PUMPING THE BRAKES

PREVIEW | FundamentalEdge Report | January 2020

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Contents

*This is a **PREVIEW** of a 40+ Page Report*

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Introduction and Key Takeaways

- ***Pumping the Brakes*** is the 1Q2020 installment of the Enverus FundamentalEdge Series. This market outlook service presents our current view of the oil, natural gas, and NGL markets and where they are headed over the next five years.

- Crude oil prices trended upwards over the final weeks of 2019, as the US and China took steps toward a “Phase 1” trade deal and OPEC+ agreed to deeper production cuts in the first quarter of 2020. Despite the deeper production cuts and a downwardly revised outlook for US crude and condensate production growth in 2020, global petroleum liquids inventories are still likely to post large builds in early 2020. Ambiguity about whether the new OPEC+ agreement will be extended beyond the end of the first quarter of 2020 may temporarily keep many US producers from increasing capital expenditures, but their caution cannot be expected to last forever. As time progresses, it will be increasingly difficult for OPEC and its allies outside the organization to contain the impact of the growing US production on prices.

- The month of January traditionally settles at one of the highest prices of each calendar year, but due to strong supply (production growth in 2019 and high inventory levels) and a no-show winter, Henry Hub prices set a record low for January 2020. Based on preliminary E&P guidance, a much-needed slowdown in gas production growth is expected in 2020. However, Enverus expects gas prices to remain depressed throughout much of the year including sub-$2.00/MMBtu monthly settlement prices.

- Natural Gas Liquids (NGL) production continues to climb, mainly out of PADD 3, as pipeline projects have come online to move gas out of the region. More pipeline projects are slated to come online in 2020, mainly out of the Permian, to move NGLs to the Gulf Coast. These volumes will be delivered to greenfield fractionators that are slated to hit the market in 2020 and 2021. However, while both pipeline and fractionation capacity are expected to alleviate bottlenecks, Y-grade supply growth is not keeping pace with increases in capacity, creating a risk of over-build in both Y-grade pipelines and Gulf Coast fractionators.

- On the operator level, companies are seeing lower costs and higher productivity. Many reported lower 2019 capex with higher production estimates for the year. 2020 capex will be lower than this year, but many are still predicting production growth. Smaller players are struggling with liquidity issues, which will contribute to offsetting continued production growth from the larger operators and majors.

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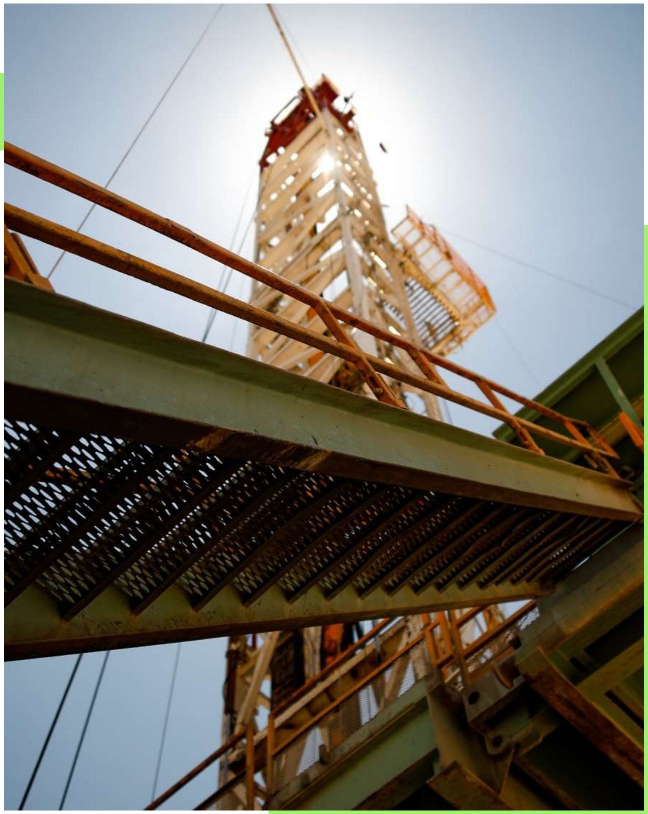
CRUDE OIL



Crude Oil Prices: 2014-2019 Drivers

Crude oil prices trended higher over the fourth quarter as the United States and China took steps toward the first phase of a multiphase trade agreement that many hope will turn around softening global macroeconomic conditions.

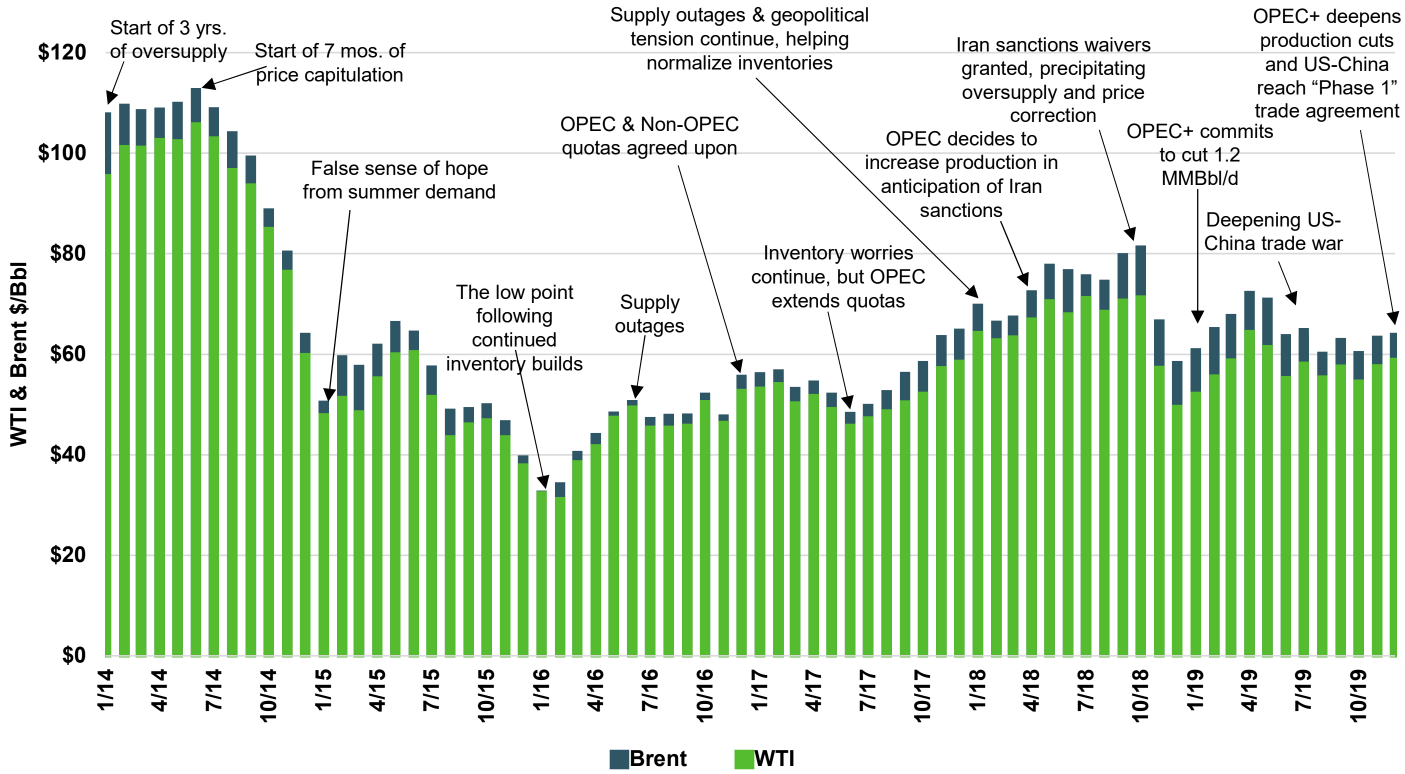
Although progress continues to be made in US-China trade negotiations, with both parties agreeing to freeze and even reduce some tariffs, a full outline of the deal remains to be seen.

Even as global demand concerns have been pushed to the back burner amid the ongoing US-China trade talks, it is unlikely that the damage to global economic growth can be immediately reversed.

The OPEC+ production cuts agreed to in early December are at best a stopgap measure to support prices until demand recovers and to reduce the size of inventory builds forecasted for early 2020.

The Saudi Aramco IPO on December 11th was also a key factor behind the deeper production cuts. Indeed, it would have been difficult to clinch a deal without Saudi Arabia's offer to deepen its already large production cuts and to voluntarily extend its 400 MBbl/d of quota overcompliance into the new year.

WTI & Brent $/Bbl Over Time



Source: Enverus Trading & Risk

OPEC+ Agreement

To reduce global inventory builds in early 2020, OPEC and allied non-OPEC oil producing countries agreed to deepen existing production cuts by another ~500 MBbl/d starting in January 2020.

Without continued overcompliance by Saudi Arabia though, the additional cuts would have reduced OPEC+ production by only 131 MBbl/d compared with November output levels.

To sweeten the deal and incent other participants in the agreement to comply fully with their assigned production quotas, Saudi Arabia offered to extend its current level of overcompliance (estimated at around 400 MBbl/d) through the first quarter of next year.

Combined the with cuts agreed to by other OPEC+ participants, the additional overcompliance by Saudi Arabia would reduce the group's production by 531 MBbl/d versus November actuals (or 2,092 MBbl/d versus the group's adjusted October 2018 baseline).

These cuts should not be taken at face value. Indeed, Russia was able to secure a major concession on condensate production, which will now be exempted from production quotas for non-OPEC participants. Russian condensate production is expected to grow by 40 MBbl/d in 2020 versus 2019. Furthermore, Ecuador has opted to leave OPEC in 2020 and will seek to increase its crude oil production over the new year in order to address domestic financial imbalances.

