

RESTRUCTURING EXPECTATIONS

PREVIEW | FundamentalEdge Report | June 2018

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FundamentalEdge
by drillinginfo

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Introduction and Key Takeaways

- ***Restructuring Expectations*** is the summer installment of Drillinginfo's Fundamental Edge 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.
- Short-term dynamics are bullish and keeping commodity prices at healthy levels. Longer-term, demand is the limiting factor and will keep a ceiling on production growth and prices.
- Natural gas price expectations in 2019 and 2020 have been revised down and are now expected to average \$2.60 per MMBtu. After 2021, gas prices are expected to return to a range of \$2.65-\$2.80 as LNG facilities, the lead contributor of gas demand, are placed in-service.
- For NGLs, the majority of production growth is expected to come from the Permian due to superior economics and proximity to market. We are likely to see the recent strength in prices continue for the next couple of years as several steam crackers come online, and pipeline capacity gets built to transport more liquids to export facilities and grow the US export market.
- After Q1'18, oil and gas exploration and production companies are focused on living within cash flows, returning cash to shareholders, and reducing debt. Recent price increases have not yet prompted producers to increase 2018 capital plans after the first quarter, but we may see producers increase expenditure guidance for the second half as they look to capitalize on high prices – while battling service cost increases in the field.

US on Track to Become Largest Producer of Crude Oil

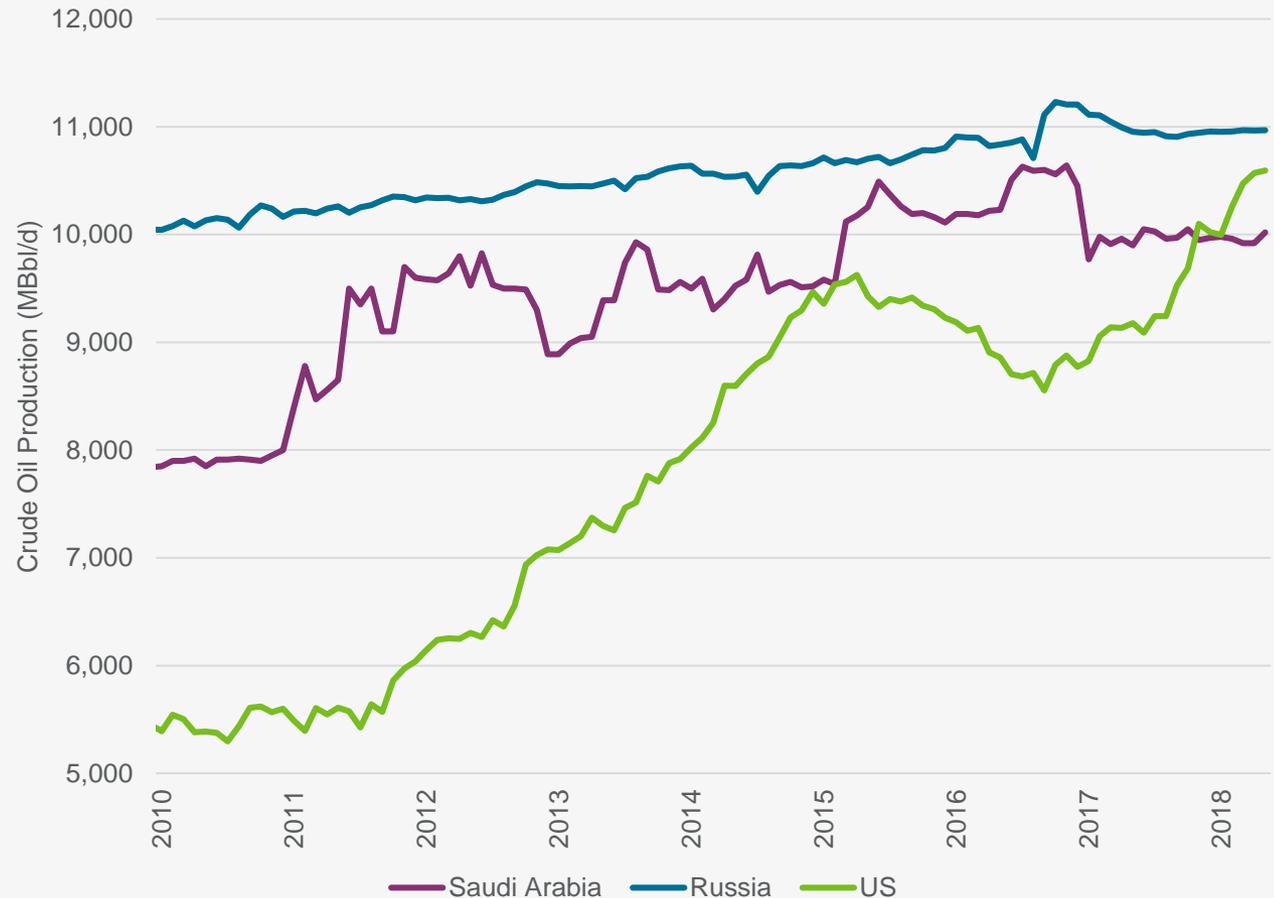
Due to data lags, we now know that by the last installment of this report, the US had surpassed Saudi Arabia to become the second largest producer of crude oil globally. The US is still on course to surpass Russia for the top spot since, barring short-term bottlenecks, which will be discussed further in this report, this trend is set to continue.

Compliance with quotas established at the 171st OPEC meeting of November 2016 have recently soared to 150%+ given the unexpected severity of production declines in Venezuela. Libya has recently hit snags at some of its ports, impacting production. The possibility still exists that returning Iranian sanctions may make it more difficult for the country to market its barrels (thereby essentially taking additional production off the market). Given these factors, in the most recent 174th OPEC meeting in June 2018, the quota-carrying countries agreed to adjust production to normalize back to a 100% compliance level starting in July 2018. This will add approximately 700-750 MBbl/d of production back into the global market.

