

Let It Flow — The Rise of U.S. LNG Exports

An Update on Recent and Upcoming Liquefaction Capacity Additions



- With a total of about 30 MMtpa, or 4 Bcf/d, of liquefaction capacity being added in 2019, feedgas deliveries are poised to be the most significant driver of Lower-48 natural gas demand this year.
- Lower-48 gas demand for LNG exports has climbed 67% in the past seven months to more than 5 Bcf/d, from about 3 Bcf/d in October 2018.
- 9 MMtpa (~1.2 Bcf/d) of export capacity was added in the first quarter of 2019 alone; another 20 MMtpa or so (nearly 3 Bcf/d) is targeting either first LNG production or completion by the end of this year.
- Liquefaction capacity additions will nearly double LNG exports by the end of this year to 8.5 Bcf/d, up from about 4.5 Bcf/d in December 2018, with the bulk of that happening along the Texas and Louisiana Gulf Coast.

1. Introduction

In just over three years, U.S. LNG exports have gone from zero to a single-day peak of nearly 5.8 Bcf/d this past winter. In doing so, they have transformed the demand profile of the domestic natural gas markets, reshuffled physical gas flows along the Texas and Louisiana Gulf Coast markets and changed pricing relationships across much of the country. And those are just the domestic effects of the export phenomenon — the rise of LNG exports from the U.S. also has shaken up international markets.

Figure 1 shows just how remarkable the growth in total U.S. gas exports (teal layer on the left axis) has been over the past five years relative to Lower-48 gas production (green layer on the left axis). Back in 2014, total exports — at that time, all pipeline exports to Canada and Mexico — were 6% of total Lower-48 gas production (burgundy line on the right axis); In recent months, exports have climbed to nearly 12% of total production, and the bulk of that growth in the past couple of years has come from LNG exports to overseas markets, with a smaller portion attributable to increased deliveries of piped gas to Mexico. In fact, LNG exports surpassed exports to Mexico for the first time on a monthly average basis this past March, with feedgas deliveries to the terminals averaging 4.9 Bcf/d, compared with 4.7 Bcf/d to Mexico.

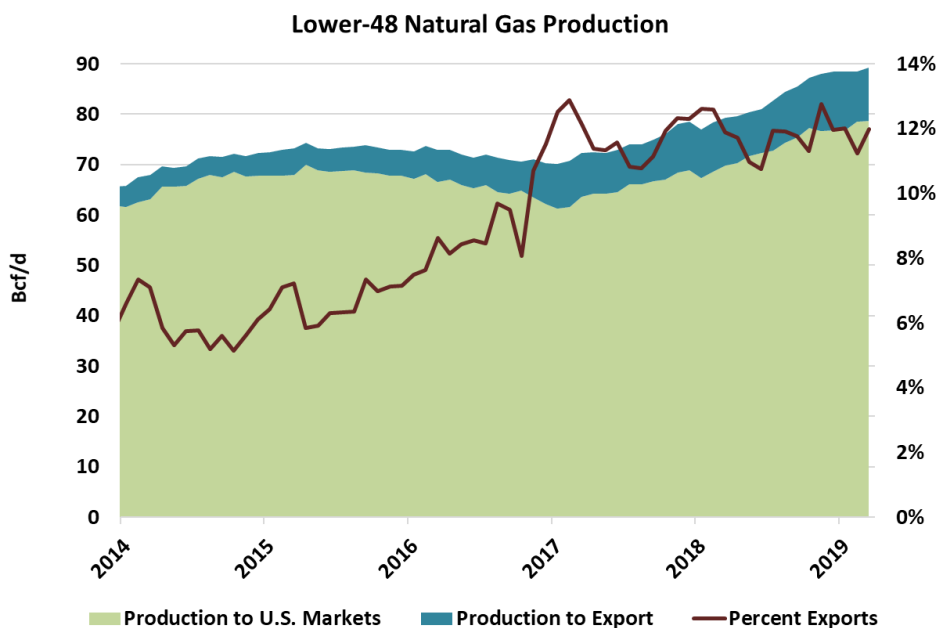


Figure 1 - Lower-48 Natural Gas Production; Source: RBN

Daily feedgas volumes, as shown in Figure 2, topped 5 Bcf/d for the first time in late-December 2018, with all five commercialized liquefaction trains — four at Cheniere Energy’s Sabine Pass LNG (SPL) in Cameron Parish, LA, and one at Dominion’s Cove Point LNG in Maryland — operating at or near full capacity for the first time, and SPL’s Train 5 in its commissioning phase. Then, in March 2019, feedgas demand climbed further, peaking at about 5.8 Bcf/d as Train 5 neared completion and full in-service, around the same time Cheniere brought online the first train at its greenfield Corpus Christi LNG (CCL) terminal. Volumes in April were relatively subdued, dropping to the 3-Bcf/d level as a combination of maintenance- and commissioning-related events disrupted flows to SPL and CCL. However, volumes already have rebounded in recent days to more than 5 Bcf/d, up 2 Bcf/d from this time last year, and baseload demand for liquefaction and export will continue to rise as much more LNG production capacity is added over the next year or so.

