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How the Midcontinent Stacks Up

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It's a new day for the gas business in the Permian Basin as associated gas output swells alongside rising crude oil production. Gas plants like Vaquero Energy's Caymus I struggle to keep up with the flow. Source: Vaquero Midstream LLC

The Permian Gets Gassy

Natural gas production from this oily basin could double by 2020, causing bottlenecks. Mexican end users and overseas LNG buyers wait while the midstream gears up.

By Leslie Haines

t's safe to say few rigs are looking for natural gas in the Permian Basin, but that doesn't mean operators are not finding it anyway—and plenty of it.

The Permian is delivering more than 2.4 million barrels per day of oil (MMbbl/d), and that number will grow substantially in the next few years, according to the U.S. Energy Information Administration (EIA). However, what cannot be overlooked is that about one-third of all the flow from the basin is now associated gas, with wells becoming gassier and wetter farther west in the Delaware Basin of West Texas and southeastern New Mexico. Already, the Permian makes about 11% of U.S. gas production, according to the EIA.

Permian production was expected to reach 8.5 billion cubic feet per day (Bcf/d) in the third quarter, the EIA reported at the end of the second quarter. Estimates by others are that it will reach 8.8 Bcf/d by year-end. These forecasts vary if excluding NGL extracted from the wet gas stream.

Second to Marcellus

In any case, all observers agree that, as the Permian rig count has nearly tripled since 134 in April 2016, more gas and NGL will be coming from the region than in many years. In fact, the rate of gas production growth is second only to the pace in the Marcellus Shale, sources say.

It's no wonder midstream companies are competing for new gas contracts and scoping out construction sites. According to one midstream source, in the second quarter a gas producer in the Delaware Basin sent a request for proposals for gathering and processing capacity and received 28 responses. Several did not have any infrastructure to fill the order yet, but planned to build to suit. Some producers are asking for an equity stake in midstream facilities in exchange for dedicating their production to a new plant—a scheme many think will become more popular as midstream firms seek project funding.

Some recent blockbuster deals in the region indicate how much its gas potential has been recognized. Delaware Basin player EagleClaw Midstream Ventures LLC was acquired by Blackstone Energy Partners LP for \$2 billion. Its Reeves County, Texas, processing capacity will grow to 720 million cubic feet per day (MMcf/d) by year-end, with an additional expansion planned in 2018.

Earlier in the year, Targa Resources Corp. bought Outrigger Energy LLC for \$565 million plus contingencies that could move the price higher.

"The Permian is the biggest U.S. gas-producing region that is not named Marcellus," RBN Energy LLC analyst Housley Carr wrote in a recent blog. The Marcellus is producing about 19.4 billion cubic feet pe day (Bcf/d) today. (Total Texas output was 21.1 Bcf/d as of the first quarter, according to the EIA.)

RBN analyst Sheetal Nasta blogged recently that Permian dry gas production "has climbed by 1.75 Bcf/d, or nearly 40%, in the past three years, to more than 6.3 Bcf/d in 2017 to date—and it's poised to grow to nearly 12 Bcf/d over the next five years." The analyst noted that these data are for dry, or residue, gas. The gross gas production including NGL is a few Bcf/d higher, Nasta said.

In comparison, total Lower 48 onshore production clocked in at 76.3 Bcf/d, according to the EIA—and the federal government has authorized export of 21.3 Bcf/d of that by LNG plants already operating, under construction, and/or proposed to handle production.

Caught by surprise

"What caught us by surprise is just how much gas the Permian is producing," said Justin Carlson, an analyst with East Daley Capital Advisors Inc. in Centennial, Colo. Daily Marcellus production will grow by 11 Bcf from last year, he told *Midstream Business*, "to 35

Lucid Energy brought its Red Hills II gas plant in Lea County, N.M., onstream in the second quarter, part of an expansion that will continue into 2018. *Source: Lucid Energy Group LLC* Bcf/d by the end of 2019, but we think it could have been bigger if the Permian hadn't shown up. We're certainly seeing a lot of money being spent there."