Saudi Arabia and Russia will certainly be the source of the majority of barrels coming back into the market. While this will likely delay the US in reaching the top spot for crude oil production for a while, it will not stop the inevitable. The robust economics and vast shale resources will make sure of it, especially with \$65+/Bbl prices.

CHART 1

Global Crude Oil Production



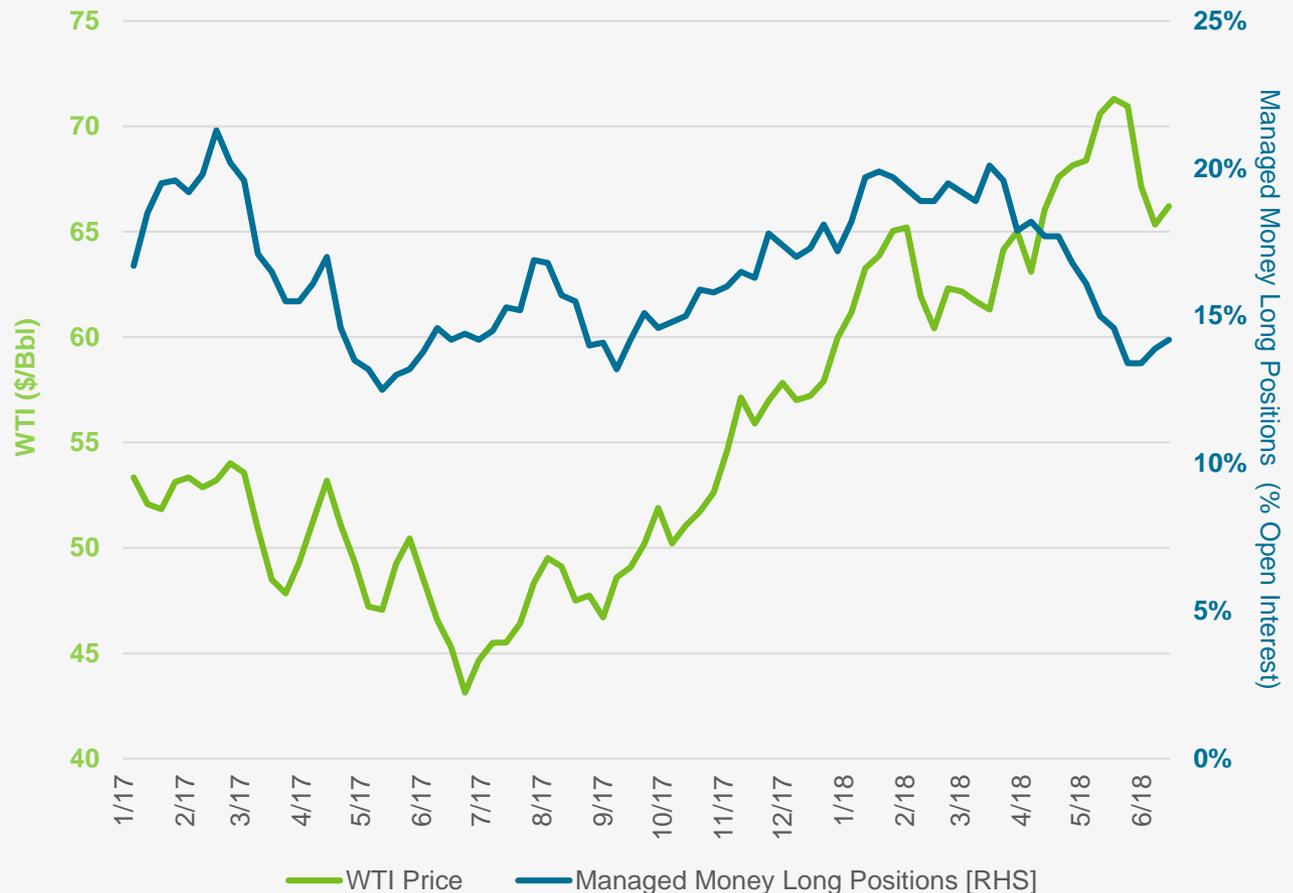
Over \$65/Bbl? What Happens Now?

Domestic crude oil prices are currently hovering around \$73 (WTI). The bullish sentiment started leading up to the 173rd OPEC meeting in November 2017 with the anticipation of OPEC extending quotas through 2018. Quickly deteriorating Venezuelan production and geopolitical tensions in the Middle East kept prices moving higher.

Fundamentals slightly explained the price run-up given the declining global inventory levels. However, the run-up was largely supported by the speculative sector. During the period of time that prices climbed from the mid-to-low \$50/Bbl levels to above \$65/Bbl, the managed money (speculative) long positions increased to ~20% of open interest. As risk set in with OPEC starting to eye an increase of its currently low production levels to quota levels, the speculative length was shed, driving the normalization of prices to more fundamentally driven levels.

CHART 2

\$60/Bbl? What Happened? Is It Sustainable?



