1 offer marine berths with water depth of 40 or 45 feet, and can accommodate Panamax (capacity ~380 Mbbl) and Aframax (~500 to 600 Mbbl) tankers. A much smaller subset can handle larger Suezmax vessels (~1 MMbbl), and fewer still are capable of partially loading VLCCs (~2 MMbbl; ~1,100 feet long, nearly 200 feet wide, and drafts of ~72 feet), which are then sent off to a trans-shipment area (TSA) for partial reverse lightering. More common still is using reverse lightering — the shuttling out of crude in Aframaxes or other smaller tankers — to fully load empty VLCCs in a TSA.

Three primary TSAs have emerged in the U.S. Gulf of Mexico. The most prominent is the Galveston Offshore Lightering Area (GOLA), which is close to all of the Houston-area terminals. Even tankers that load in Corpus Christi or Louisiana are often seen traveling to GOLA to perform ship-to-ship transfers. Still, lightering areas off Corpus Christi and Sabine Pass, LA, are growing as lightering destinations as well. We estimate that nearly half of all of the crude exported from existing land-based ports along the Gulf Coast in the first 10 and a half months of 2018 were transferred onto larger vessels in TSAs (blue bar segments in Figure 2).

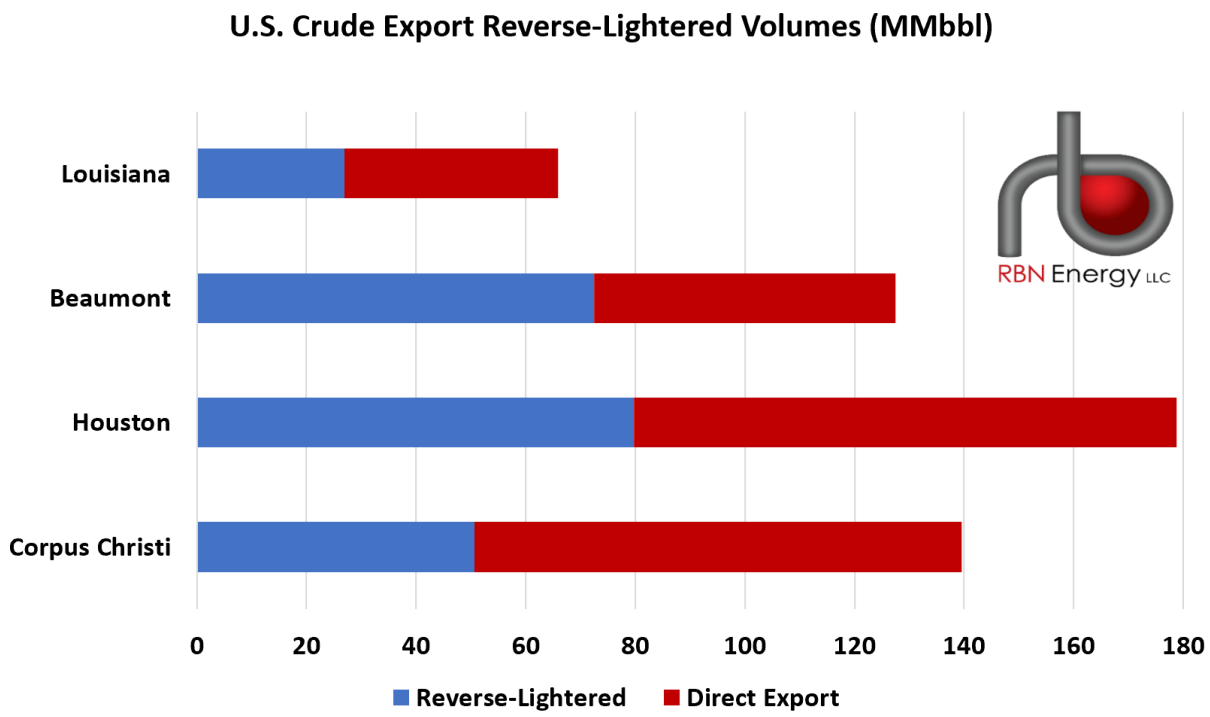

Figure 2 – Reverse-lightered U.S. Crude Export Volumes, January 1-November 16, 2018. Source: RBN *Crude Voyager*

Loading VLCCs via reverse lightering is an interim and costly alternative to loading directly from a deepwater terminal. In *Crude Voyager,* we have reported that the Panamax and Aframax tankers used to shuttle crude from land-based ports to VLCCs offshore were spot-chartered at rates between $40,000-$50,000 a day. The tankers are typically leased out for three-day periods to get one transfer done. That means that for an Aframax tanker that typically hauls 500-600 Mbbl of crude, four separate trips would be required to fill one VLCC. Filling a supertanker that way would take at least 12 days in the most efficient scenario, and cost as much as $600,000 in chartering costs. Any extra delays would incur additional demurrage fees.

In reality, the supertankers on the receiving ends of reverse-lightered cargoes are typically floating in the U.S. Gulf of Mexico for at least a month's time. A typical VLCC has around 18 different storage tanks, and international buyers are known to take different grades, normally no more than two, on the same ship. In our research, we have observed VLCCs co-loading crudes from multiple different origins across the Gulf Coast. It is also not unusual for a tanker to fill up only halfway with U.S. crudes before moving on to finish the job by loading with Maya crude offshore of Mexico's East Coast.

Compare these costs and logistics to that of a VLCC-capable deepwater terminal. Several of the proposed terminals outlined in this report are designing loading arms that can move 2 MMbbl in a 24-hour period, significantly improving efficiency. With U.S. crude export volumes now high enough to fill nearly one 2-MMbbl VLCC a day, there is a big push on to develop new offshore terminals capable of fully loading the supertankers off the coasts of Texas and Louisiana. There also are at least a couple of efforts under way to develop *onshore* terminals capable of fully loading VLCCs at Harbor Island and at Ingleside, TX, both of which are near the entrance to the Corpus Christi Ship Channel.

This Drill Down Report will focus primarily on the projects that would involve the construction of new offshore or onshore terminals with the ability to fully load VLCCs. The report also will discuss ongoing efforts at LOOP — which was developed in the late 1970s and early 1980s as an import-only facility — to increase its export volumes.

It is important to note that while U.S. crude export volumes may well double or even triple over the next several years, only a small number of the new VLCC-ready terminals now in various stages of planning and permitting are likely to advance to Final Investment Decisions (FIDs), construction and operation — at least in the near-term. This report does not pick likely winners and losers — the market will do that — but instead discusses the details of each of the projects. It must be said, however, that some projects are entirely or mostly greenfield in nature, while others make extensive use of existing assets — something that could give them a leg up on their competition. Also, some of the projects would be tied to extensive networks of existing storage and pipelines.

This report is divided into five sections, including this introduction. Section 2 discusses the proposed offshore terminals, and Section 3 looks at proposed land-based terminals that would – – or later could — be capable of fully loading VLCCs. Section 4 focuses on LOOP — its existing capabilities as well as the efforts to enable a wider variety of U.S. and Canadian crudes to flow to LOOP's Clovelly storage hub, the staging point for crude exported through the offshore terminal. Section 5 offers conclusions.

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