Despite the increase in gas exports that's begun, the rise in Permian gas output foreshadows what Tudor, Pickering, Holt & Co. analysts predict will be "a brouhaha" of gas-on-gas competition among the Marcellus, Haynesville and Permian regions.

Low gas prices may not deter activity as much here as in other gas plays, however, as Permian drilling is driven by the oil price—producers' gas is essentially a "free" byproduct.

"In the Delaware, it's really going to be the oil price, not the gas price, that drives activity," Heath Deneke, COO and president of Crestwood Equity Partners LP's pipeline services group, told *Midstream Business*. It has signed a joint venture (JV) with private-equity firm First Reserve Corp. to bulk up Crestwood's Delaware footprint.

"The way we see it playing out, you're going to have some volatility around gas prices with the Marcellus and Haynesville. I think there's a wide range of outcomes, but the industry seems to be coalescing around \$3/Mcf [thousand cubic feet]."

East Daley's Carlson said the mighty Marcellus may cede some ground to the Permian after all, if lower gas prices cause Northeast producers to cut back their completions pace.

Back to the Permian

"The Marcellus is the top-tier gas basin, but here we are suddenly back in the 90-year-old Permian. If oil prices hold, it changes the dynamic for natural gas in the U.S.," he said. "The Permian helps force gas prices lower in other basins. You can't put another 3 'Bs' out of the Permian and not expect something to give."

Each midstream analyst and consultant has a different view, but all agree: The numbers are trending higher, whatever the scenario. Permian gas output could double by 2020 from current levels, they said. Although gross volumes will be less than the Marcellus by about half, Permian gas production is increasing nearly as fast on a percentage basis.

Total Permian gross gas output—wet and dry—could hit 13.7 Bcf/d in 2020 or, if accounting for NGL shrinkage, 10.3 Bcf/d, according to Bernstein Research analyst Jean Ann Salisbury's report.

Drillinginfo Inc. is similarly bullish. "In the Permian, operators keep hitting new highs every month, reaching levels we've not seen before, so we keep revising our forecast, especially since this past January," said Maria Sanchez, dry gas analyst. "It takes about three months after adding rigs to see gas production, so we're really starting to see an increase in gas right now," she told *Midstream Business.*

Sanchez said Drillinginfo estimates that, by year-end, total gas production



Topics



Source: Drillinginfo Inc.



Source: Drillinginfo Inc.

will be about 8.8 Bcf/d, 10% more than in 2016. It could rise further to 10 Bcf/d by the end of 2018, she added. The dry gas number alone could be 6.5 Bcf/d by this December and rise to 7.6 Bcf/d by year-end 2018.

Morgan Stanley analysts placed some context around the surge in their recent report: "The Permian Basin should deliver supply growth similar to Appalachia through the balance of the decade," they wrote. Significantly, they increased their associated gas forecast despite lowering their oil price deck.

"By 2020, we expect [U.S.] total associated gas to grow by just over 8 Bcf/d up from about 7.5 Bcf/d previously, led by the Permian and Oklahoma Stack. This gas is roughly equivalent to all incremental planned LNG export projects and is geographically close to demand growth in the U.S. Gulf Coast." Their estimate incorporated an assumption of \$55/bbl for West Texas Intermediate crude in 2018, down from \$60/bbl previously. They warned, however, that oil prices remain a key risk to their call "as we see the two commodities as negatively correlated over the next few years."

Waha wins and woes

Where is all this Permian gas going? Existing transportation patterns and plans for incremental capacity show it moves to all four compass points. But first, it emanates through the Waha trading hub near Fort Stockton in Pecos County, Texas, and also through the El Paso hub northeast of there.