Source: EIA Weekly Cushing, OK Crude Oil Future Contract 1, CFTC

OPEC Quotas: Compliance & Motive

CHART 4

OPEC Quotas: Compliance & Motive

Member	Quota (MBbl/d)	May 2018 (IEA) (MBbl/d)	May 2017 (OPEC) (MBbl/d)	May Cuts (IEA) (MBbl/d)	May Cuts (OPEC) (MBbl/d)
Saudi Arabia	10,058	10,020	9,987	+38	+71
Iraq	4,351	4,470	4,455	-119	-104
UAE	2,874	2,870	2,865	+4	+9
Kuwait	2,707	2,710	2,701	-3	+6
Venezuela	1,972	1,360	1,392	+612	+580
Angola	1,673	1,530	1,525	+143	+148
Algeria	1,039	1,040	1,031	-1	+8
Qatar	618	610	585	+8	+33
Ecuador	522	530	519	-8	+3
Gabon	193	170	189	+23	+4
Iran	3,797	3,820	3,829	-23	-32
Eq. Guinea	128	120	130	+8	-2
OPEC-12	29,932	29,250	29,208	+682	+724



Sources: IEA, OPEC (Secondary Sources)
Compliance (%) = (1,176 + Cuts) / 1,176 MBbl/d

OPEC's compliance with quotas has consistently surpassed 100% since October 2017, most recently surpassed 170%. The overcompliance has been driven by the situation on the ground in Venezuela leading to ~600 MBbl/d of declines above and beyond the country's quota.

Given the higher prices and declining inventory levels, as well as other factors such as outages in Libya and the reinstated sanctions against Iran, OPEC has decided to normalize their production to a level that will reflect 100% compliance starting as soon as possible. This means that an additional 700-750 MBbl/d will be made available to the market almost immediately.

Dry Gas Production Forecast

Dry gas production is expected to increase by an average 2 Bcf/d per year over the next five years and reach over 90 Bcf/d by the end of 2023. This growth rate is lower than the 5-7 Bcf/d observed over the past two years.

The lower expected production growth rate is dictated by projected demand increases, mainly from the LNG export facilities.

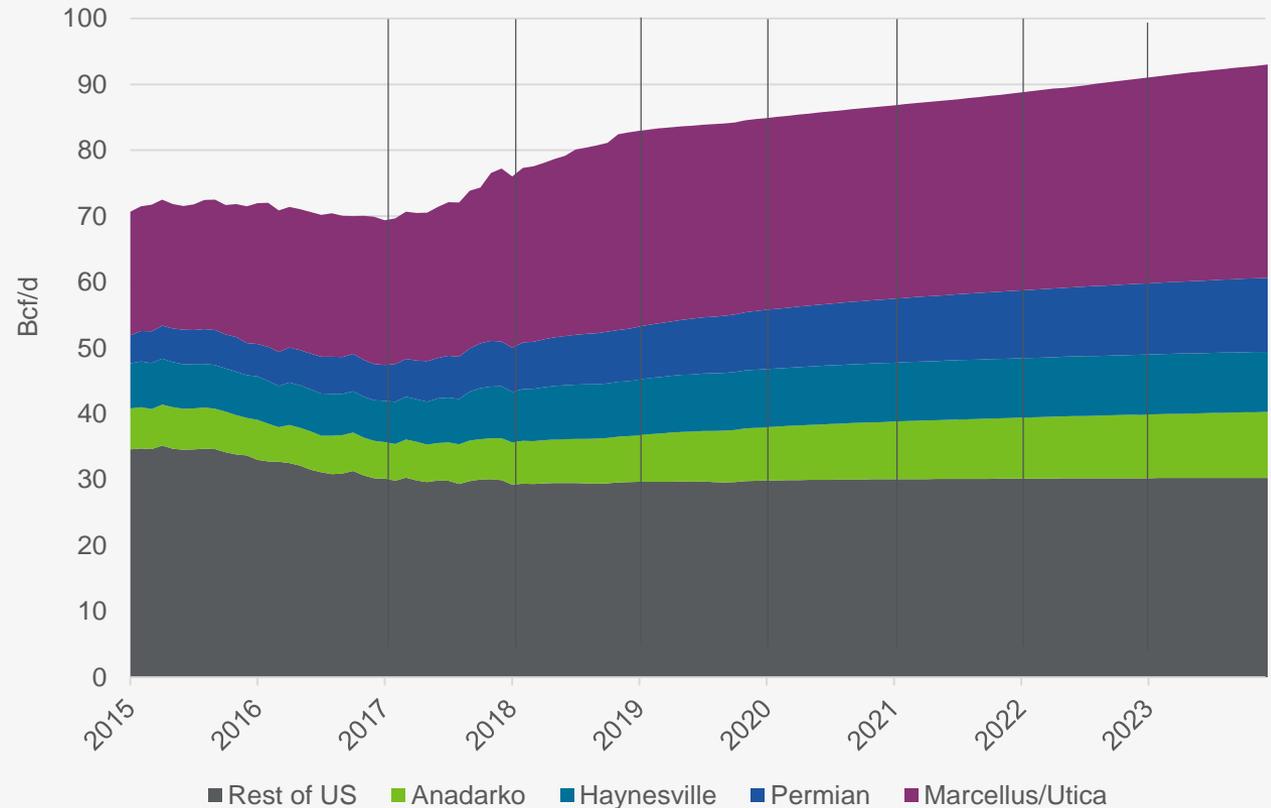
Chart 19 shows US dry gas production by key basins, assuming \$60/Bbl WTI and the updated gas prices between \$2.60-\$2.80/MMBtu. This price combination brings the gas supply/demand equation back into balance. See table below for a breakout of forecasted prices per year.

Year	WTI (\$/Bbl)	HH (\$/MMBtu)
2019	\$60	\$2.60
2020	\$60	\$2.60
2021+	\$60	\$2.65-\$2.80

CHART 19

US Dry Gas Production

	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
Δ Dec to Dec (Bcf/d) →	+7.30	+5.48	+2.00	+1.96	+1.92	+2.27	+2.08
Δ YoY (Bcf/d) →	+2.20	+7.67	+3.70	+2.15	+2.08	+2.43	+2.21



Source: DI ProdCast

Gas Breakevens Thresholds

Natural gas prices have been trading rangebound between \$2.70-\$2.90 per MMBtu most of this year, and in the \$2.90s over the past month.

