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## I Saw Miles and Miles of Texas

### *Mexican Demand, LNG Exports Pull Marcellus/Utica Gas to Lone Star State*



- Favorable production economics will drive continued growth in Marcellus/Utica natural gas production; in contrast, gas output in other regions, including Texas, has sagged and may not rebound in the medium term.
- The Northeast now produces more gas than it needs year-round; new sources of gas demand will be required as output rises, and Gulf Coast LNG export facilities plus rising demand from Mexico are natural targets.
- Marcellus/Utica gas will be moved to the Gulf Coast on a number of pipeline projects, mostly reversals of pipes that traditionally moved gas north and east, but many of these projects do not get the gas all the way to LNG and Mexico export outlets, begging the question – how will all that gas get across miles and miles of Texas (and Louisiana)?
- There are concerns that LNG export volumes may disappoint, or that growth in gas exports to Mexico may slow. What then for Marcellus/Utica’s gas surplus, and for Texas gas producers?

### 1. Introduction

The Shale Revolution continues to undo the old order. For decades, Texas and Louisiana were epicenters of natural gas production in the U.S., and much of their gas was piped north to demand areas in the Northeast and Midwest. Now, with the ascendance of the Marcellus/Utica shale regions, the Northeast is producing more gas than it needs, and midstream companies are scrambling to add pipeline takeaway capacity to move gas to customers in the Midwest, the Southeast and — biggest prize of all — the Gulf Coast, where several new liquefaction plants are coming online and super-cooling gas for export as liquefied natural gas (LNG) and pipeline exports to Mexico are slated to boom – assuming those export markets ramp up as planned.

Texas still produces more natural gas than any other state (20.4 Bcf/d “marketed production” in April 2016, according to the Energy Information Administration, or EIA), and Louisiana produced an average of 5.2 Bcf/d the same month (25.6 Bcf/d combined). But the core Marcellus/Utica region produces almost as much as Texas and Louisiana together: 22.0 Bcf/d in April, including 14.3 Bcf/d in Pennsylvania, 4.0 Bcf/d in Ohio, and 3.7 Bcf/d in West Virginia, and it seems likely that, given the Marcellus/Utica’s very favorable production economics, these three states will soon produce more gas than their Gulf Coast rivals.

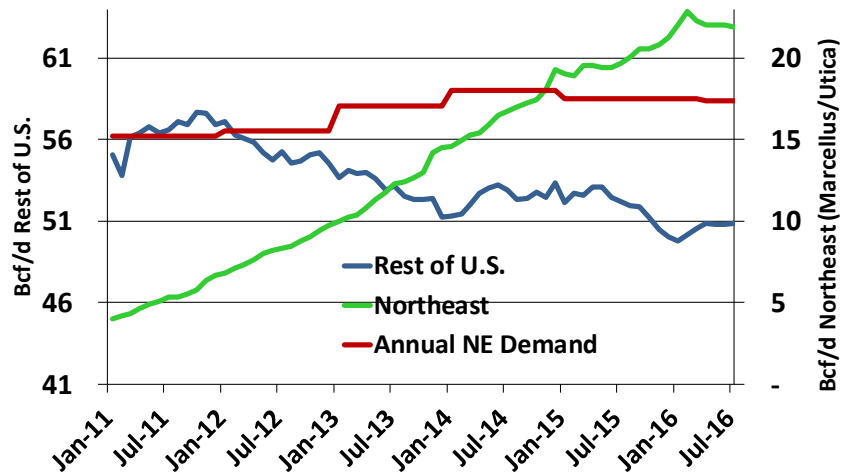
What has been shaping up is a battle for market share. Texas and Louisiana producers already have lost most of their traditional Northeast markets to the Marcellus/Utica upstarts. Much of the Midwest and parts of the Southeast are not far behind — states like Virginia, North and South Carolina, and Tennessee can now receive increasing volumes of Northeast gas thanks to pipeline reversal projects that allow gas to move south on big-diameter pipelines that for decades moved Texas and Louisiana (and Gulf of Mexico) gas north.

What's coming now — and the subject of this two-part Drill Down Report — is Marcellus/Utica gas is moving into Louisiana and parts of East Texas and North Texas, targeting markets along the Gulf Coast, and competing head-to-head with Gulf Coast production. Ohio's own Woody Hayes, the iconic football coach of the Ohio State Buckeyes for 28 years (five national championships and 13 Big Ten Conference titles), coined a phrase for fierce fights for turf like this: "Three yards and a cloud of dust." With faraway domestic markets for Texas and Louisiana gas being lost to Marcellus/Utica producers, Texas and Louisiana producers increasingly are serving more regional and local needs — and getting geared up to fight for their share of those two new and fast-growing demand centers: 1) new liquefaction/LNG export terminals along the Gulf Coast and 2) Mexico, whose imports of U.S. gas (the vast majority of it crossing the Rio Grande from Texas) have more than quadrupled in the past six years (to more than 3.4 Bcf/d as of April) and may rise past 5 to 6 Bcf/d by the early 2020s.

