Presentation

North American Upstream Cost & Technology Trends

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Contents

IHS Markit Product Scope

Upstream Costs & Technology

Subscriptions

Project Cost Planning | Strategic Sourcing | Technology Strategy

Upstream Costs & Expenditures

- Upstream Costs & Expenditures
- North America Costs & Expenditures
- Brazil Costs & Strategic Sourcing

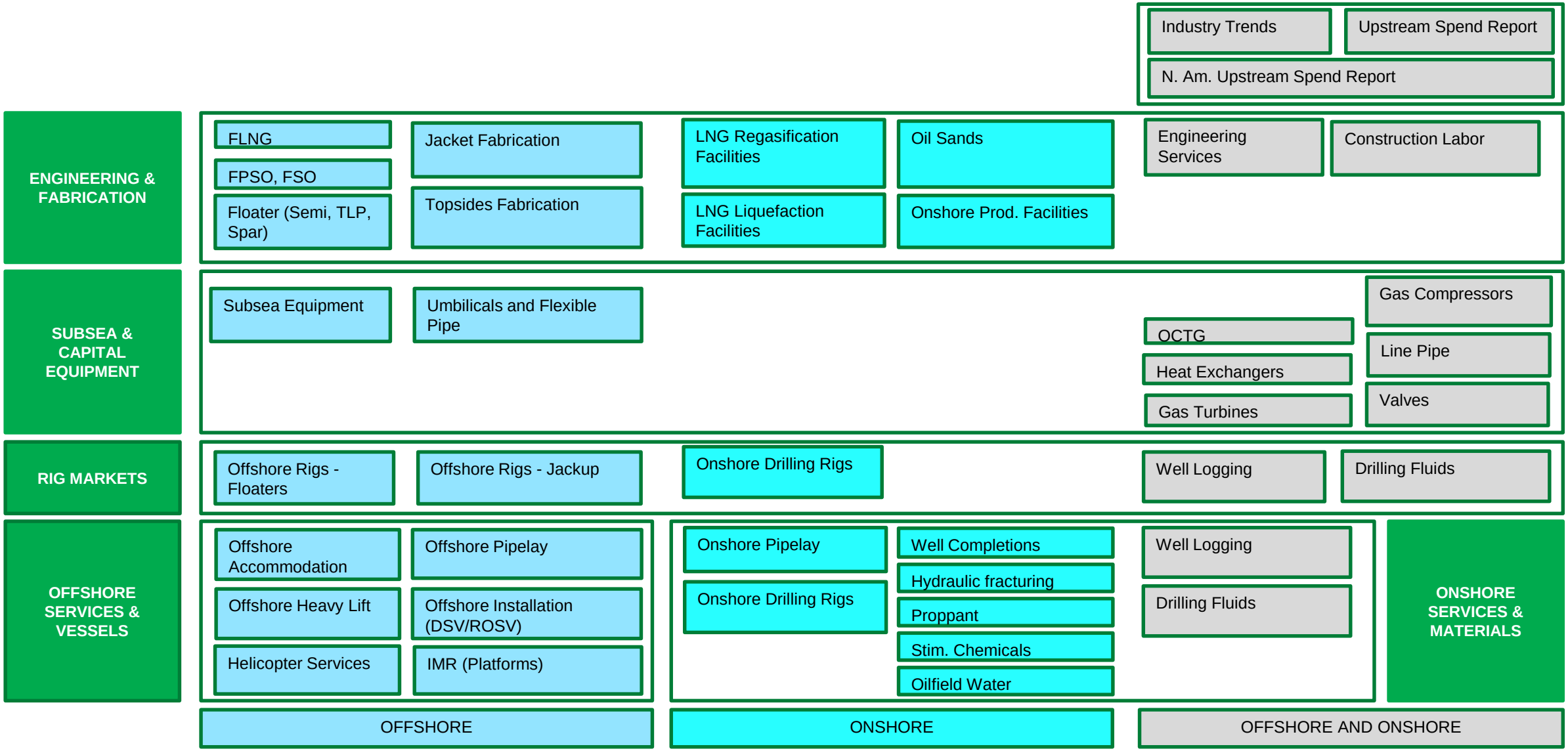
Oilfield Equipment & Services

- Engineering & Fabrication
- Offshore Services & Vessels
- Onshore Services & Materials
- Subsea & Capital Equipment
- Rig Markets