Newly Agreed OPEC+ Production Cuts (MBbl/d)

Participant	Existing Baseline (A)	Existing Cut (B)	Existing Quota (A-B)	New Cut (C)	Total Cut (B+C)	New Quota (A-B-C)	New Quota vs. Nov. Production
Saudi Arabia	10,633	322	10,311	167	489	10,144	244
Iraq	4,653	141	4,512	50	191	4,462	-188
UAE	3,168	96	3,072	60	156	3,012	-78
Kuwait	2,809	85	2,724	55	140	2,669	-21
Nigeria	1,829	55	1,774	21	76	1,753	-17
Angola	1,528	47	1,481	0	47	1,481	201
Algeria	1,057	32	1,025	12	44	1,013	-17
Congo	325	10	315	4	14	311	-39
Gabon	187	6	181	2	8	179	-11
Equatorial Guinea	127	12	115	1	13	114	2
Total OPEC	**26,316**	**806**	**25,510**	**372**	**1,178**	**25,138**	**76**
Russia	11,747	230	11,517	70	300	11,447	-92
Kazakhstan	2,028	40	1,988	17	57	1,971	-54
Mexico	2,017	40	1,977	18	58	1,959	-39
Oman	995	25	970	9	34	961	42
Azerbaijan	797	20	777	7	27	770	14
Others	1,221	28	1,193	10	38	1,183	-78
Total Non-OPEC	**18,805**	**383**	**18,422**	**131**	**514**	**18,291**	**-207**
Total OPEC+	**45,121**	**1,189**	**43,932**	**503**	**1,692**	**43,429**	**-131**
OPEC+ With Saudi 400 MBbl/d Overcompliance				**903**	**2,092**	**43,029**	**-531**

Source: IEA MODS

Global Supply and Demand

The new and improved OPEC+ production cuts were intended to offset a seasonal drop in global demand in 1Q2020 and reduce the magnitude of global inventory builds forecasted over the period.

Despite these efforts, global inventories are still expected to grow substantially in early 2020, mainly due to continued growth in non-OPEC production (namely the United States, Norway, and Brazil).

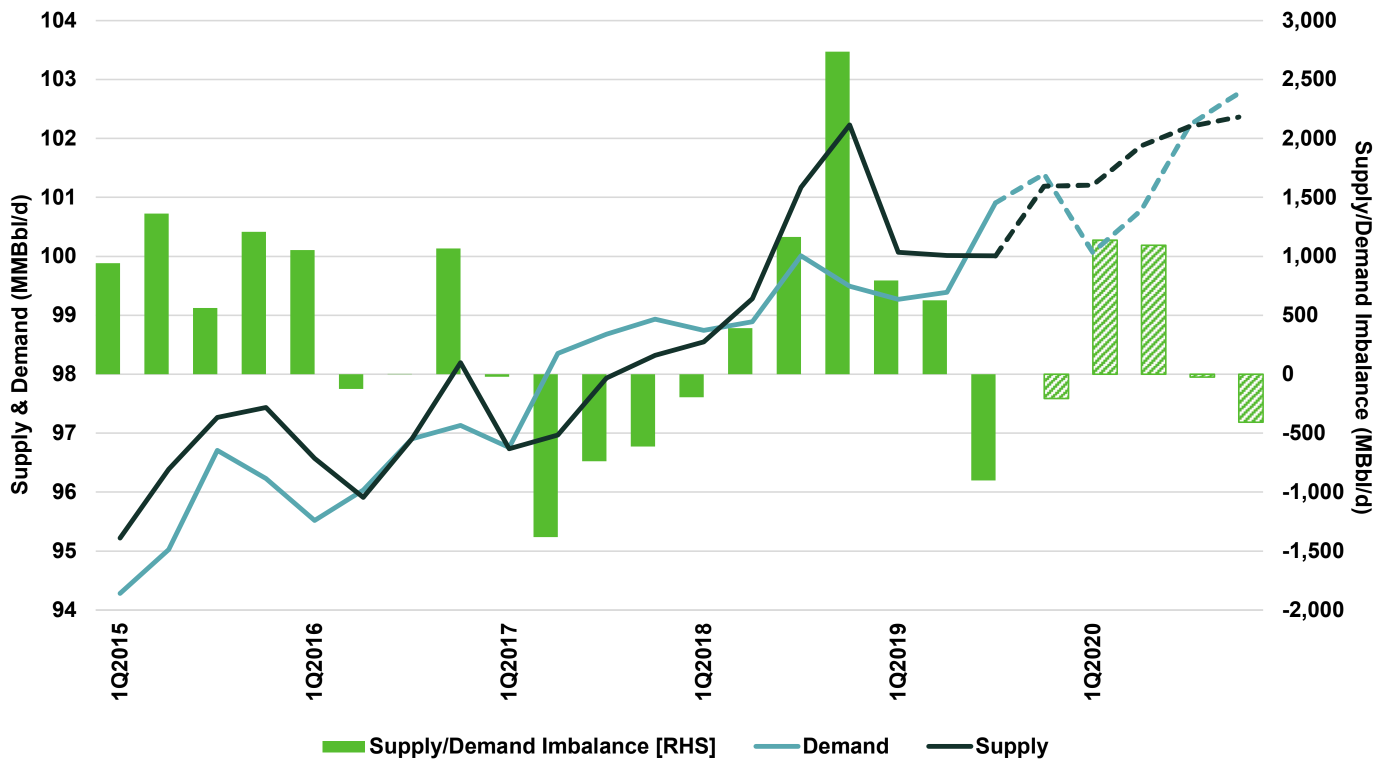
The status of the new OPEC+ deal beyond March 31 has yet to be defined. For our modeling, we have assumed that OPEC+ will extend the cuts agreed to on December 6 through the end of 2020.

Although extending the cuts would certainly be constructive for prices compared with allowing inventories to rise unchecked throughout the year, the possibility that OPEC+ could return to previous quotas could be a factor limiting further price increases in the near term.

By the same token, the uncertainty that this creates may lead US tight oil producers to remain cautious about increasing capital expenditures despite the $5/Bbl increase in WTI since the new OPEC+ deal was struck.

Unless there are additional and sustained inventory draws over the second half of 2020 due to a supply disruption or other unforeseen geopolitical event, a range of $55-60/Bbl WTI remains as prudent an assumption in 2020 as it was in 2019.

Global Petroleum Supply, Demand, and Implied Inventory Movements



Source: Enverus ProdCast, IEA MODS

US Rig Count: Steady Declines Since Late 2018

The rig count in the United States has been steadily falling since late 2018. Currently Q4 2019 is averaging 314 rigs fewer than the same period the year before.

The decline in the rig count gained momentum during the second half of 2019, with the fourth-quarter rig count coming in less than 112 rigs compared with the third quarter.

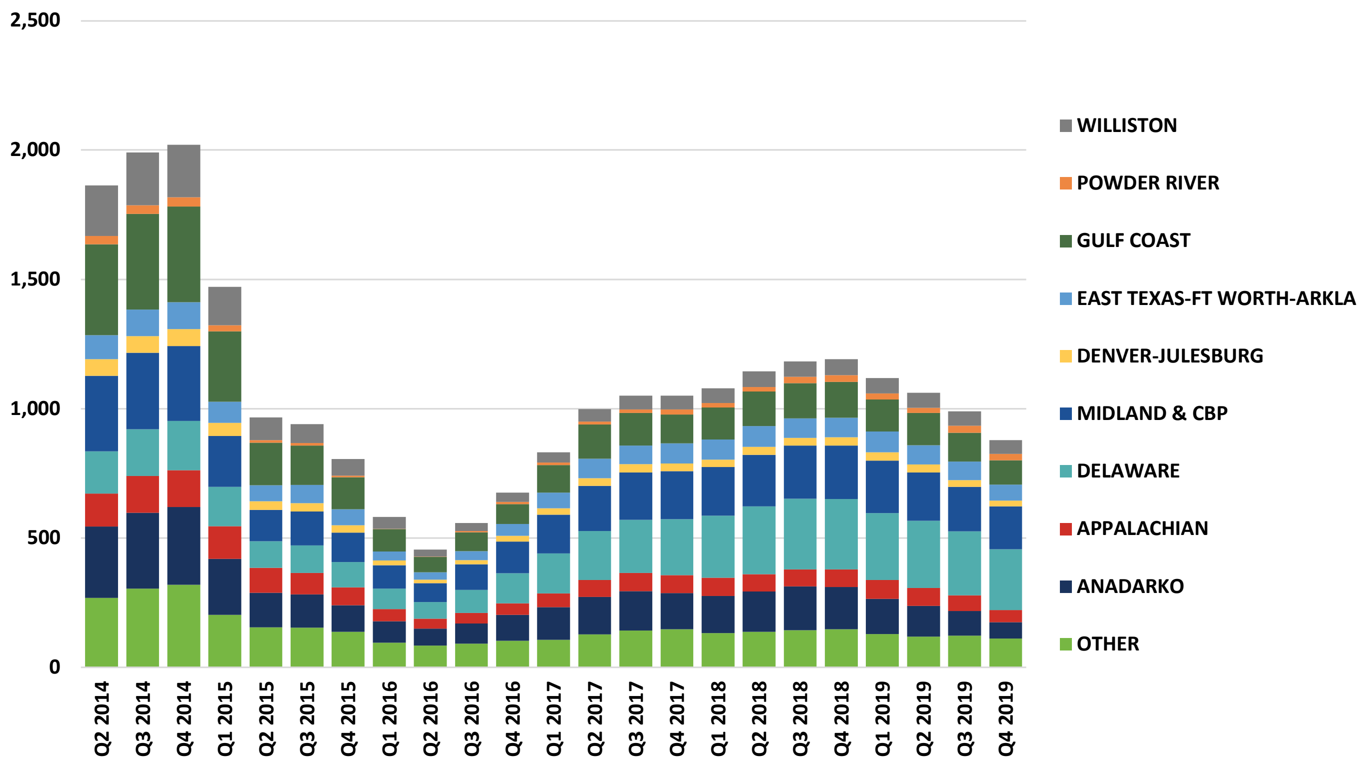
The total US rig count currently sits at levels last seen during Q1 2017.