Bernstein's Salisbury wrote, "We believe that as of February 2017, when 5.8 Bcf/d of post-NGL gas was produced in the Permian, some 4 Bcf/d flowed eastward on the intrastate pipelines, 0.3 Bcf/d flowed to Mexico [awaiting further interconnects], 1.3 Bcf/d flowed westward [to Arizona and California] and 0.25 Bcf/d flowed northward."

Sources estimate more than 12 Bcf/d could be flowing through Waha in the future, aiming primarily for the Texas coast and/or Mexico. But the gas surge could cause a bottleneck and poor price basis, according to RBN.

Citing Bloomberg data, RBN reported, "Spot gas prices at Waha so far this year are averaging 27 cents/ MMBtu [million British thermal units] below the national benchmark at Henry Hub, compared with just 13 cents/MMBtu in the same period last year ..." The reasons it cited were mild weather, increased hydroelectric power generation in western markets and rising gas production trying to get through Waha.

Salisbury's bullish stance on Permian oil growth drives growth in gas also, but she issued a warning: The scenario that is unfolding now is "a situation in which 'free' Permian gas is competing with very low-cost Marcellus gas for marginal growth. Therefore, even though our outlook is for \$3/Mcf gas for 2018 onward, there is downside risk to this price if the Permian continues to grow unconstrained." Inter-regional gas-on-gas competition is one challenge. The other is constraints within the Permian, especially in the Delaware Basin, that already have widened the differential between the Henry Hub and Waha prices. In addition, there has been as much as a 40cent/Mcf difference between the Waha and El Paso hubs.

RBN reported, "As Permian production growth occurs, pipeline takeaway capacity from [Waha], the primary trading hub ... will become increasingly constrained, a trend that will drive pricing and flow dynamics into the early 2020s."

There is 10.8 Bcf/d of takeaway from Waha now with more coming, it added, and 3.8 Bcf/d flows to the Gulf Coast. Another 3.1 Bcf/d could flow to Mexico—although, on the Mexican side, capacity is limited so only about half that flow is possible during the next few years. Another 2.9 Bcf/d heads west.

Mexico plans infrastructure for importing up to 9 Bcf/d vs. less than 4 Bcf/d currently, according to government authorities.

Bernstein's Salisbury foresees differentials averaging 35 cents/Mcf in 2018 and, if all eastbound capacity is filled by year-end, possibly up to 75 cents.

The midstream responds

Most major midstream firms are expanding throughout the Permian, especially to handle rising Delaware volumes. Last fall, a half-dozen firms added close to 1 Bcf of daily processing capacity. Since last October 2016, Energy Transfer Partners LP's Trans-Pecos and Comanche Trail lines, along with ONEOK Inc.'s Roadrunner, began service with combined capacity of 3 Bcf/d through Waha.

Carlson said, "I believe you do need all these projects. The bigger concern for our client base is to be wary of the assets in development and the return they could get if gas prices go lower. In a nutshell, everyone can't grow and everyone can't win."

Pipelines are not the main issue, however, warned Drillinginfo's Sanchez.

"The real constraint is demand downstream of that," she said. "Nameplate capacity is one thing, but downstream capacity [to take the gas] is another. If you look at the [differential to Nymex] at Waha, the market clearly believes that there is not yet enough demand on the existing corridors."

Despite these concerns, many projects are moving forward. In the second quarter, Lucid Energy Group LLC started its Red Hills II processing plant in Lea County, N.M., with capacity of 310 MMcf/d, according to MidstreamBusiness.com. It may grow to 545 MMcf/d next year.

All told, Lucid has about 930 MMcf/d in operation or under construction throughout the Permian. Since it bought Agave Energy Co. in 2016, it has tripled capacity on the Agave system.

The Lucid companies, which also operate in the Midland Basin, are the largest privately held gas processor in the Permian, with 660 MMcf/d of capacity now, some under construction, and more than 3,300 miles of pipeline.