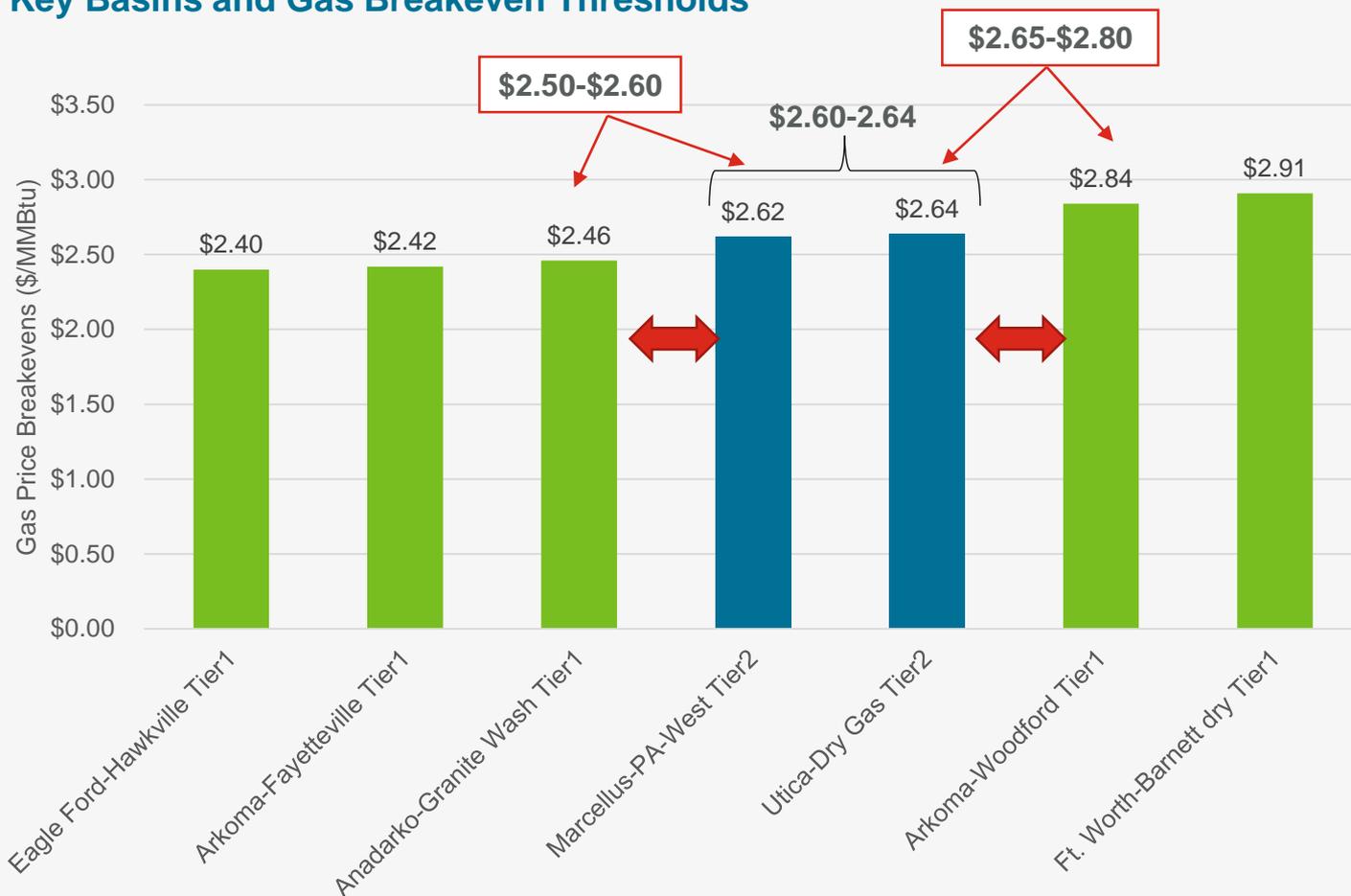
Chart 21 can explain some of these ranges and also supports Drillinginfo's gas price forecast.

First, only areas with breakevens between \$2.40 and \$2.91 are displayed in this chart. As it can be observed, there aren't many; only seven areas have the potential to change the supply and demand balance.

Two key areas, Marcellus PA West Tier 2 and Utica Dry Gas Tier 2 represent the largest potential areas for production growth. Therefore, Drillinginfo has lowered its price forecast to \$2.60 in 2019 and 2020 in order to slow down production growth in the US, but increase prices back to \$2.75 starting in 2021. In reality, we are expecting a price between \$2.65 and \$2.80, as there are no areas that come into or out of the money within that range.

CHART 21

Key Basins and Gas Breakeven Thresholds



Coal Plant Retirements and Fuel Switching Update

Company announcements indicate that coal retirements will reach 14.3 GW this year, while another 3.1 GW will permanently switch fuels. This is nearly a 19% increase in announcements since our March update. The 0.55 GW Oyster Creek nuclear plant is also expected to retire this year.

Chart 27 illustrates the historical generation (in GWh) of the combined 14.3 GW of retiring coal plants, 3.1 GW of fuel switching plants, and Oyster Creek. The GWh figures are converted to combined cycle (CC) gas equivalent Bcf/d by applying the average CC gas heat rate of 7667 Btu/Kwh and the average gas heat content of 1037 Btu/cf.

As these plants retire, their power generation will have to be replaced by other existing plants, which are likely to be natural gas fired. In order for combined cycle natural gas to entirely replace the 2017 generation of these plants, they would have to consume 1.4 Bcf/d of gas on average, assuming average heat rates.

Over the 2019-2022 time frame, coal retirements and fuel switches are likely to surpass 18 GW, the sum of current announcements. This is an increase of 15% in announced capacity since our March update. In addition, nearly 3 GW of nuclear is set to retire during that time period. This is bullish for natural gas power burn, as the generation of these plants will likely be replaced mostly by natural gas.