The Anadarko basin continues to lead the way in terms of rig count declines, dropping 32 rigs from Q3 to Q4 2019. Large companies (e.g., Devon, Cimarex, Continental, etc.) are laying down rigs in Anadarko basin. Some companies are also reducing their rig counts either due to poor results or balance sheet concerns (such as Alta Mesa).

The Permian basin saw its rig count drop by 19 rigs in the same time frame. Although Permian production is still expected to grow, the rig counts have been declining as operators high grade operations in order to operate within cash flow.

Although the rig count has been in decline, the US rig fleet is currently operating at its highest-ever level of efficiency, as companies are drilling longer and more complex wells much faster than before.

Rig Count by Basin



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Source: Enverus Rig Analytics

US Production Growth Drivers

Without a doubt, the Permian basin is and will continue to be the core driver of US crude and condensate production into the foreseeable future.

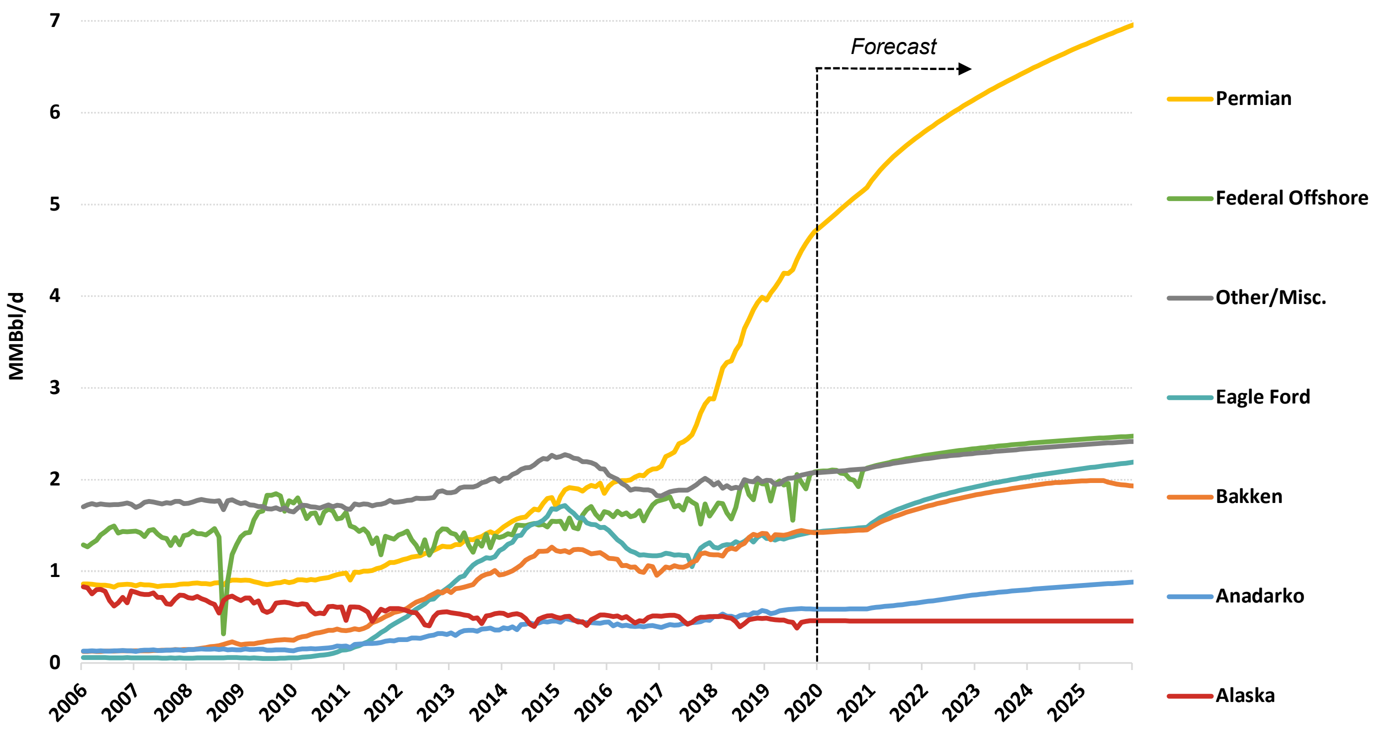
The chart to the right shows Enverus' base case forecast for 2021 (using forward guidance from producers and current rig counts as a guide), with a $60/Bbl flat price scenario for WTI from 2022 through the end of 2025.

Crude and condensate production in the Permian basin is estimated at just below 5.2 MMBbl/d in December 2019. But under a $60/Bbl scenario, that could reach nearly 7 MMBbl/d by the end of 2025.

Permian production would still reach 6.9 MMBbl/d at the end of 2025 under a $55/Bbl flat price scenario and just over 6.8 MMBbl/d under a $50/Bbl scenario. These are small differences.

Given this resilience to lower price levels, it is clear that further expansions to midstream infrastructure will be required in the Permian basin. The question going forward though is whether midstream developers will overshoot the mark or bring on too much capacity before it is needed.

Crude and Condensate Production by Basin



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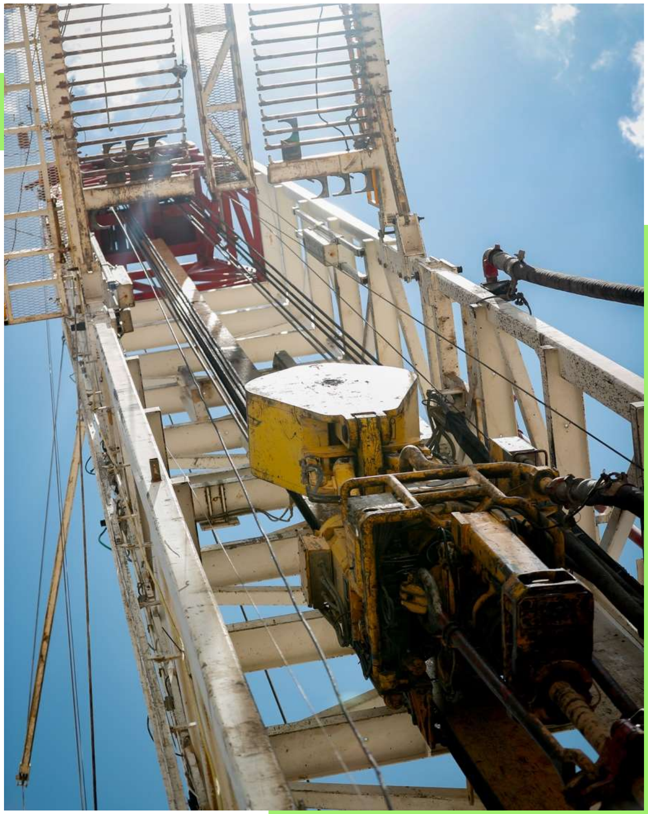
Source: Enverus ProdCast

Natural Gas



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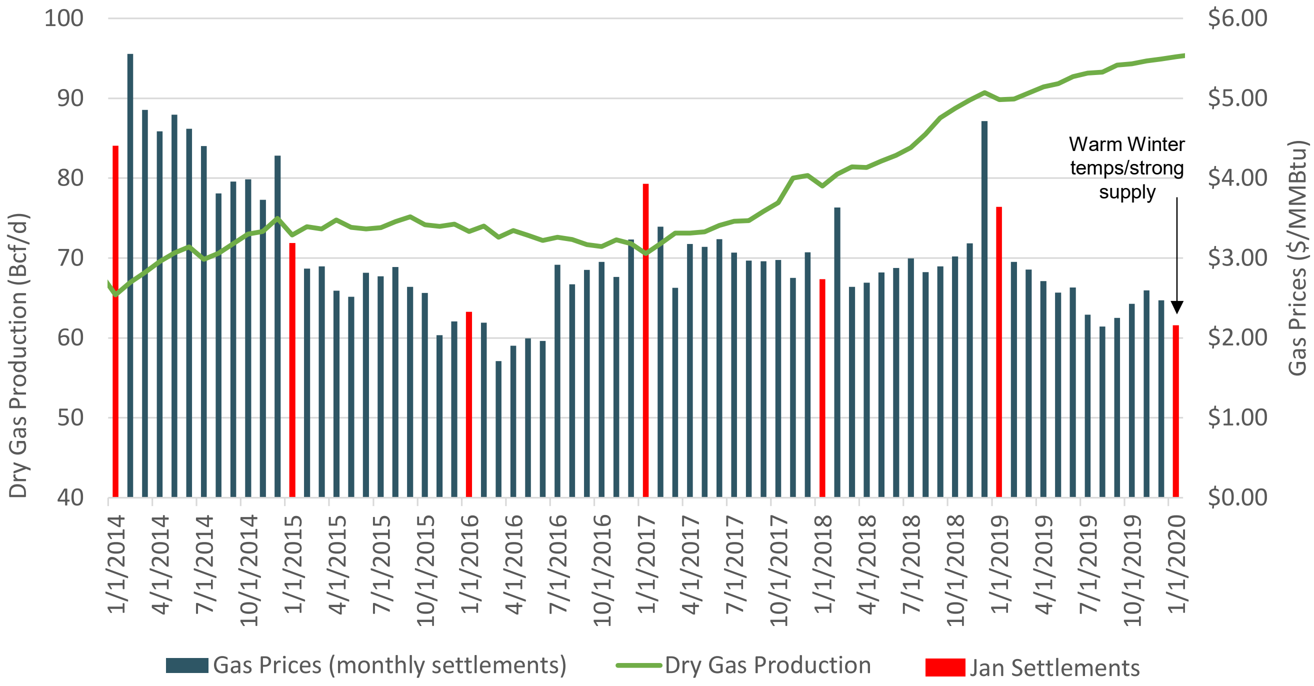
US Dry Gas Production and Prices

Natural gas production in the US has been strong in the past decade, with the growth accelerating in 2017 driven by the Utica, Marcellus, and Permian basins.

