

The Shale Revolution has triggered a renaissance in the oil and gas business in the US, and Worldwide



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Only a few years ago, industry experts declared that oil production in the US had peaked and was destined to progressive decline. **This July, the US Department of Energy reported the US is the largest oil and associated liquids producer in the world and will surpass Russia and Saudi Arabia in two years to become the largest oil producer.**

Texas is playing a key role in this renaissance and the Port of Houston is ideally located and well equipped to receive and process the increasing oil and gas gushing out of the Eagle Ford. The Port is also a gateway for equipment and other supplies needed to sustain the development of the rich deposits.

From its inception and the completion of the deepwater Ship Channel in 1914, the Port of Houston has been intricately linked to the oil and gas industry.

The oil industry has since experienced significant ups and downs, but the activity alongside the Houston Ship Channel has demonstrated great resilience. Today, the waterway serves more than 150 public and privately-owned cargo terminals and other industrial facilities. The Port of Houston is the nation's No.1 port in terms of foreign waterborne tonnage and is home to the world's second largest petrochemical complex after Rotterdam.

There is yet a large new chapter of growth for the Port of Houston being called by the need to process, store and transport the increasing amounts of crude, gas and liquids being unlocked from shale deposit through the revolutionary, Texas-grown technique to inject water and sand in horizontal wells to fracture to shale rock.

In a recent interview with REDNews, R.D. Tanner, Director of Real Estate at the Port of Houston Authority, indicated about 3,500 acres of green field property throughout the Port of Houston is available for development with some of the property having frontage along the Ship Channel.

On the other hand, every week the media reports a new multi-million dollar investment in:

- pipelines and rail systems for moving the increasing crude oil and liquids production
- new and expanded processing plants and refineries in Texas, or
- expansion of marine terminals that will load ships and barges with

the light crude oil to refineries in Louisiana, New Jersey or even some limited exports to Eastern Canada.

The projects also generate a significant amount of skilled jobs: The Greater Houston Port Bureau expects 111,700 direct jobs and 154,100 indirect jobs to be created from announced Ship Channel investments. Very attractive employment compensation packages are being offered to entice the limited skilled labor available. In turn, the living and amenity demands of these workers will be at a higher end than typical blue collar communities.

Additional facilities are needed to handle drilling equipment and steel pipe for the oil fields. Even coal export facilities are being proposed as US demand is displaced by low cost domestic natural gas.

Demand for oil facilities at the Port of Houston is also coming from production increases in the Permian Basin in West Texas and from utilization of Canadian oil sands that are well suited to the sophisticated Houston high conversion refineries.

Not all of the required infrastructure must have frontage to the Ship Channel, and most of the ancillary services and workers accommodations and amenities will be seeking space nearby. Expansion and development of these secondary businesses will impact land value many miles beyond the Ship Channel.

Below is a description of some of the projects being developed or recently completed within the Ship Channel area and how they handle and take advantage of the increased shale production.

Pipelines:

Pipeline is the vehicle of choice for transporting oil in large quantities due to safety and cost. But pipelines take time to build and sometimes they may not be suitable to the terrain between the producing fields and the markets. Texas, and the Port of Houston in particular, have a well developed pipeline system; therefore Eagle Ford production is rapidly finding pipeline access to Houston. In the past 12 months two new pipelines have connected Houston refineries and storage terminals to 650,000 barrels per day (b/d) of Eagle Ford production:

- Kinder Morgan started operations on June 14, 2012 of its 300,000 b/d pipeline from Cuero, Texas to the recently expanded Oiltanking Terminal.

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- Enterprise's South Texas Crude Oil pipeline system came into service in June 2012 with a 350,000 b/d line from Wilson County to Sealy, which then connects to the Rancho Pipeline into Houston and the Enterprise Houston Crude Oil terminal. Phase 2 of this project, a 200,000 b/d line from Gardendale to Wilson County, was completed in the second quarter of 2013.

Rail is also utilized.