Enabling increasing volumes of Marcellus/Utica gas to move to the Gulf Coast is requiring an extensive "re-plumbing" of gas-delivery infrastructure between the Northeast and Texas/Louisiana, and within the Gulf Coast region itself. Midstream companies for the past few years have been making significant enhancements to pipeline networks within Pennsylvania, Ohio and West Virginia to help accommodate burgeoning production in the Marcellus/Utica regions, and to pipelines in nearby states to allow more gas to flow away from these production areas to demand centers. Not all has gone well. For example, while a few projects have marginally increased gas flows to New England, some other projects have faced strong public opposition, regulatory delays and other challenges. The same is true for some projects to move more gas into the Mid-Atlantic states. Fortunately for Marcellus/Utica producers, projects to enable Northeast gas to flow to the west and south on pipelines originally designed to flow the other way have been securing regulatory approvals and advancing to construction. As we will discuss, some have already come online, and several more will be doing so later this year, in 2017 and in 2018.

### **1.1 Sources of Supply for Natural Gas Exports**

Since 2011 — even in the face of natural gas prices that have averaged only \$3.37/MMBtu over that time frame (and only \$2.15/MMBtu in 2016 year-to-date) — Lower 48 gas production has increased by 9.3 Bcf/d, or more than 14% over the five-year period. But there has been a huge disparity in the geographic distribution of that production growth. As shown below in Figure 1, production in all other regions of the U.S. except for the prolific Marcellus/Utica region has declined from about 56 Bcf/d in 2011 to only about 51 Bcf/d in 2016 (blue line, left axis), while over the same period, production from the Marcellus/Utica shale (numbers here include total gas production from the Appalachian Region) has increased more than five-fold, from about 4 Bcf/d to about 23 Bcf/d (green line, right axis).



**Figure 1 - U.S. Natural Gas Production, Northeast Demand; Source: RBN**

Even more significant, in 2015 the Northeast (as defined here, a huge region that includes 15 states from Kentucky to Maine) became a net supply region on an annualized basis when Marcellus/Utica production (Figure 1, green line) first exceeded annual Northeast demand (red line). Output then continued rising to the point where the Northeast region was a net supply region during the winter of 2015-16, a historical milestone indicating that at least some surplus Marcellus/Utica gas now must find a home outside the Northeast 365 days a year. Recently, growth in Marcellus/Utica supply has slowed, but there is little doubt that with higher prices and the coming increases in gas pipeline capacity, incremental Northeast production will provide much of the volume needed to meet growing demand from gas-fired power generation within the U.S., and for exports — either through liquefaction into LNG or through pipelines to Mexico.

In contrast, the Texas producing region nearest the export points has been in steep decline for the past year. As shown in Figure 2, output from the Eagle Ford basin (located generally south of San Antonio, Texas, north of Corpus Christi, extending westward to the border with Mexico and eastward to just north of Houston) has dropped from about 7.4 Bcf/d in July 2015 to an estimated 6.1 Bcf/d in July 2016, an 18% decline in only 12 months. In fact, since the crash in crude oil prices in mid-2014, production in the Eagle Ford basin has declined faster than any other region in the U.S. This is in large part because most Eagle Ford production is “associated” gas that comes along with crude oil and condensate production, and “wet” gas that comes along with NGL production. The economics of crude/condensate and NGL wells has suffered with the decline in crude prices. That, combined with weak performance of wells in most Eagle Ford counties (see the previous RBN Drill Down report titled “The GOOD, the BAD and the UGLY”) has resulted in a collapse in the Eagle Ford’s rig count, which is down from 228 in early 2014 to only 35 in July 2016. Without a substantial increase in crude oil prices, Eagle Ford oil production is expected to continue to decline, with natural gas production falling along a similar trajectory.

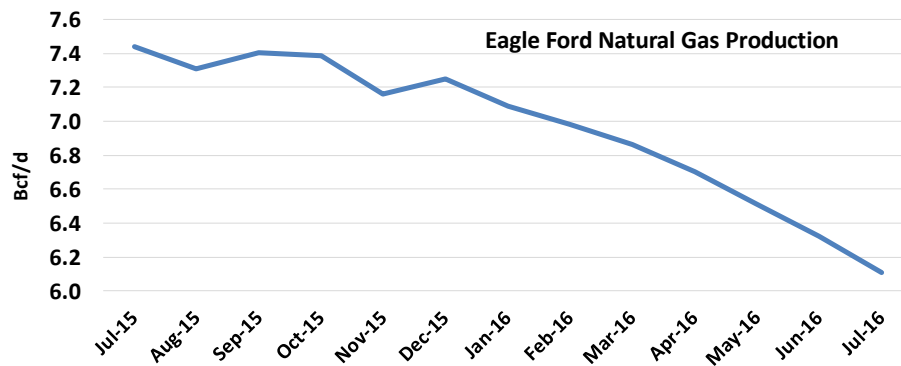


Figure 2 - Eagle Ford Natural Gas Production; Source: EIA DPR

Due partly to the gas-output fall-off in the Eagle Ford, gas production in Texas as a whole is also down, from a peak of 23.4 Bcf/d in December 2014 to 20.4 Bcf/d in April 2016, a 13% decline. That drop — especially coming as the Northeast has surplus gas to market to other regions — suggests that Marcellus/Utica gas will continue to gain ground along the Gulf Coast, and that gas supplies from Texas and Louisiana will lose market share.