Prices have been supported during most of this time by increasing demand in Power, LNG exports, and seasonal ResCom. However, Winter 2019-20 has remained mild pushing the January 2020 contract to settle at the lowest level ever recorded. $2.158 per MMBtu.



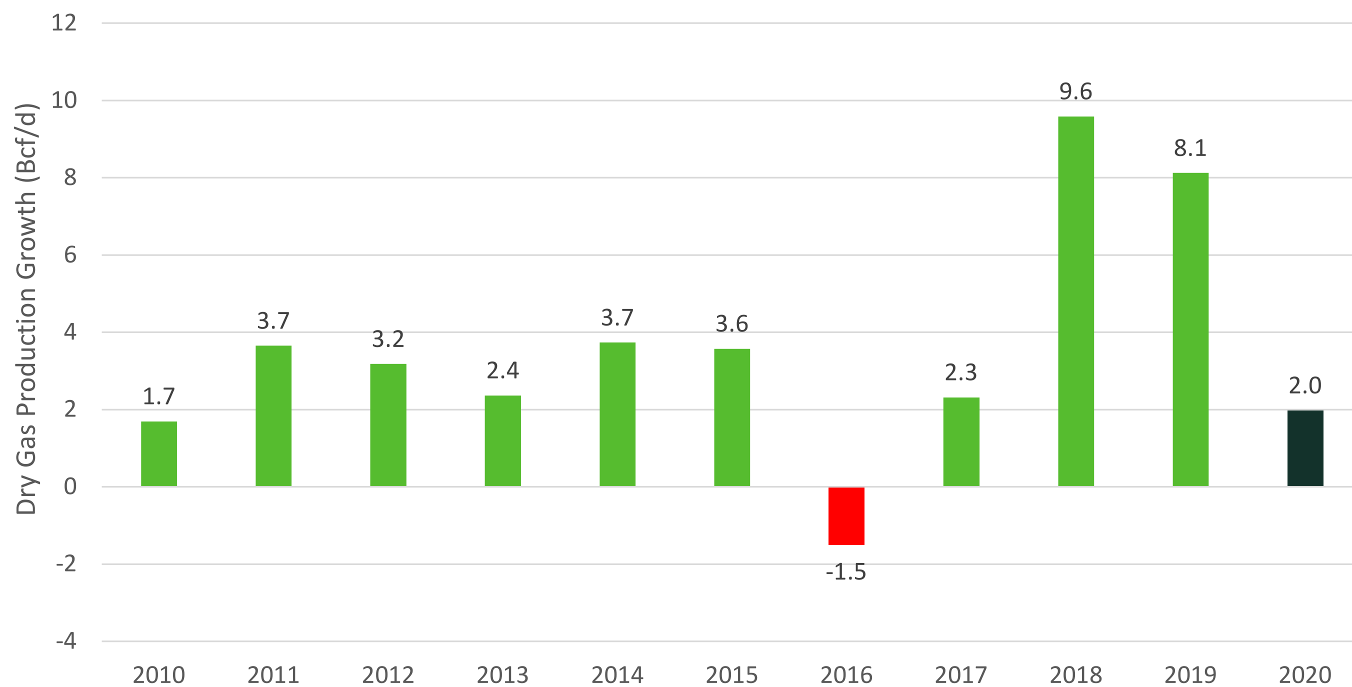
Source: Enverus ProdCast

Natural Gas Production Growth to Slow in 2020

Dry gas production has gained 2-3 Bcf/d per year starting in 2010. The year 2016, when production declined, was the only exception.

Pipeline expansions led to an explosion in growth in 2018 and 2019 (9.6 Bcf/d and 8.1 Bcf/d, respectively). However, this level of supply growth is not sustainable. Domestic demand growth is not sufficient. Therefore, Enverus forecasts dry gas production growth to slow down significantly in 2020. Based on early guidance and assuming a $2.50/MMBtu average Henry Hub price, dry gas production is expected to increase by 2.0 Bcf/d in 2020. This forecast has a risk to the downside and will likely get revised down once final capex guidance becomes available.

Dry Gas Production Growth per Year



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Source: Enverus ProdCast

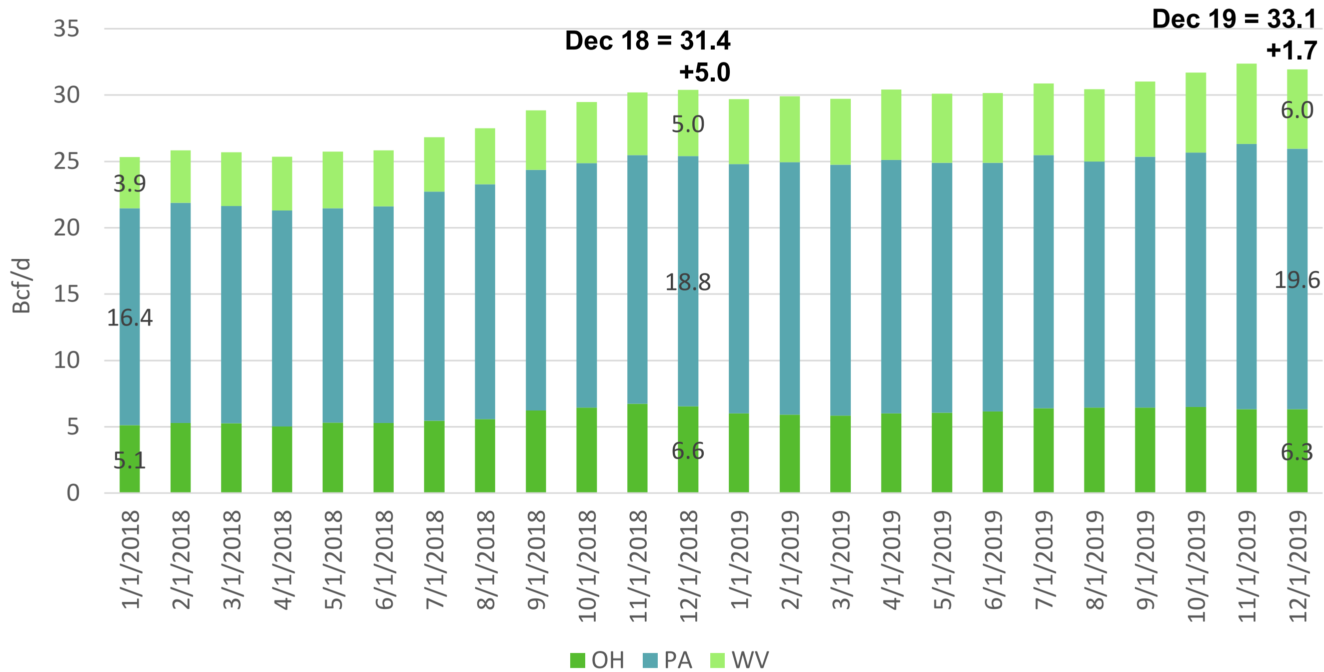
Marcellus and Utica Gas Production

The Marcellus, defined as Pennsylvania and West Virginia, is responsible for most of the growth in 2019. Gas production in the Utica (Ohio) has remained relatively flat.

In this region, over 95% of production can be observed in pipeline nomination data (meter readings), thus reinforcing confidence in the forecast.

The region closed 2019 strong, adding 1.7 Bcf/d from December 2018 to December 2019.