While Eagle Ford Shale is located close to existing pipeline systems, the large Bakken Shale in North Dakota is not as lucky. Extensive use of rail car has allowed Bakken production to reach markets while pipelines may take up to 5 years to be completed. Petroleum and chemical liquids and gases have been transported by rail for many years in small amounts (3 to 10 railcars per train). However, the large volume of crude coming from the fields requires moving about 100 rail cars at a time in what is called "unit trains". These unit trains, more than a mile long, must be taken off the tracks at the origin and receiving terminals and be loaded/unloaded at a rate of up to three unit trains or 300 cars per day. Each rail car can hold about 600 barrels.

Houston refineries are processing increasing domestic shale oil production within their existing capacity by reducing or completely stopping importing similar foreign crude. However, these refineries are very sophisticated, having made large investments in equipment to process heavy and sour (high sulfur) crudes from Mexico, Venezuela, Saudi Arabia and others to take advantage of increasing production and lower prices for those crude grades.

Associated natural gas production from shale oil is the major factor for keeping a lid on natural gas prices in the US today and in the nearby future.

The other associated gases are **ethane, propane** and **butane** and they are also experiencing an oversupply as traditional demand and transport infrastructure catches up. Propane and butane can be condensed into liquid form by applying pressure and moved in pressurized vessels or through moderate refrigeration. Ethane and natural gas (methane) can only be liquefied through very low temperature refrigeration at much higher cost.

The lightest portion of the liquid produced is called condensate and is composed of gasoline-like hydrocarbons but not suited for today's car engines; therefore, it must be upgraded at a refinery or find other uses in petrochemicals or as diluents for heavy oils.

Houston refineries and petrochemical plants are undergoing modifications to handle larger amounts of the light crude oil from US shale production or to manufacture higher value goods using domestic, low cost natural gas and other hydrocarbons produced "associated" to shale oil.

Independent liquid storage facilities receive and transfer crude oil, condensate, liquefied propane and refined products for third parties, like a warehouse.

There are several large such facilities in the Houston Ship Channel that offer enhanced service through excellent and expanding access to pipelines, rail, interstate highway and waterway, together with collocation with the largest oil refining and petrochemical complex in the US. These facilities are also being expanded to handle the increased demand and they require significant real estate.

Some projects underway include:

Kinder Morgan's:

- **Battleground Oil Specialty Terminal (Bostco):** A \$485 million new facil-



ity sprawling 185 acre on the Houston Ship Channel.

- **Galena Park:** A \$75 million investment to build five new tanks.
- **Pasadena:** \$106 million to purchase 20 acres next to KM Pasadena terminal to build nine new storage tanks and construct a barge dock.
- **Targa Resources is investing \$480 million to increase capabilities to handle natural gas liquids (propane and butane) at its Galena Park site on the Ship Channel and its Mont Belvieu site northeast of the Ship Channel off Interstate 10, which are connected by pipeline.** The Galena Park facility includes refrigeration facilities and marine docks for exporting propane and mixed propane-butane to international markets. The project will be complete in the third quarter of 2014. The expansion included acquisition of the Patriot Terminal just south of Targa's Galena Park, with existing dock and nearby access to refined products pipeline.
- **Intercontinental Terminals:** \$150 million investment announced in March 2013 for the purchase of 180 acres greenfield site in Pasadena and the construction of a new petrochemical and petroleum terminal to be operational in second quarter 2015 .
- **Enterprise Crude Oil Terminal:** following the 2012 startup, an additional 0.9 MMBbls of storage capacity is expected to be in service in the second quarter of 2014 for a total 6.0 MMBbls of crude oil storage capacity. The facility covers 187 acres
- **Oiltanking:** \$200m investment to build 4.2 million barrels of new crude oil storage capacity and pipelines connecting to nearby refineries.
- **Odfjell** is adding 10 tanks to its Bayport site by the first quarter of 2014. The facility currently has 100 storage tanks for natural gas liquids derivative chemicals.

The Shale renaissance is expected to have a long life:

A long-term energy outlook released on Nov. 12 predicts the U.S. will top Saudi Arabia and Russia as the world's leading oil producer by 2015. The report, published by the International Energy Agency, based in France, attributed this prediction to technological advances in shale drilling such as hydraulic fracturing and horizontal drilling, which allow drillers to explore unreached shale plays.

"United States performance has consistently overshot most projections to date and it is possible that more resources will be found and developed to sustain production at a higher level and for longer than we project," the IEA said in the report.