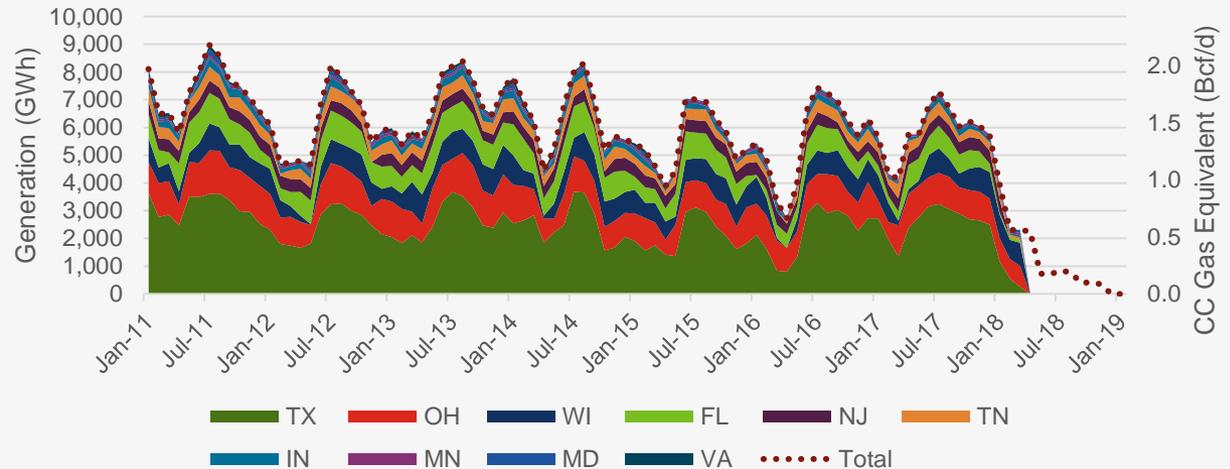
CHART 27

Coal/Nuclear Retirements and Fuel Switching to Gas



CHART 28

Power Generation From 2018 Retiring Coal/Nuclear Plants by State



Source: SNL

Five-Year Ethane and LPG Export Outlook

Ethane export capacity is expected to plateau over the next three years, with some incremental exports after Mariner East 2 and 2x begin service. Energy Transfer and Satellite Petrochemical recently announced a joint venture to construct an export terminal to deliver ethane to Satellite for consumption at their cracking facilities in China.

Energy Transfer calls Marcus Hook “the Future Mont Belvieu of the North.” LPG exports are expected to increase out of the facility with the in-service of the Mariner East projects.

Enterprise recently announced the acquisition of 65 acres for the expansion of their EHT facility to meet growing export demand. The company is also developing an ethylene export system capable of 2.2 billion lbs per year.

Morgan’s Point has been averaging about half of its available 240 MBbl/d of capacity in 2018.

Pembina Pipeline Corporation is also building a 25 MBbl/d export facility in British Columbia called Price Rupert, expected to be inservice mid-2020.

CHART 38
Ethane Exports

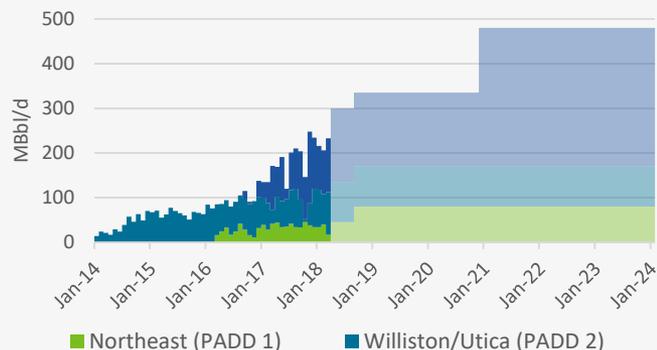
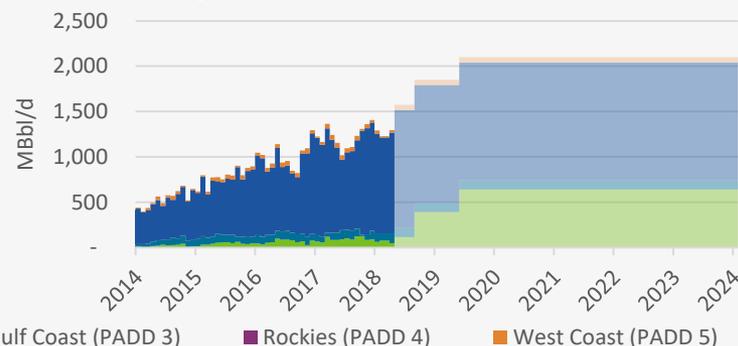


CHART 39
LPG Exports



Key Export Pipelines or Facilities

Export Infrastructure	Operator/Owner	Location	Product	In Service
Mariner West	ETP/Sunoco	Ohio to Canada	Ethane	In Service
Vantage Pipeline	Pembina Prairie Facilities	North Dakota to Canada	Ethane	In Service
Marcus Hook	ETP/Sunoco	Philadelphia to Europe	Ethane + LPG	In Service
Enterprise Hydrocarbons Terminal	Enterprise	Houston Ship Channel	Ethane + LPG	In Service
Morgan’s Point	Enterprise	Texas to Europe, India, Brazil etc.	Ethane	In Service
UTOPIA	Kinder Morgan	Ohio to Ontario, Canada	Ethane	In Service
Nederland Marine Terminal	Sunoco/Lonestar	Nederland, TX	LPG	In Service
Freeport Terminal	Phillips 66	Freeport, TX	LPG	In Service
Orbit Gulf Coast	ETP and Satellite Petrochemical	Gulf Coast to China	Ethane	End of 2020

Source: EIA, DI Analysis

Potential Propane Tariffs

After President Trump announced tariffs on Chinese imports, China retaliated by publishing a list of products exported by the US to which China may apply its own tariffs.