Dry Gas Production: Pipeline Sample



Source: Enverus OptiFlo Gas

LNG Exports Set a Record High During Summer 2019

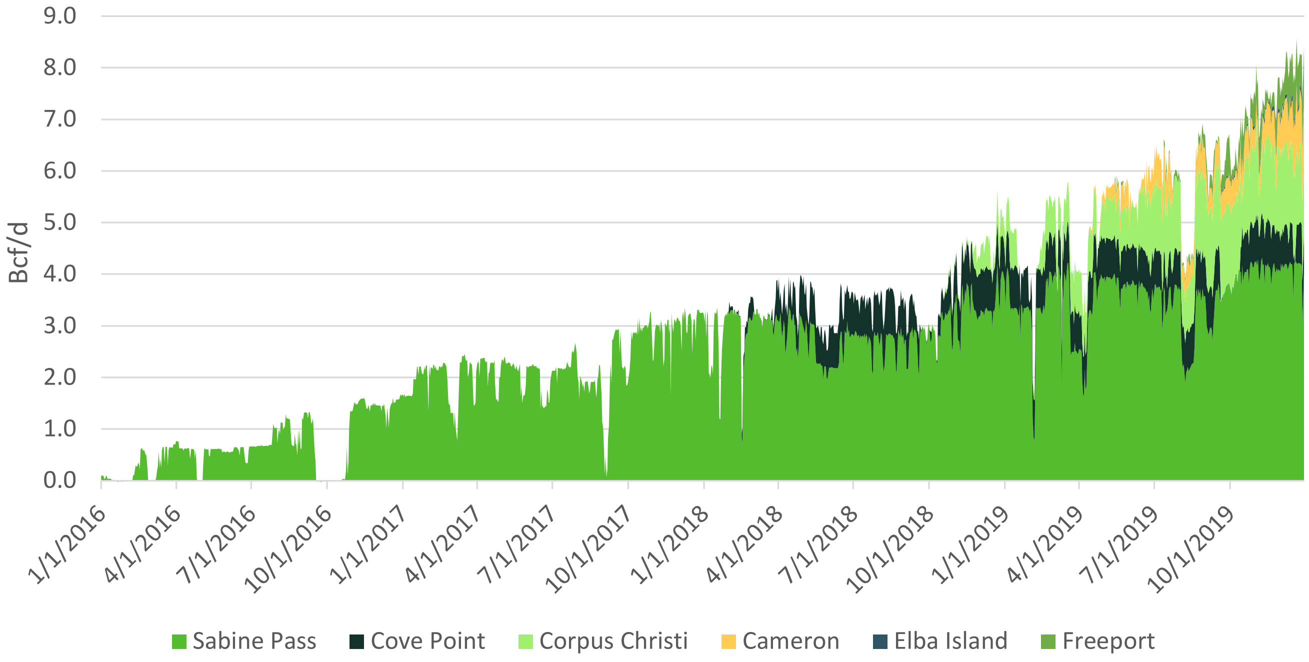
Natural gas pipeline deliveries to LNG export terminals have been increasing consistently since Sabine Pass started operations in 2016.

Currently, there are six operating terminals, and volumes as high as 8.6 Bcf/d were observed on December 21, 2019, as some terminals are commissioning additional trains.

Enverus expects LNG exports to reach 9 Bcf/d by 2023.

Year	LNG Exports Forecast
2019	5.0
2020	6.5
2021	7.8
2022	8.0
2023	9.0
2024	9.0

Natural Gas Feedstock to LNG Export Terminals



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Source: Enverus OptiFlo Gas

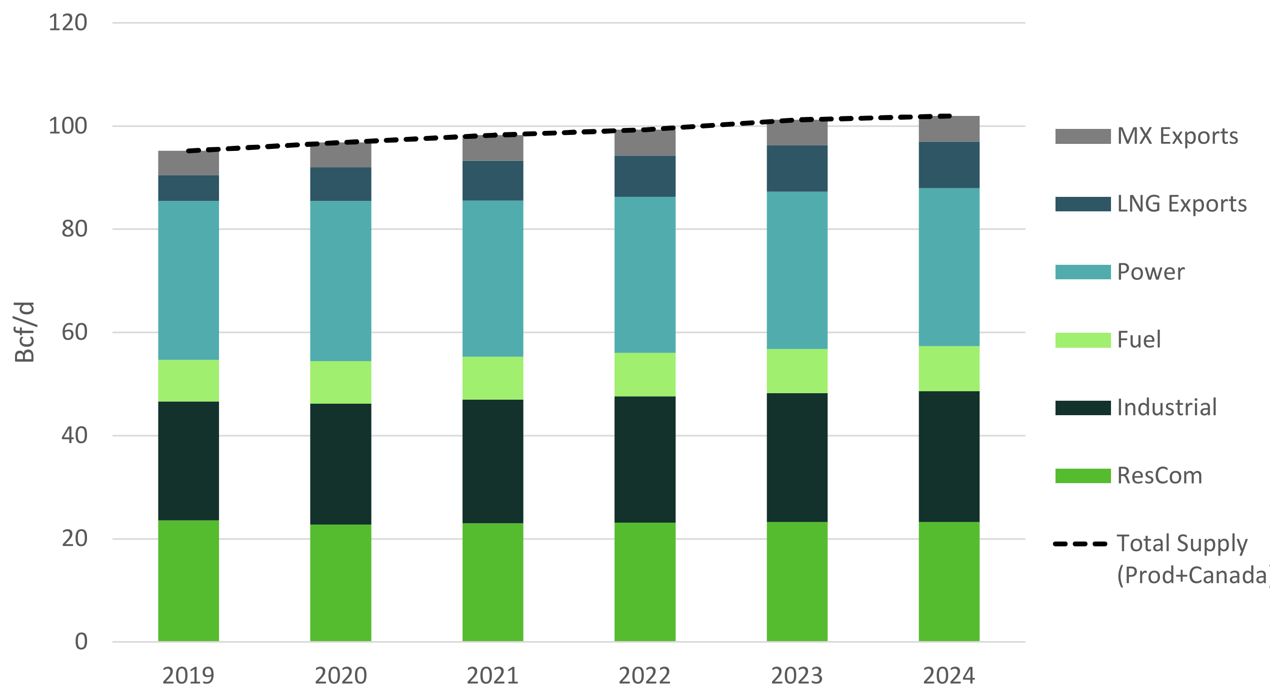
Supply and Demand Balance (5-Year Outlook)

Enverus uses a fundamental approach to balance the natural gas market, and monitors supply and demand developments in order to forecast prices.

As production continues to grow at a fast pace, Enverus expects prices to remain depressed trading under $2.50/MMBtu on average in the next five years, in order to slow down production growth and keep the market in balance.

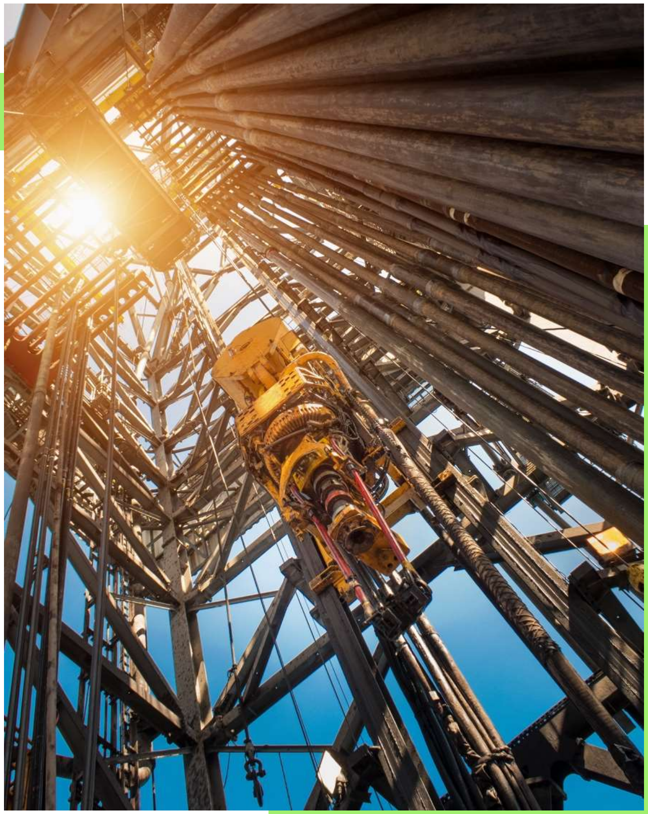
After 2030, prices are expected to return to $2.65 per MMBtu. At these prices, natural gas production will grow at the rate that meets the expected demand growth.

Natural Gas Five-Year Outlook



Source: Prodcast, Enverus analysis

NGLs



PADD Production

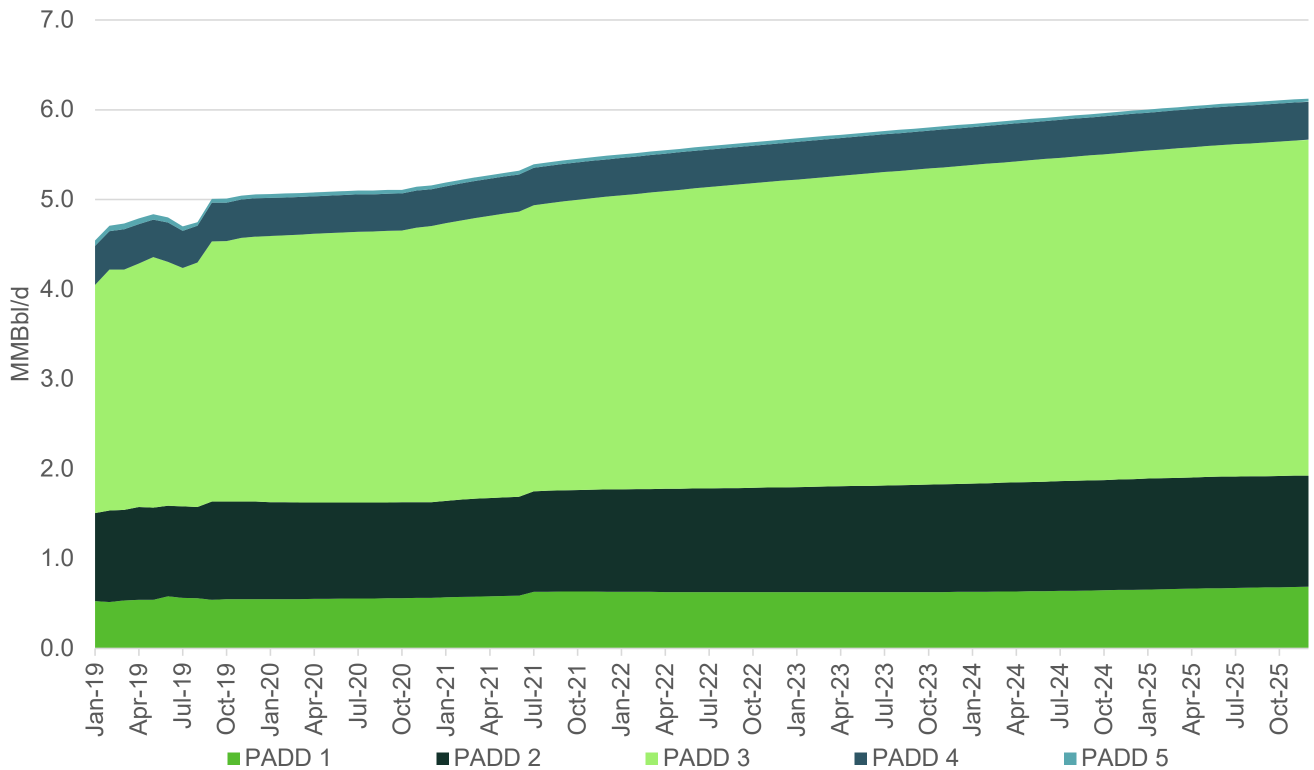
The Permian is the hottest basin in the Lower 48, mainly for the oil production. However, drilling in the Permian also results in the co-production of natural gas and natural gas liquids.