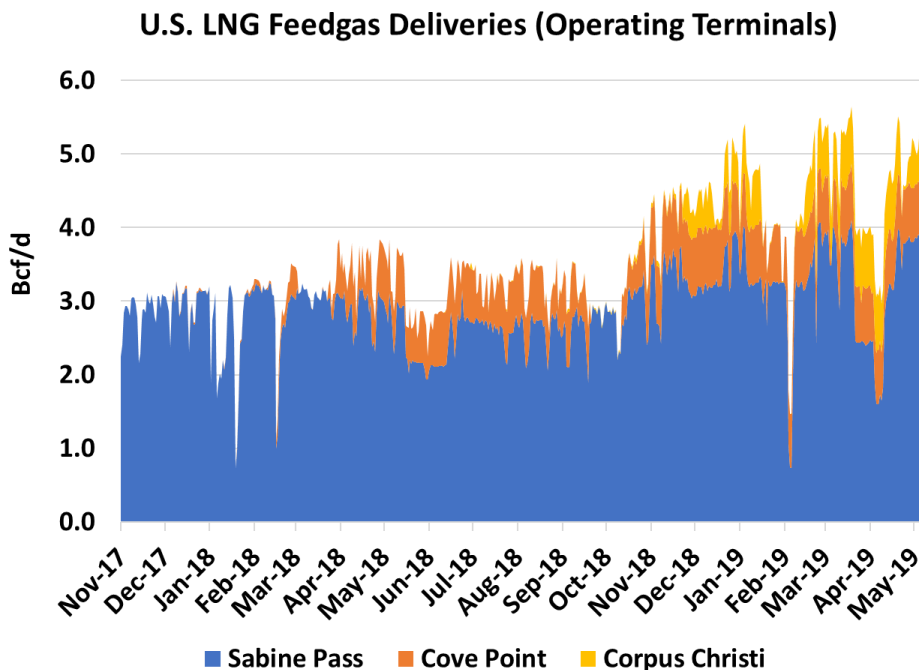


Figure 2 - U.S. LNG Feedgas Deliveries; Source: RBN LNG Voyager

In fact, the surge in commercial operations of LNG trains this year should amount to the largest annual growth spurt in export demand thus far and for several years to come, until the “second wave” of liquefaction projects begins to materialize in the 2022-23 timeframe. Altogether, the 2019 export capacity additions could contribute more than 4 Bcf/d of new demand by the end of the year, bringing total LNG export demand to about 8.5 Bcf/d, nearly triple the 2018 full-year average of 3.1 Bcf/d. Moreover, as the new trains coming on this year are commercialized and feedgas flows stabilize at their newly elevated levels, that demand will be here to stay, becoming a year-round mainstay of the Lower-48 gas supply-demand balance, save for short-term maintenance events. As such, feedgas demand is poised to be one of the most significant drivers of Lower-48 natural gas demand this year.

In addition to shifting the national balance, that much incremental demand growth in a relatively short span of time — and mostly concentrated along the Gulf Coast — is all but guaranteed to disrupt and reconfigure physical gas flows in the region, particularly as the liquefaction capacity has the potential to come online faster than the new pipeline capacity required to supply to feed it. In fact, there is already a disconnect developing between the timing of Gulf-bound pipeline expansions from West Texas’s Permian Basin — the fastest growing producing region in the U.S. — and the impending onslaught of export demand along the Texas Gulf Coast. Until the first substantial Permian-to-Gulf pipeline enters service (Kinder Morgan’s Gulf Coast Express in late 2019), we can expect a major supply imbalance to materialize in the region and, along with it, premium prices along the Gulf Coast (relative to Henry Hub). Add to that competing demand just to the south in Mexico and it is a recipe for increased volatility, especially given that the pipeline expansions will criss-cross and siphon gas from as many existing intra- and interstate pipelines as they can get to (for the sake of maintaining supply diversity).