Delaware sub-basins

When considering next steps, Lucid's President and CEO Mike Latchem told *Midstream Business* he breaks the Delaware into five sub-basins. All are critical to his growth plans and each has its own growth profile based on reserves and operator activity.

"We try to plan for areas where the associated gas rates per well are higher or where the oil economics are so good that we know more drilling is coming and, with it, more gas," he said.

At press time, Lucid was actively negotiating its next big project—this one in New Mexico. Investment decisions factor for what customers say they will need, current well results and plans for additional drilling, Latchem added.

It's a formula being played out across the Permian Basin. Howard Midstream Energy Partners LLC recently signed a deal with WPX Energy Inc. to build a 400-MMcf/d cryogenic plant to serve WPX acreage in Lea and Eddy counties, N.M., and Reeves and Loving counties, Texas, in the Delaware. The \$563-million partnership includes associated pipelines and some oil infrastructure. Funding is to be provided by international investors: Alberta Investment Management Corp. (AIMCo), which invests Alberta's pension and endowment funds; GIC,



Source: Vaquero Midstream LLC

Waha's Where It's At

f Permian gas production is growing, that means the region's central gas pipeline hub–Waha–will only grow in importance. So it's logical for a midstream operator that wants to establish a major presence in the Permian to be there.

It's the same concept that brought dozens of energy companies to the Houston Ship Channel or the nearby Mont Belvieu NGL hub.

Yorktown Energy Partners LLC-backed Vaquero Midstream LLC has quietly built a 400 million cubic feet per day (MMcf/d) processing facility and over 100 miles of a 24- to 30-inch rich-gas gathering system across the southern Delaware Basin. Its main plant is very close to the Waha Hub– less than five miles away.

Gary Conway, Vaquero's principal, president and CEO, told *Midstream Business*, "[We] intentionally located our plant and tailgate, Caymus I, providing direct access to Waha with the thought to give producers on our system options to increase their profits through market best-price optionality. Our current producers are benefiting from the Vaquero connections header already."

With direct access to at least 12 markets to which Waha connects, producers on Vaquero's system can capitalize on their location to get "on market" and achieve the best netback and maximize their own profitability, he emphasized. Vaquero is not obligated to any downstream pipeline, so the producer can choose the best market without any backhaul fees.

In addition, Vaquero is adding another 200-MMcf/d processing plant, Caymus II, to accommodate growth from its producers scheduled to be in service in first-quarter 2018 and is adding another NGL connection. Its system spans Pecos, Loving and Reeves counties, Texas, with upcoming expansion in adjoining Culberson County.

"Being right at Waha itself provides enough compression to get into any of these marketplaces," Conway said. "Vaquero is the only privately backed processing plant out here that's connected to as many gas residue pipes as it is, and we're working on our third NGL connect with Targa, so we'll have Lone Star, Chaparral and the new Targa line from an NGL perspective. We're really trying to create the best competition for residue gas and NGL pricing for our producers.

"That's what our position was when we established our plant near Waha. We wanted to create a marketplace for NGL and natural gas products from the residue side, after processing, to give the basin producers as much flexibility to get their products out of basin to the highest priced market," he added. "That's not trying to be too utopic



Vaquero's Gary Conway pauses at a Waha Hub meter run. Source: Vaquero Midstream LLC

and solve every problem; that's just simply the best way to alleviate constraints: Go to a place that has the most outlets. That seems to make a lot of sense to me."

Additionally, the multiple markets ensure producers' gas will always have a place to flow and always have an outlet and gives them flow assurance, he emphasized.

The advantage for any producer is to be "on a header where they can get pricing, the best pricing possible, and the most optionality and flexibility possible," he said. And it pays off when he hears his customers' comments that "I didn't know I was going to get another 8 cents or 10 cents [per MMBtu]. That goes directly to their company bottom line netback.