Natural gas liquids in PADD 3, based on \$55/Bbl WTI and \$2.50/MMBtu Henry Hub, are expected to grow ~786 MBbl/d from December 2019 to December 2025, with ~574 MBbl/d coming from the Permian.

PADD 3 production jumped in September by ~175 MBbl/d. The increase in production was due to the startup of Targa's Grand Prix pipeline in August and volumes ramping up to ~230 MBbl/d in September.

The remainder of the NGL production growth will come from PADD 1 and PADD 2, which are expected to increase ~137 MBbl/d and ~154 MBbl/d, respectively.

US NGL Production by PADD



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Source: Enverus ProdCast, EIA

Gulf Coast Y-Grade Pipeline Projects

Most Gulf Coast pipeline projects are slated to come out of the Permian and make their way to the Gulf Coast.

The lone exception is Arbuckle II, which takes Y-grade from the Midcontinent to the Gulf Coast and will have capacity of 400 MBbl/d. Arbuckle II is expected to be online in 1Q 2020.

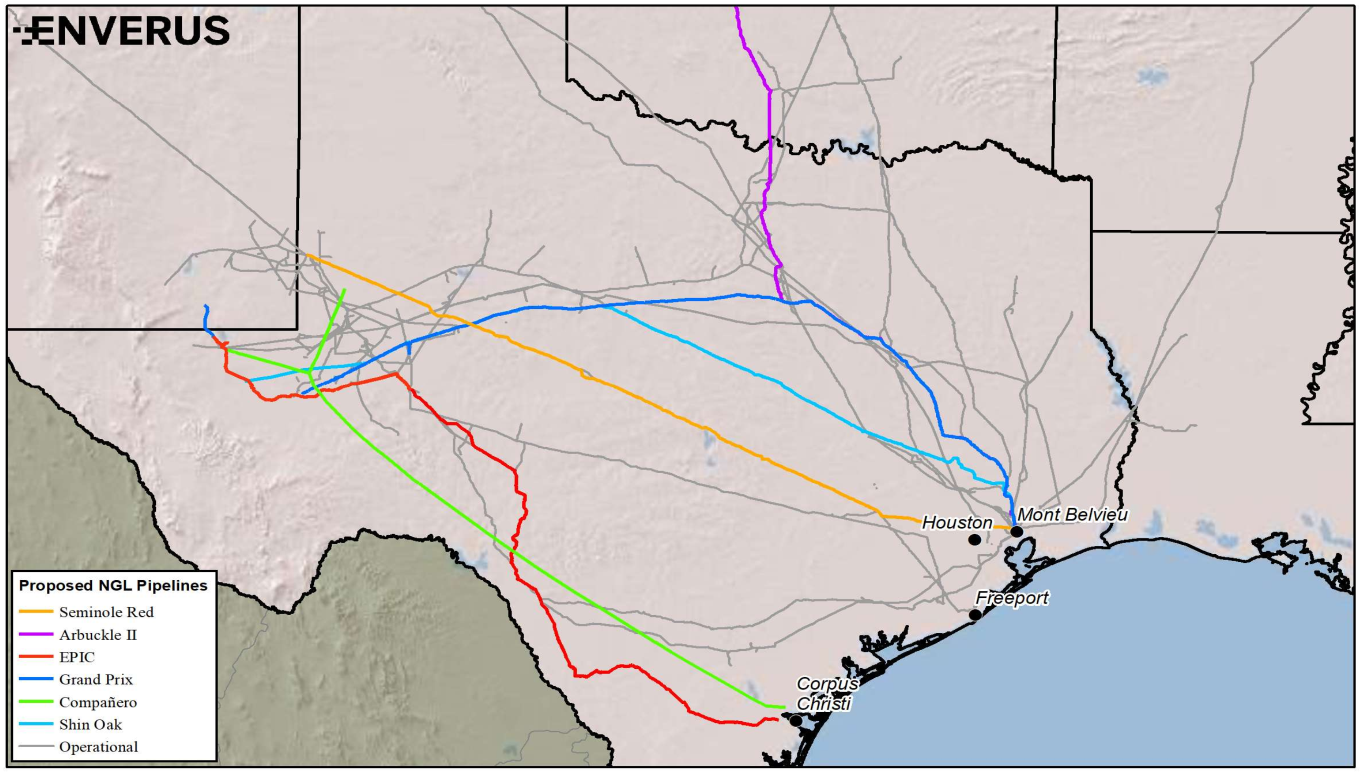
Shin Oak and Grand Prix began service earlier this year, and Shin Oak has a second phase that is expected to be online by the end of 2019, boosting capacity from 250 MBbl/d to 550 MBbl/d.

EPIC and Compañero will deliver Y-grade from the Permian to greenfield fractionators under development in Corpus Christi. EPIC is expected to startup in late 1Q 2020 and will have a capacity of 440 MBbl/d.

Work on Compañero (330 MBbl/d) appears to have stalled. The project was planned for completion at the end of 2020.

The Seminole Red line was converted to crude service at the beginning of 2019. However, Enterprise announced recently that the pipeline will be converted back to NGL service and is expected to add around 140 MBbl/d of capacity from the Permian to the Gulf Coast in mid-2021.

Gulf Coast Pipeline Projects



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Source: Company Filings, Enverus

Texas Fractionation Capacity

Through most of 2018 and 2019, fractionation capacity has been running tight in Texas.

Pipeline projects have come online to feed more Y-grade volumes to the Gulf Coast. However, even though pipeline capacity has freed up volume to get to the Gulf Coast, fractionation projects have not come online at the same rate.

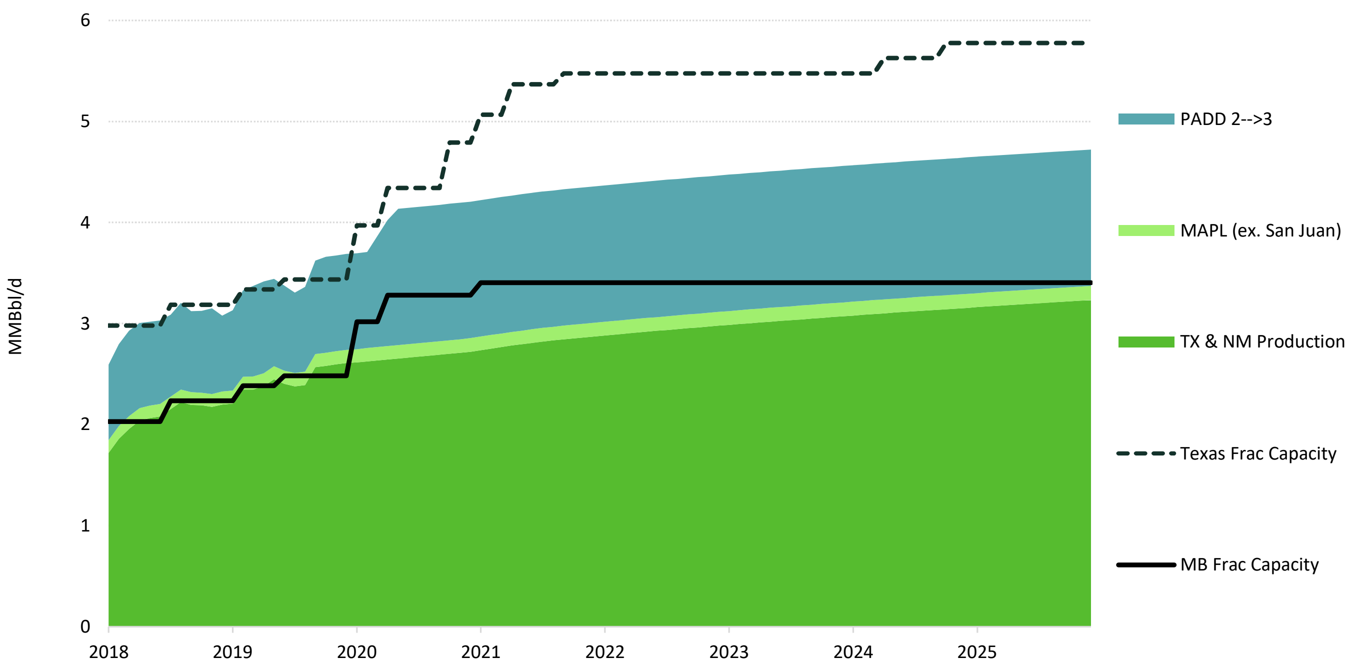
Most fractionation projects are slated for startup in 2020 through 2021. Until the projects come online in early 2020, fractionation space will likely be running tight.

Capacity at the end of 2019 will be ~3.4 MMBbl/d and capacity expansions, both at Mont Belvieu and other areas of Texas, will begin to hit the market in 2020 and beyond.