### 1.2 Where Will All the Northeast Gas Go?

Seven projects totaling 3.9 Bcf/d are being developed to move gas out of the Marcellus/Utica heading south from Ohio. All of these projects are reversals of existing pipelines that have traditionally moved gas north and east from the Gulf Coast. Four other projects will expand Marcellus/Utica takeaway capacity to the Southeast/Gulf via the Mid-Atlantic by 5.2 Bcf/d. Just under half of this capacity is on the Williams/Transco pipeline, which is also in the process of being made bi-directional. Another four projects totaling 4.3 Bcf/d are targeting Midwest demand markets. Although these projects will not move gas directly into the Gulf Coast region, they will displace some of the Texas and Louisiana gas that has traditionally served the Midwest market. Thus those displaced volumes will need to find new markets. In total, these 16 pipeline projects have the potential to move more than 14 Bcf/d out of the Northeast, with most of that gas impacting — either directly or indirectly — the Gulf Coast supply/demand balance. (A few of these projects are shown in Figure 3; they will be discussed in detail later in the report.)

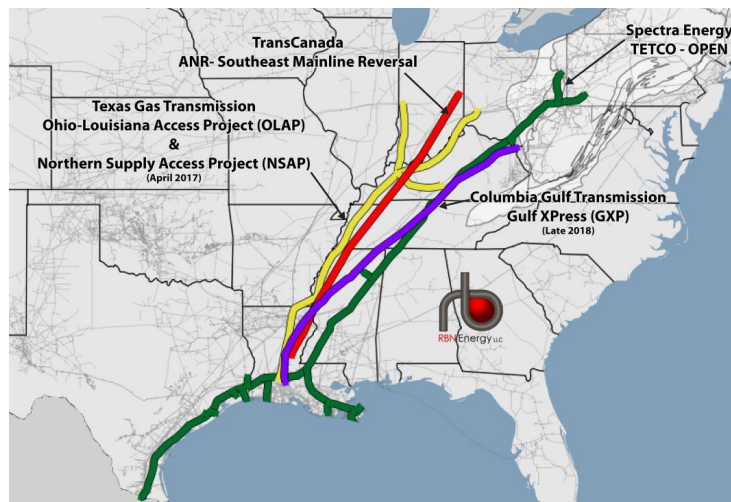


Figure 3 - Marcellus/Utica Pipeline Projects Bringing/ Displacing Gas to the Gulf Coast

The good news for gas suppliers targeting Gulf Coast markets is that demand for export volumes is increasing. By 2021, an astronomical 14 Bcf/d of new pipeline capacity to move gas into Mexico is planned to come online, with most of the border crossings coming from Texas. Over the same 2016-21 period, 13 new liquefaction “trains” with capacity totaling 56 million tons per annum (MTPA) — enough to liquefy more than 7 Bcf/d of gas — will begin operating in Texas and Louisiana. One 4.5-MTPA train already is officially online at Cheniere Energy’s Sabine Pass LNG terminal in southwestern Louisiana, and the second train at Sabine Pass is in the final stages of commissioning. (Dominion is building a single-train, 5.25-MTPA liquefaction facility in Maryland that will depend almost entirely on Marcellus/Utica-sourced gas.)

Even with all that export capacity, two significant issues still face the markets for these new gas supplies. First, will there be any capacity issues that constrain the ability to move the new supplies to the liquefaction/LNG export facilities and Mexico cross-border points? Both Texas and Louisiana have a quirky mix of interstate pipelines (regulated by the Federal Energy Regulatory Commission, or FERC) and intrastate pipelines (regulated by the Texas Railroad Commission and the Louisiana Department of Natural Resources). The rules that apply to intrastate pipelines are quite different from FERC-regulated pipelines, which offer both advantages and disadvantages for natural gas exporters. All the Marcellus/Utica volumes coming into these markets will be on interstate pipelines, while much of the capacity within Texas and Louisiana is on intrastate pipelines. A big question: How will these systems work together to deliver inbound gas flows and Gulf Coast production to export markets?

The second issue is whether there will be enough demand for gas from these export markets. An examination of Mexico’s potential demand suggests it is unlikely that incremental export volumes will exceed 5 Bcf/d by 2021. So while there will be significant pipeline capacity available within Mexico, there is considerable uncertainty about how much of that capacity will be used, at least in the medium term. LNG exports are even more of a wild card, and could experience capacity utilization numbers ranging from the mid 50% range all the way up to 90%. But both of these export estimates are subject to a wide range of outcomes, implying the need for significant flexibility from the entire system of pipelines and other facilities needed to get all of this gas to market.

In this Part 1 of our Drill Down report, “I Saw Miles and Miles of Texas,” RBN examines the challenges of supply and infrastructure necessary to move Marcellus/Utica gas to the Gulf Coast market. In Part 2, to be published next month, we will review the export facilities expected to handle all of the volumes, and the degree to which Texas’s existing pipeline infrastructure will be able to handle the changes on the horizon.

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