Upstream Technology & Innovation

- Upstream Technology & Innovation

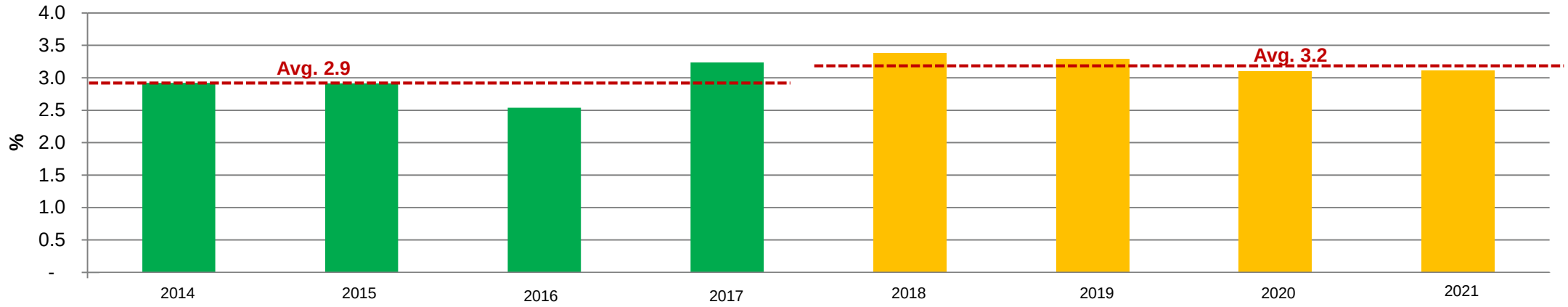
Oilfield Equipment & Services - Segment coverage



Upstream Outlook

Global economic outlook continues to strengthen and is expected to boost global oil demand over the coming years

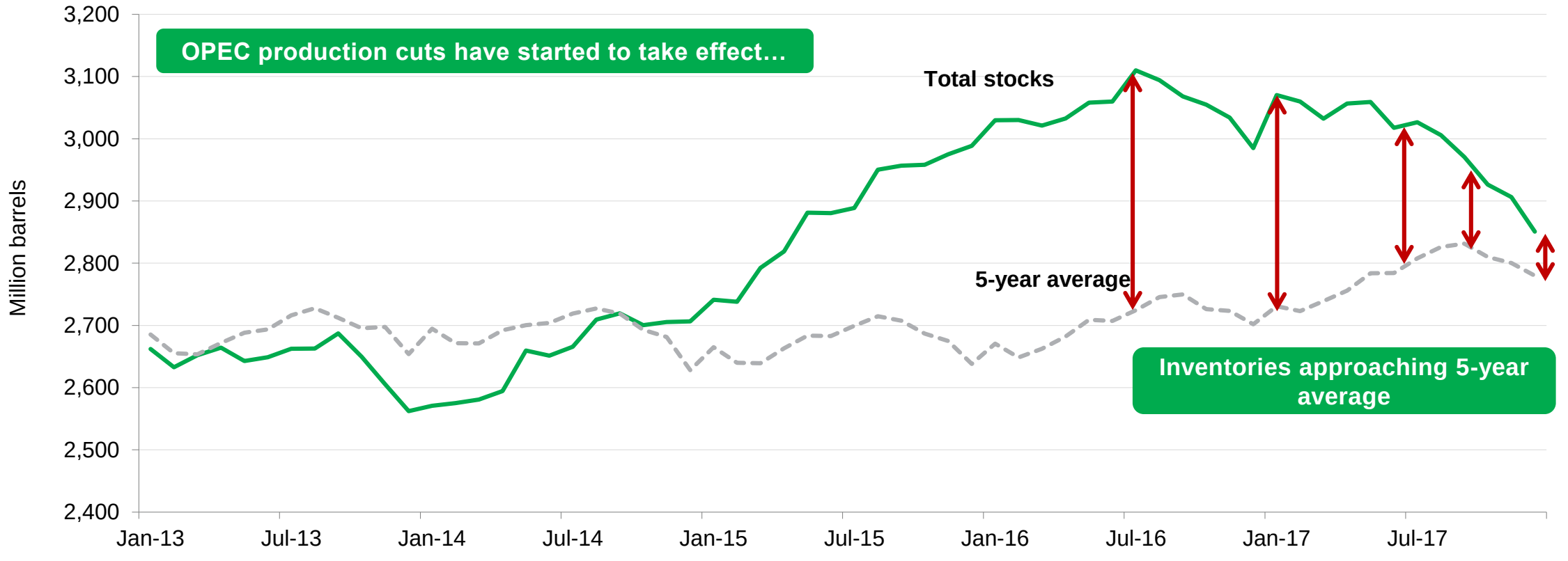
Global GDP growth 2014-2021 (real)