"While the Vaquero cryogenic plant has some tweaks, which allow us to achieve better recoveries through operations, most producers would see that it may not appear to be that different than anybody else's—a processing plant is a processing plant. I think the real difference in us is our operations experience and connectivity on how many markets you can get at Waha and how many markets we can get you to on an NGL perspective. The benefit it actually has is on the producer's netback, not just now but in the future. And we believe the Waha pricing will be the best market to be in," he added.

Waha's connections will only get better as growing gas production makes new infrastructure possible, according to Vaquero's strategy.

"There are at least three main projects that are moving gas east into the Katy Hub [Texas] that will take volumes away. And I think people are starting to make an issue about Mexico via Roadrunner and Comanche Trail. Trans-Pecos has not really taken as much gas, because its downstream infrastructure in-country has not come along as fast as they needed it to be, so they're not taking those big draws that I think everyone associated with it. It doesn't mean they won't, it just means it didn't come when they thought it was going to come," Conway said.

There are more market outlets that need to be made, he said. "I think we're [the mid-stream industry] going to end up fixing the problem. It's still an infrastructure concern, to date, because the pipe doesn't physically exist yet, but there are enough projects that are sitting out there today that are gaining some traction."

—Leslie Haines and Paul Hart contributed to this article.



A major stumbling block to building a new gas plant in the Permian Basin is power—or the lack of it. Current air emission regulations virtually prohibit gas-fueled equipment, so midstream operators must look to regional utilities or rural cooperatives. This 25-megawatt substation serves Vaquero's Caymus I plant. *Source: Vaquero Midstream LLC*

Singapore's sovereign wealth fund; and Alinda Capital Partners LLC, a \$10 billion infrastructure investment firm.

WhiteWater Midstream LLC began building the Agua Blanca intrastate pipeline from Orla to Waha, serving portions of Culberson, Loving, Pecos, Reeves and Ward counties, late in the second quarter. The 1.25 Bcf/d capacity of the 75-mile pipeline may be expanded to 1.75 Bcf/d. It is initially supported by more than 500 MMcf/d of long-term, firm-volume commitments, and in-service is expected in the fourth quarter.

Meanwhile, Crestwood's initial phase of the Nautilus gas gathering system in the Delaware began first flow. It includes 60 miles of pipeline owned by the JV with First Reserve and handles production dedicated by Shell Oil Co. across Loving, Reeves and Ward counties. "Shell is our anchor producer, but we're open to other companies coming in," Deneke said.

"Broadly speaking, the well economics in the Delaware are almost unrivaled, so the whole industry is gearing up, and this system is one example of that. The Delaware is going to be a very robust basin for a long time to come," he added.

The system will be expanded over the next two years. As a result, the JV is preparing to build a series of facilities including a cryogenic plant at Orla with initial capacity of 100 MMcf/d. This and associated pipelines will connect Crestwood's systems at Willow Lake in Eddy County to the north of New Mexico with the Nautilus system south, creating what Deneke called "our 100mile super-system."

Delaware growth

Regardless of drilling or commodity price scenarios, all outcomes point to

growth for oil, gas and NGL out of the Delaware, Deneke said. "I think crude infrastructure is largely sufficient through 2022. Gas takeaway could be fairly tight in 2018 but improves by 2020, and I think NGL is OK. The tightest of the three is going to be gas residue.

"If you pick a \$50-oil environment, you'd probably see up to 2 million barrels by 2020 out of the Delaware and, for gas, you're looking at 6 or 7 Bcf/d, just out of the Delaware," Deneke added.

Midstream executives have to cast a broad net to understand what's happening upstream and respond in kind amid the competition. Crestwood's Deneke said, "Permian dry gas production could be 5.7 Bcf/d in 2017 and ... some forecasts go as high as 13 to 15 Bs a day in a few years.

"You really don't have a deterministic forecast to rely on, because there are so many variables involved. And think of the amount of capital needed to ramp up activity to be able to produce those growth forecasts and build enough infrastructure.

"What I do like, though, and what is unique about the Permian, is that all scenarios point to growth for oil, gas and NGL."

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