All that said, there is also uncertainty in the timing of the incremental demand. Figure 3 below plots historical and upcoming liquefaction capacity additions through 2019. The parenthetical

numbers indicate the number of trains at each facility by the end of the year, if all goes as planned.

Besides SPL Train 5 (the 2019 bump in the navy-blue layer) and CCL Train 1 (the first bump in the pink layer), which both came online in the first quarter, there are another half-dozen or so trains looking to cross the finish line in 2019, while a few more that were originally slated for this year have been pushed out into 2020.

- Kinder Morgan’s brownfield Elba Liquefaction project in Georgia (purple layer), which is targeting completion this year of 10 modular “mini-trains” (0.25 MMtpa, or ~35 MMcf/d, each), on April 22 requested to bring online the first unit by May 1. The Federal Energy Regulatory Commission (FERC) has yet to grant approval, but subsequent project filings indicate the developers are working to meet pre-conditions related to that request and there were some nominal and intermittent gas flows to the facility in the past week.
- Sempra’s Cameron LNG in Louisiana (peach layer) was expecting to bring online all three of its Phase 1 trains (4-MMtpa, or 500 MMcf/d, each) this year, but the lead construction contractor on the project, McDermott International, said last week that it had been contending with weather and construction-related delays. Train 1 is expected to produce first LNG this quarter, but the contractor stated that trains 2 and 3 are now targeting completion in the first and second quarter of 2020, respectively.
- The construction of Freeport LNG (teal-blue layer), also led by McDermott, has faced weather-related delays as well, and the facility has yet to introduce feedgas for Train 1. The latest timeline puts initial production from Train 1 in the third quarter of this year and Train 2 in the fourth quarter. (Train 3 would follow in the first quarter of 2020.)
- And, finally, CCL Train 2 completion is due in the fourth quarter of 2019 (the second bump up in the pink layer).

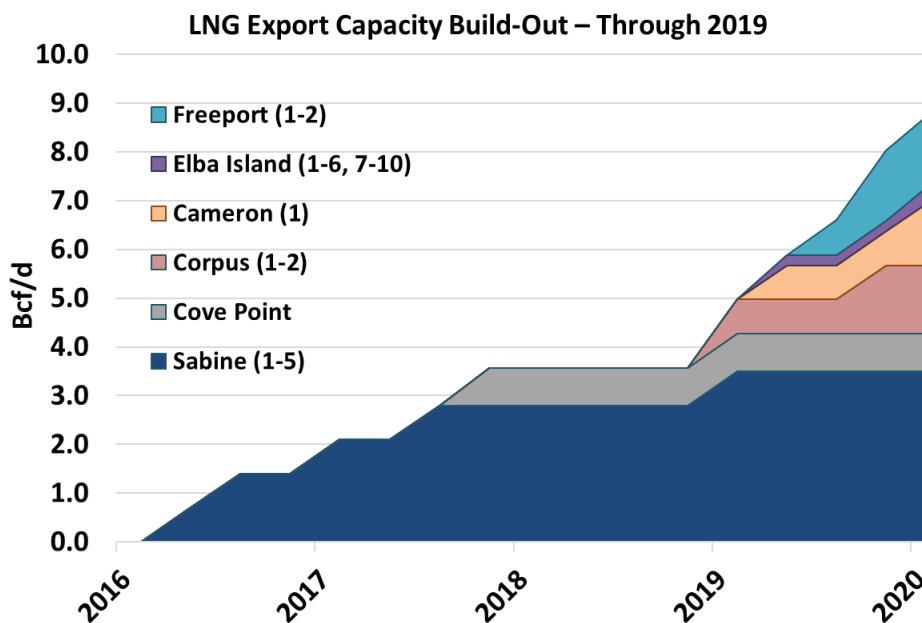


Figure 3 - 2019 Build-Out of U.S. LNG Export Capacity; Source: RBN

There is still another 20 MMtpa or so (~2.6 Bcf/d) of liquefaction capacity scheduled to come online in 2019. The pace and timing of this emerging demand growth over the course of the year will come down to how quickly the anticipated trains can complete construction and testing, the timing of which can depend on a whole host of factors, including the extent of the repairs or modifications that are needed along the way, regulatory approvals, or the timing of gas pipeline connections to supply the facilities. Understanding these factors will be key to anticipating the gas-market impacts of the oncoming demand.

This report reviews historical feedgas flows at operating terminals as well as the latest activity at trains and terminals that are currently in development — either under construction or in the commissioning phase — using the typical ramp-up process as a guide to anticipate future feedgas demand.

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