In 2020, ~1.4 MMBbl/d of capacity additions are expected, with ~0.6 MMBbl/d of those expansions coming to Mont Belvieu.

Between December 2019 and December 2025, Texas is expected to add ~2.3 MMBbl/d of fractionation capacity, while Mont Belvieu will add ~0.8 MMBbl/d.

Texas Frac Capacity vs. Y-Grade Supply



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Source: Company Filings, Enverus analysis

Waterborne LPG Exports

Waterborne LPG exports have averaged ~1.3 MMBbl/d since July 2019.

The bulk of the export volume has come from Enterprise's Houston Ship Channel (HSC) terminal, which has averaged ~509 MBbl/d of LPG exports from July through mid-December.

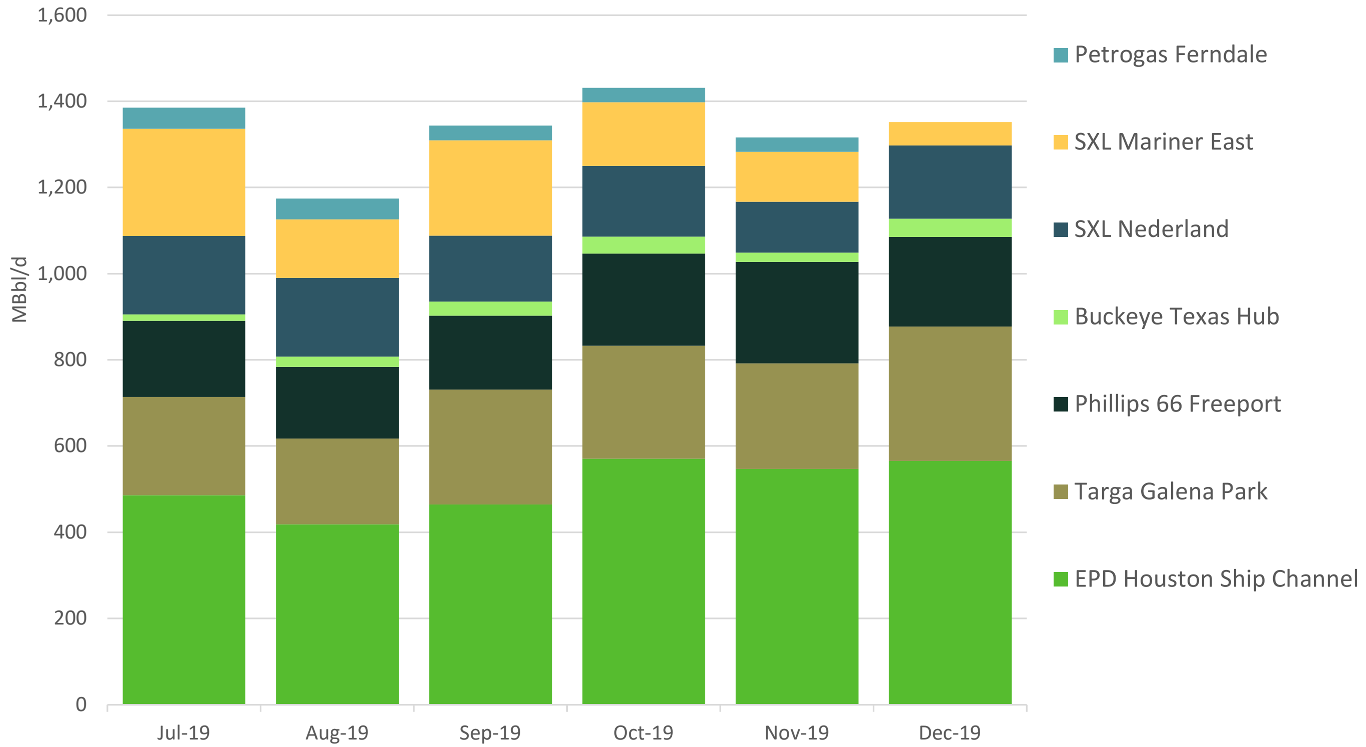
The HSC terminal also went through an expansion in the second half of 2019, increasing export capacity by 175 MBbl/d.

This increased capacity has been visible in Enverus' shipping data, as the terminal averaged exports from July through September of ~456 MBbl/d, and from October through mid-December has averaged ~561 MBbl/d.

After Enterprise's HSC, Targa's Galena Park terminal accounts for a good portion of LPG export volumes, accounting for ~252 MBbl/d since July.

Targa also started up dock 2 at Galena Park, raising export volumes from ~231 MBbl/d from July to September, to ~273 MBbl/d from October to mid-December at the terminal.

LPG Exports by Terminal



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Source: Enverus Shipping Data

Q3 2019 OPERATOR UPDATE

Q3 2019 Earnings Calls: Key Takeaways/Trends

Continued focus on capital discipline; 2020 plans confirm flat-to-lower spend from 2019 levels

1. **Costs Are Down** – Times are tough for OFS companies. Operators are pointing to 10%-25% in cost reductions from 2018 levels. Noble, for example, has seen a reduction of $2M per well in the DJ (25% less) and Delaware (20% less) from just three quarters ago. Most E&Ps are confident that they will not see cost inflation in 2020, either. Even companies without scale, such as Bonanza Creek point to current bids for 2020 that are 15%-20% less than 2019 levels. Based on commentary this earnings season, service companies seemed to have chased themselves to the bottom in 2019, but companies like Halliburton have already started their withdrawal of equipment to keep fleets healthy and limit attrition during this time of low margins. Given enough service supply leaving the market, costs may increase.
2. **Productivity Is Up** – Some of the cost reductions are attributable to cycle-time reductions and efficiencies, however.
3. **2019 Capex Is Down With Production Up** – Thinking back to when 2019 plans were announced, amid the low and volatile pricing environment, most operators were likely deathly afraid of outspending capex guidance. Only a small number of companies revised 2019 guidance upward this quarter; almost all narrowed or revised down. This is all attributable to a combination of falling costs and increased productivity, but also likely because of conservative estimates. Will 2020 yield even more conservative estimates?
4. **2020E Capex Is Down With 2020E Production Up** – Most preliminary plans show capex flat-to-down from 2019. Operators who have disclosed average a 13% reduction, gas weighted average a 25% reduction, and liquids weighted average a 5% reduction in 2020 activity from 2019 levels. The weighted average is an 8% reduction, with Oxy leading the way with a 2020 DJ and Delaware program that is 44% less than this year's capex ($2.5B).
5. **Liquidity Issues** – We have seen several bankruptcies in the last couple quarters, including EP Energy, Sanchez, Alta Mesa, and Halcon. Smaller operators are finishing out their 2019 plans with some barely reaching cash flow neutrality with near maximums drawn from credit facilities. This fall brought the redetermination season on borrowing base commitments, and an increase or decrease in commitments provides both positive and negative testaments to operators' abilities to pay debts when they become due. As many are backed up against a wall, they look to sell assets into the buyer's market, forcing themselves to sell assets below value. All these factors will likely lead to an even further reduction in capex for these operators if prices stay the same, which should provide a slight offset in production growth to the larger-scaled operators who are capable of achieving growth with less capital.

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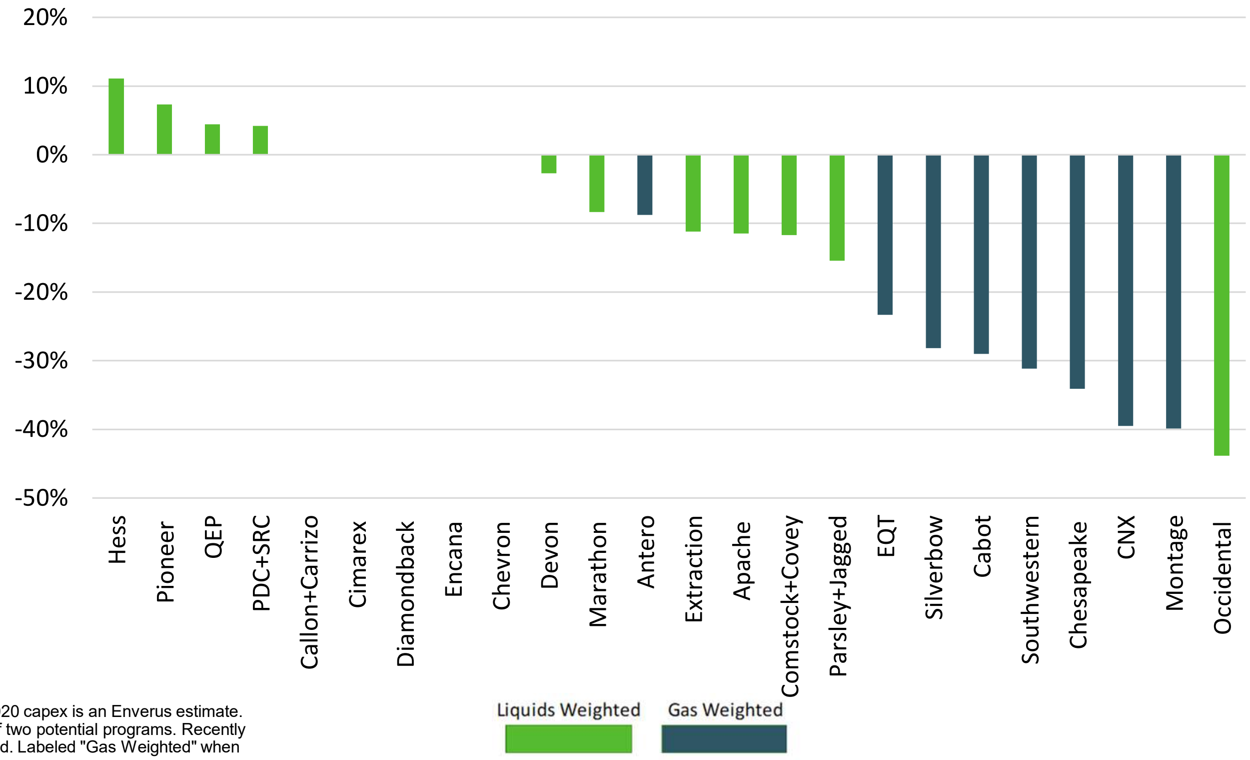
2020E vs. 2019E Capex

Over $5B of total capex will be shed from 2020 programs from these producers alone with more likely to come from those who have not disclosed

Liquids weighted producers are averaging about a 5% reduction in 2020 capex from 2019 levels, led by Oxy with a $2.5B, 44% reduction in the Permian and Rockies alone.