Propane is on the long list of products, which puts a risk on domestic propane prices.

In a circumstance that China follows through with the list, buyers in China will source their supply from other countries, because the marginal cost to buy from the US is increased.

US sellers would have to redirect their cargos to other countries and receive a discount to China's orders, or pay more for transportation costs.

Because of the marginal cost to ship to other countries, there will be more propane sold domestically at a lower price with no demand there to meet it, which will drive process lower.

CHART 40
Propane Exports to China (MBbl/d)

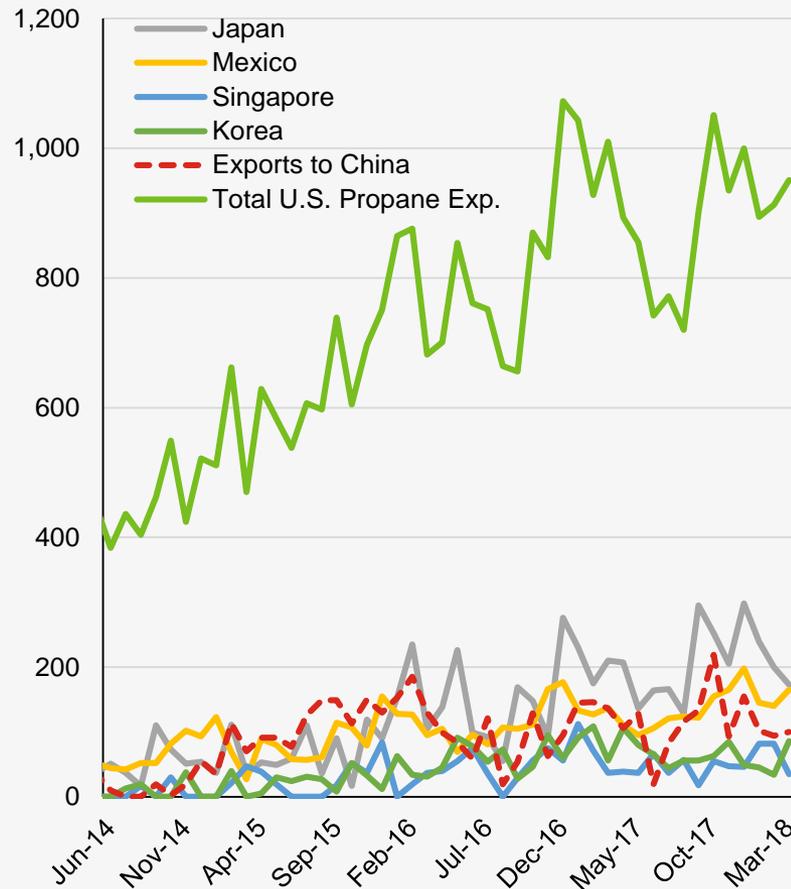
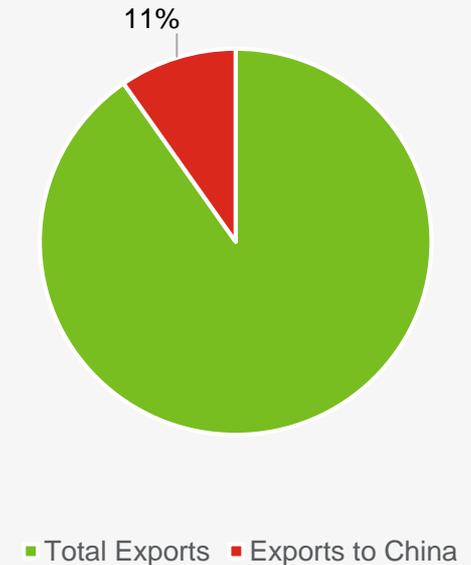
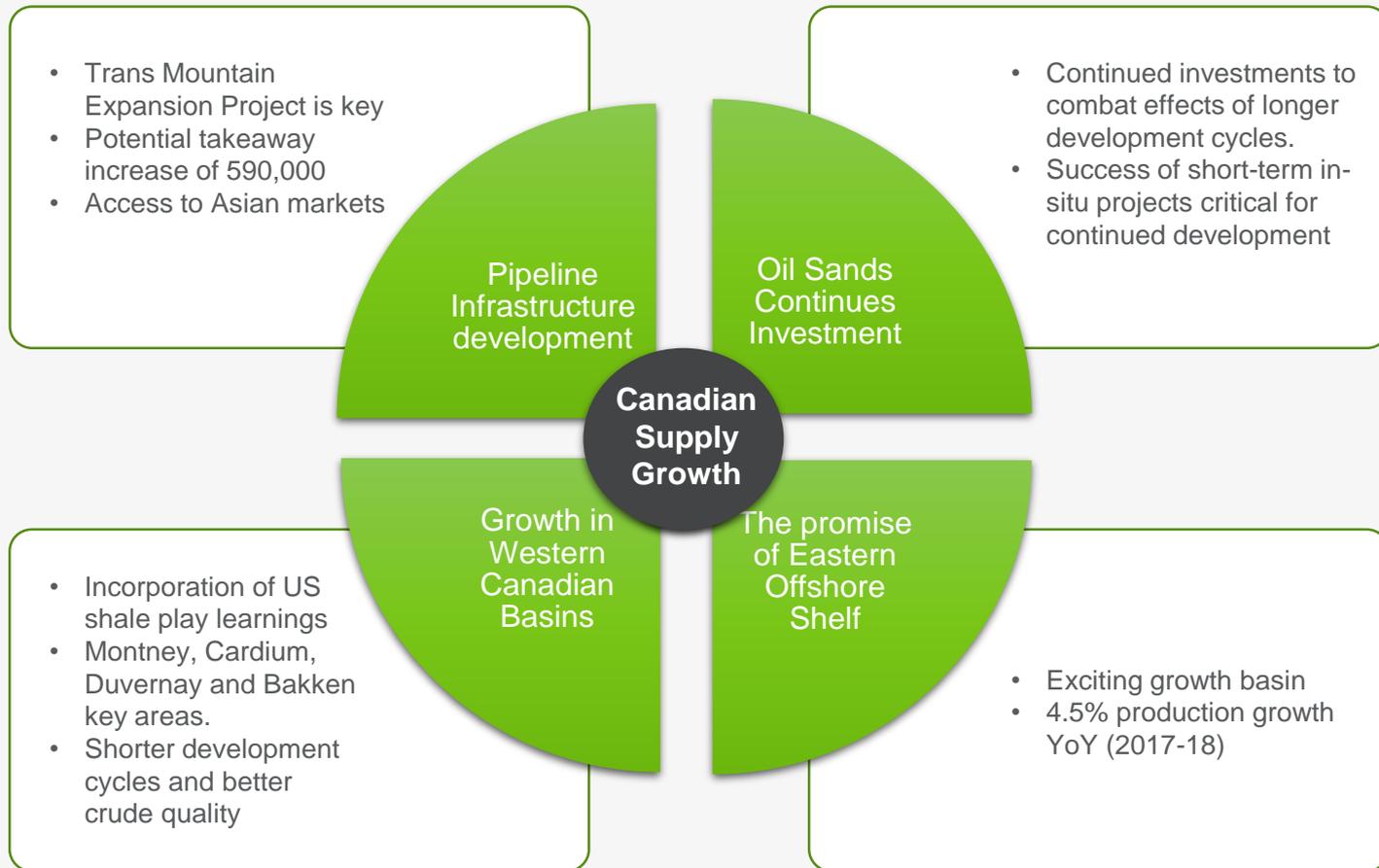