Source: IHS Markit

OPEC's production cuts finally started to impact inventories during 2017…

OECD total oil industry stocks

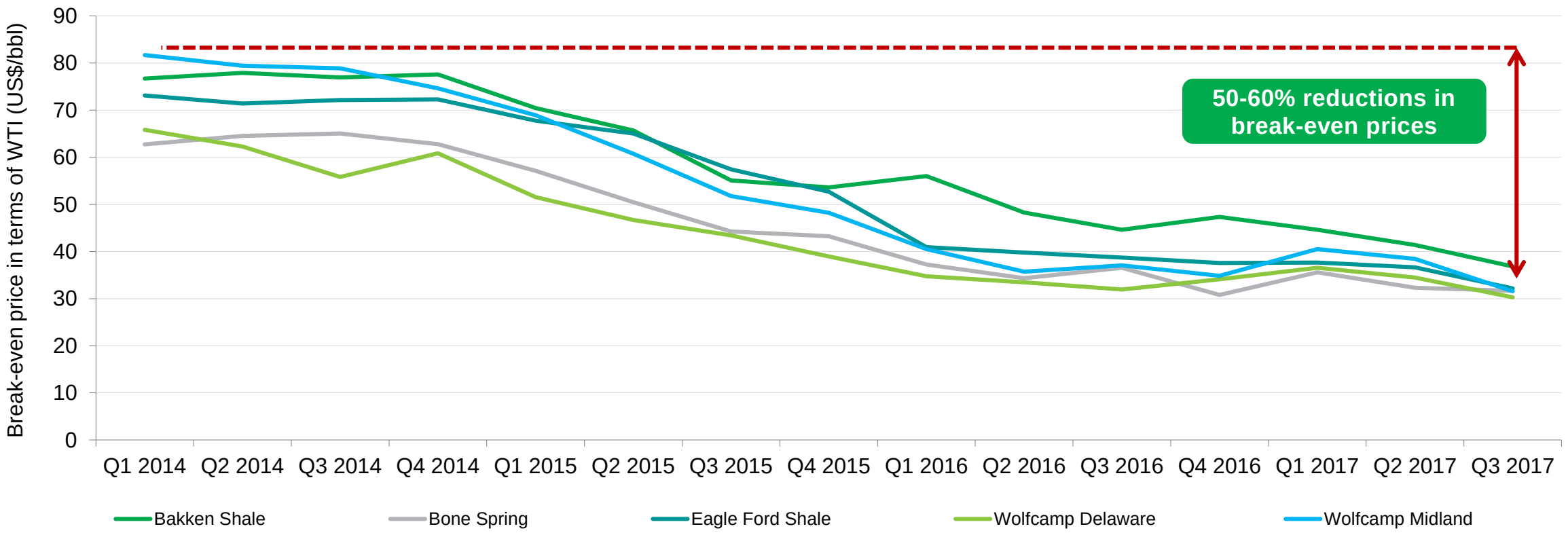


Data through December 2017.

