



U.S. LNG Trade Rising, But No Domestic Shipping

As U.S. natural gas production sets new records, trade in liquefied natural gas (LNG) has risen sharply. Since 2016, when the first plant in the lower 48 states to cool gas to minus 260°F for export opened in Louisiana, the United States has exported LNG by ship to 27 countries. The inauguration of a second liquefaction facility in Lusby, MD, in April 2018, portends a further increase in LNG exports.

Yet despite abundant gas supplies and a growing volume of LNG exports, the United States continues to import LNG as well. Imports, including the January arrival of a shipment containing Russian gas to Boston, persist in part because there is negligible domestic trade in LNG. The lack of U.S.-built LNG tankers, a legal requirement in order to move LNG domestically by sea, may be encouraging the use of imported rather than domestic gas in some locations.

LNG Export Expansion

In 2017, the United States became a net exporter of natural gas for the first time since 1957, according to the U.S. Energy Information Administration (EIA). Total exports, pipeline and LNG, were 8.7 billion cubic feet per day (BCF/D), or 12% of production. Most of these exports (78%) move to Mexico and Canada by pipeline. Exports by ship require that the gas be liquefied, which in turn necessitates construction of extremely expensive liquefaction plants. Most U.S. LNG exports, so far, have gone to Mexico, South Korea, and China.

Alongside the Louisiana facility and the new facility in Maryland, three other LNG export facilities may begin operations in 2018, with a combined capacity of 4.62 (BCF/D (**Table 1**)). If these open on schedule, U.S. export capacity could be more than 8 BCF/D of LNG. All told, exports are likely to absorb 11% of U.S. gas production by year end. Additional facilities under development could enable the United States to supplant Australia and Qatar as the top LNG exporter within a few years.

Table 1. Aggregate Status of U.S. LNG Export Facilities

Stage	Combined Capacity (BCF/D)	Status
Operating	3.54	Exporting
Under Construction	4.62	Due online 2018
	3.54	Online post-2018
Small Scale	0.28	DOE Approved
Permitted, but Not Under Construction	6.79	DOE and FERC approved
Proposed	38.14	Permits pending

Sources: Estimated by CRS based on Department of Energy (DOE) and Federal Energy Regulatory Commission (FERC) information. See https://www.energy.gov/sites/prod/files/2018/04/f50/Summary%20of%20LNG%20Export%20Applications_0.pdf, and <https://www.ferc.gov/industries/gas.asp>.

Notes: LNG projects in Alaska are not included in this table as they are subject to different market conditions. The table includes small quantities of LNG exported in shipping containers by American LNG Marketing, mainly to the Bahamas and Barbados. Capacity data are mainly from DOE, which may differ from FERC data, and in some cases are rounded.

LNG Imports: Key for New England

U.S. natural gas imports by pipeline and LNG were 8.3 BCF/D (12% of U.S. consumption) in 2017. Although almost all U.S. natural gas imports (97%) come by pipeline, LNG remains an important source of supply for the Boston area, which is not adequately served by transmission pipelines from gas-producing areas. The Everett LNG Terminal, which is the only facility in the continental United States receiving regular LNG cargoes, imports almost all its LNG from Trinidad and Tobago. Once unloaded, the LNG is regasified and put into the gas distribution system.

Despite importing relatively small amounts of natural gas compared to overall U.S. consumption, the Everett LNG import terminal and its owner, the French energy group Engie, caused a controversy earlier this year when it reportedly imported an LNG cargo containing at least some natural gas from Russia’s Yamal LNG project. Yamal LNG is primarily owned by the Russian energy company Novatek, which is subject to U.S. sanctions, although natural gas shipments are not. The United States has never before imported natural gas from Russia, and the shipment raised the question of why all domestically produced natural gas, shipped either by pipeline or as LNG, was not used.

Natural gas pipelines into New England have faced challenges. Opposition groups have been effective in blocking or delaying the permitting of pipelines that would bring additional volumes of natural gas into New England, or which would generally increase gas transportation capacity in the Northeast market. The main arguments against these pipeline projects include opposition to the extraction and burning of fossil fuels due to climate change concerns, possible water contamination from hydraulic fracturing, overdependence on one fuel for electric power generation, and local construction impacts.