CHART 41
2018 US Exports by Destination



Source: EIA, DI Analysis

Canadian Supply Growth Outlook



“Living Within Cash Flow”

The new E&P mantra is exercising capital discipline by not spending more than their cash flows. This new self-funding principle runs parallel with smart growth strategies, decreasing leverage, and returning cash to shareholders.

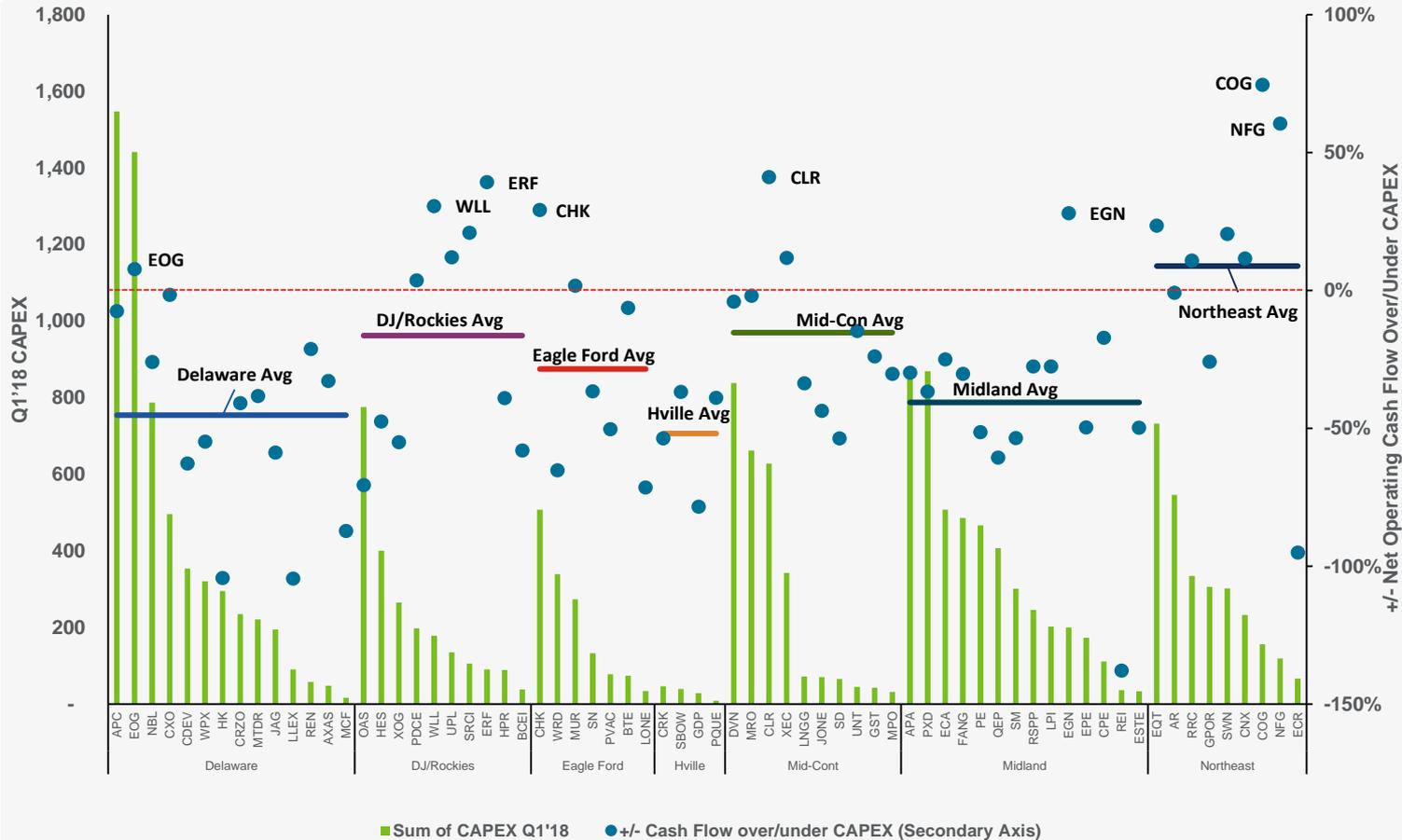
Almost everyone is aiming for this, but who is actually achieving it? See the figure to the right.