The average reduction among gas weighted producers sits at 25%, with notable companies like EQT and Chesapeake shedding $1.1B between them. In the northeast, 6 of the top 7 pure-play Appalachia producers are collectively dropping capex by $1.5B.



*Chevron, Hess, Devon, Marathon, and Encana include global spend. Marathon's 2020 capex is an Enverus estimate. Apache is Upstream assuming 75% US allocation. Assumes Cabot chooses lower of two potential programs. Recently merging operators assume pro forma and the deal closing. D&C used when disclosed. Labeled "Gas Weighted" when company discloses total production in Mcfe rather than Boe.

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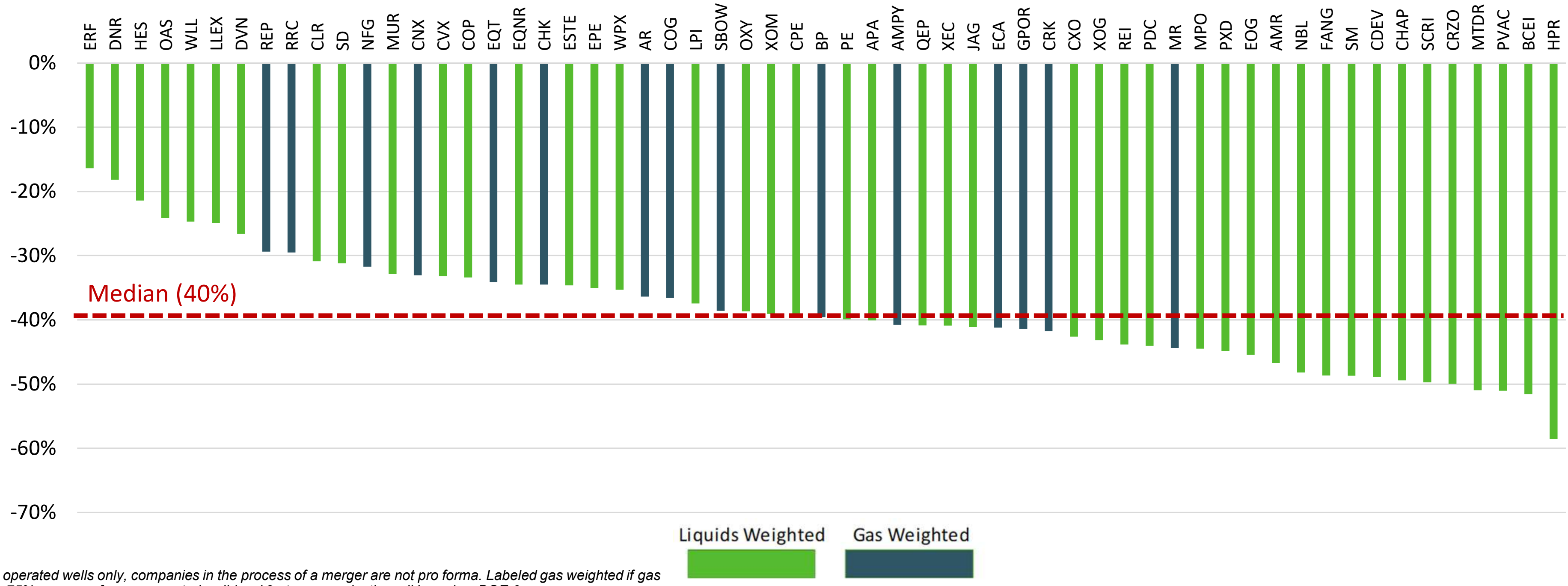
Source: Company Filings

U.S. Q3 2019 Exit to Q4 2019 Exit Decline Rates (BOE:6)

Only 10% of these producers have 5-quarter declines over 25%, and almost half will lose 40% of their gross operated September 2019 production by 2020-exit



US gross operated wells only, companies in the process of a merger are not pro forma. Labeled gas weighted if gas makes up 75% or more of gross operated well-level 2-stream production, all based on BOE:6.

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Source: Enverus Drillinginfo PDP

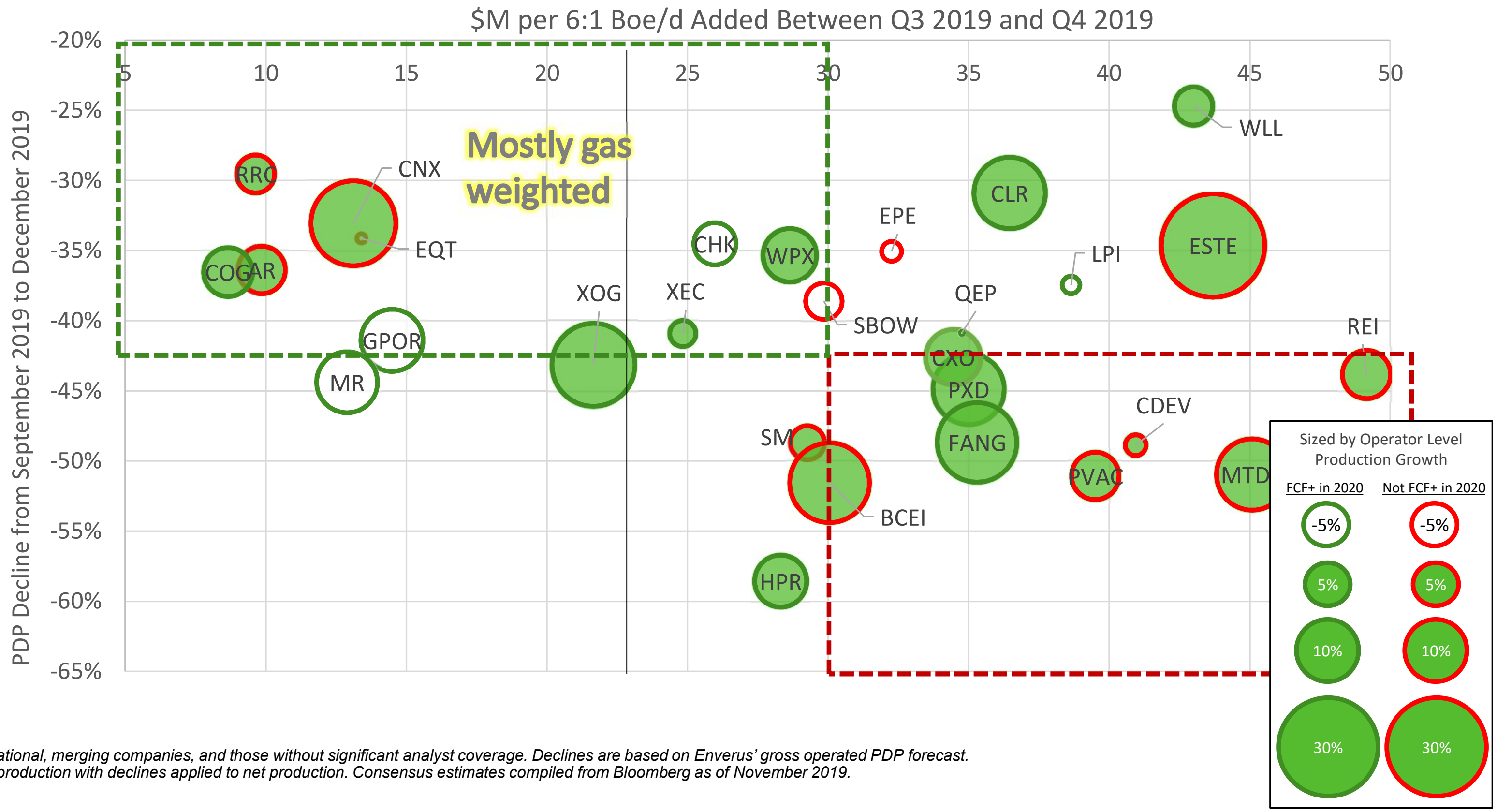
2020 Sustainability and Capital Efficiency

42% of these Lower 48 E&Ps are expected to be within consensus free cash flow

Although low declines are important for free cash flow – low declines coupled with capital efficiency means *sustainable* free cash flow. In 2020, 42% of these Lower 48 E&Ps will be within FCF (15 out of 31).

Most consensus expectations expect producers to continue to increase production next year, except for a select group that needs to focus on liquidity instead of growth (the white and small circles).

Since this is BOE:6, gas producers own the majority of the top left quadrant, but bottom right E&Ps generally have to spend more for production growth because of decline and capital efficiency.



From Q3 2019 to Q4 2019. US operations only, excludes international, merging companies, and those without significant analyst coverage. Declines are based on Enverus' gross operated PDP forecast. Production growth and capex are based on consensus and net production with declines applied to net production. Consensus estimates compiled from Bloomberg as of November 2019.

CONTACT

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This is a preview of the full report.
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