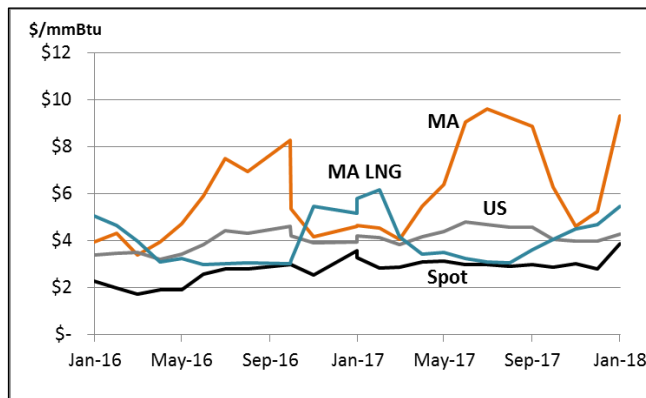
There is currently less opposition to the import of LNG. The Everett LNG import terminal has been operating since 1971. It supplies about 20% of the regional market demand

for natural gas. There is also a second operational import terminal near Boston, Excelerate's Northeast Gateway Deepwater Port, which is mainly used to meet demand spikes. It has not received a cargo since 2016. A third facility, Neptune LNG, now owned by Engie, suspended operations in 2013; in 2017 it applied for decommissioning, which is in process. Its floating storage and regasification unit (FSRU) has already been moved to Turkey.

Natural Gas Prices

Due to natural gas infrastructure constraints, gas users in Massachusetts (and other New England states) tend to pay higher prices than gas consumers in most of the rest of the country (Figure 1).

Figure 1. Comparison of Select U.S. Gas Prices 2016-2018



Source: EIA, <https://www.eia.gov/naturalgas/data.php#prices>.

Notes: Citygate (US and MA) is the price of natural gas where it transfers from a transmission system to a distribution system. Spot price is a one-time market transaction at current market rates. MA LNG refers to the import price at the Everett terminal. Units = nominal dollars per million British thermal unit.

Figure 1 shows prices in Massachusetts usually peak in the summer months leading into fall. However, this year, Massachusetts faced a price spike in January, which led to the importation of the Russian LNG cargo. In the future, the new Maryland LNG terminal, which is some 700 nautical miles from Boston, could potentially be used to supply the New England market in similar circumstances. However, U.S. law governing domestic shipping may make such shipments economically impractical.

The Jones Act and LNG

Currently, U.S. law restricts vessels that may carry domestic shipments, including LNG. The Merchant Marine Act of 1920, commonly referred to as the Jones Act, requires that any vessel transporting cargo between U.S. points be built in the United States, be mostly U.S.-crewed, and be at least 75% U.S.-owned. Currently, there are no Jones Act-qualified LNG tankers, and the United States has not built one in almost 40 years. Other types of oceangoing ships built in the United States cost between three and five times more to construct than foreign-built ships of similar size. U.S. shipyards do not build ships for export so economies of scale are lacking. U.S. crews also cost

substantially more than foreign crews. The non-availability of U.S.-built ships and the higher costs have led U.S. gas consumers to rely on pipelines or LNG importation for natural gas supply.

The effects of the restriction on transporting LNG from one U.S. port to another is not limited to the Boston area. Hawaii usually has among the highest price for natural gas of any state. Developers have not built a large LNG import terminal in Hawaii, but since 2014, the state has received LNG in cryogenic shipping containers from California. These are truckload-sized containers shipped on conventional container ships. Puerto Rico, which does have an LNG import terminal, imports most of its LNG from Trinidad and Tobago. It also receives smaller volumes in containers from the United States. Even though Hawaii and Puerto Rico are in proximity to shipping routes for U.S. LNG exports, neither has been able to fully benefit from the large increase in U.S. natural gas production or the new liquefaction facilities, in part because of the Jones Act.

Jones Act Waivers Are Possible

Congress enacted a provision (46 U.S.C. §501) waiving the Jones Act for national defense when no or insufficient Jones Act qualified vessels are available. This provision has generally been used in the aftermath of hurricanes to speed fuel transport if overland transport is limited. The rationale is that a region without essential supplies creates a defense vulnerability. Waivers have also been used to expedite oil shipments from the Strategic Petroleum Reserve. As a possible model for LNG shipments between U.S. ports, Congress has waived the Jones Act to allow foreign-flag cruise ships to sail between any U.S. port and Puerto Rico (46 U.S.C. §55104) because no U.S. cruise lines have offered this service and thus none are harmed by the waiver.

In 2011 (P.L. 112-61), Congress allowed three U.S.-built LNG tankers to re-enter the Jones Act trade after they had become ineligible for sailing under a foreign-flag. None of the ships re-entered, and all are now 40 years old. In 1996 (P.L. 104-324), Congress allowed certain foreign-flagged or foreign-built tankers not eligible under the Jones Act to transport LNG to Puerto Rico from any other U.S. port, but these ships have not done so. Puerto Rico completed its LNG import terminal in 2000. In the aftermath of Hurricane Maria, which caused extensive damage to Puerto Rico in September 2017, legislation was introduced in the 115th Congress (H.R. 3966 and S. 1894) that would exempt Puerto Rico from the Jones Act. Additionally, H.R. 1240 has again been introduced, which would require a portion of U.S. LNG exports to be transported on U.S.-crewed and -owned tankers. It would also require that LNG exporters provide training opportunities for U.S. mariners to become credentialed to work on LNG vessels.

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