High-producing operators like Cabot, Continental, and EOG are leading the pack with the most cash flow over their expenses this quarter.

Average net operating cash flow per operator across all basins is 27% below CAPEX or \$54 million.

CHART 45

Q1'18 Capex Vs. Net Operating Cash Flow



Source: FactSet and DI analysis

Gas Supply – 2017 Forecast Vs. Actual

The Drillinginfo ProdCast tool allows you to forecast production with one of the key inputs being the expected price of oil (WTI) and gas (HH).

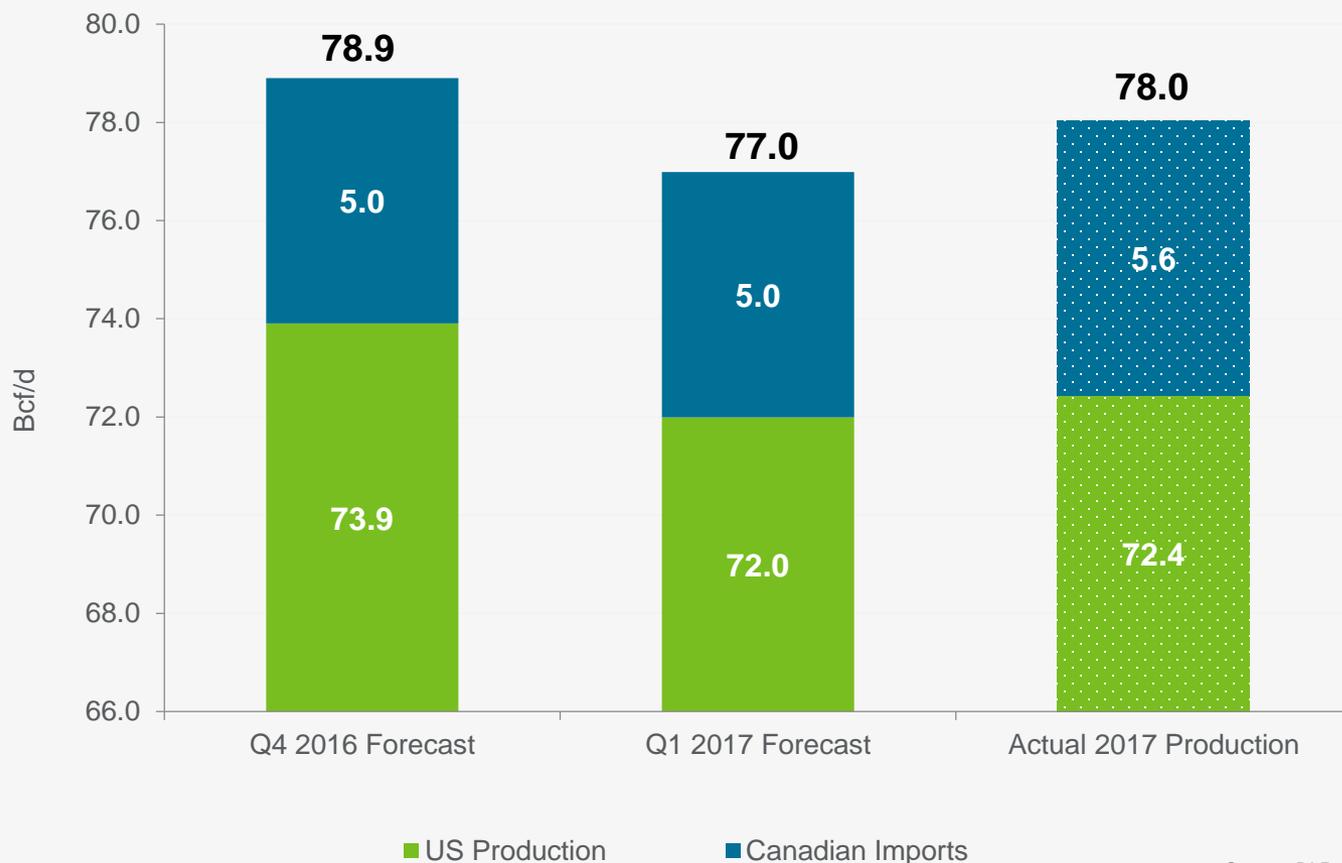
In the Q4 2016 of this report “Supply for Every Demand” and using ProdCast, Drillinginfo forecasted dry gas production will average 73.9 Bcf/d in 2017. The production forecast was lowered to 72 Bcf/d in the next quarter. E&P companies published their first guidance for each year during the first quarter of the same year.

Actual 2017 production was 72.4 Bcf/d, 1.5 Bcf/d lower compared to Q4 2016 and only 0.4 higher than DI’s Q1 2017. Both errors were 2% or lower.

For Canadian imports, DI’s error in 2017 was 12%, but only 0.6 Bcf/d lower than actuals.

CHART 48

US Production and Canada Imports – Forecast Vs. Actual



Source: DI ProdCast

2017 Crude Oil Prices – Forecast Review

DI forecast of \$52/Bbl was slightly higher than actual 2017 averages for WTI, which averaged ~\$51/Bbl.

CHART 54

WTI Crude Oil Price – Forecast Vs. Actual



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Thank you!

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