Notes: Total oil industry stocks include crude, refined product, NGL, and feedstocks. Data are monthly, through December 2017.
Source: IHS Markit

…however US producers have passed the "tight oil test" by adjusting costs to lower prices and remain competitive

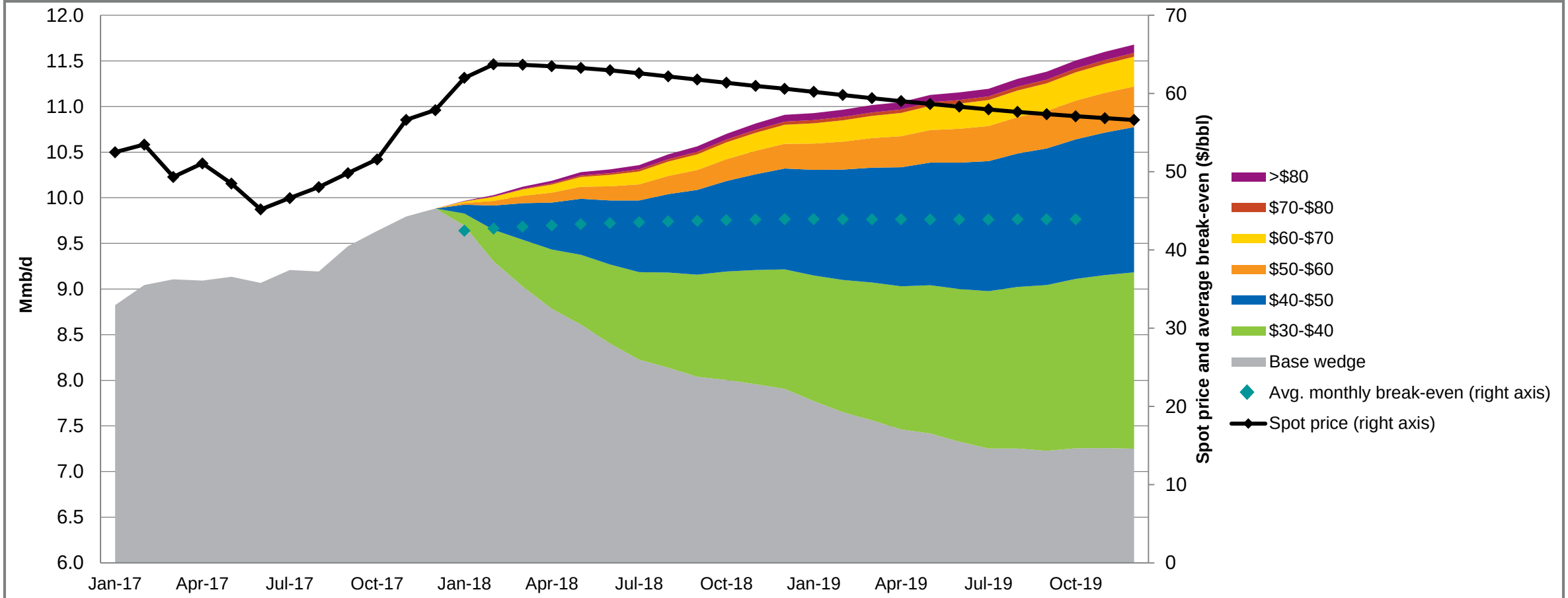
Median break-even prices for five key US oil plays, 2014–17



Notes: The break-even price is the WTI crude oil price required for the project to cover all of its estimated well capital and operating costs and generate a 10% rate of return. Data are through 3Q 2017.
Source: IHS Markit Performance Evaluator

US oil production responds quickly to price changes, though growth can be sustained with oil prices in the mid-$50/bbl range

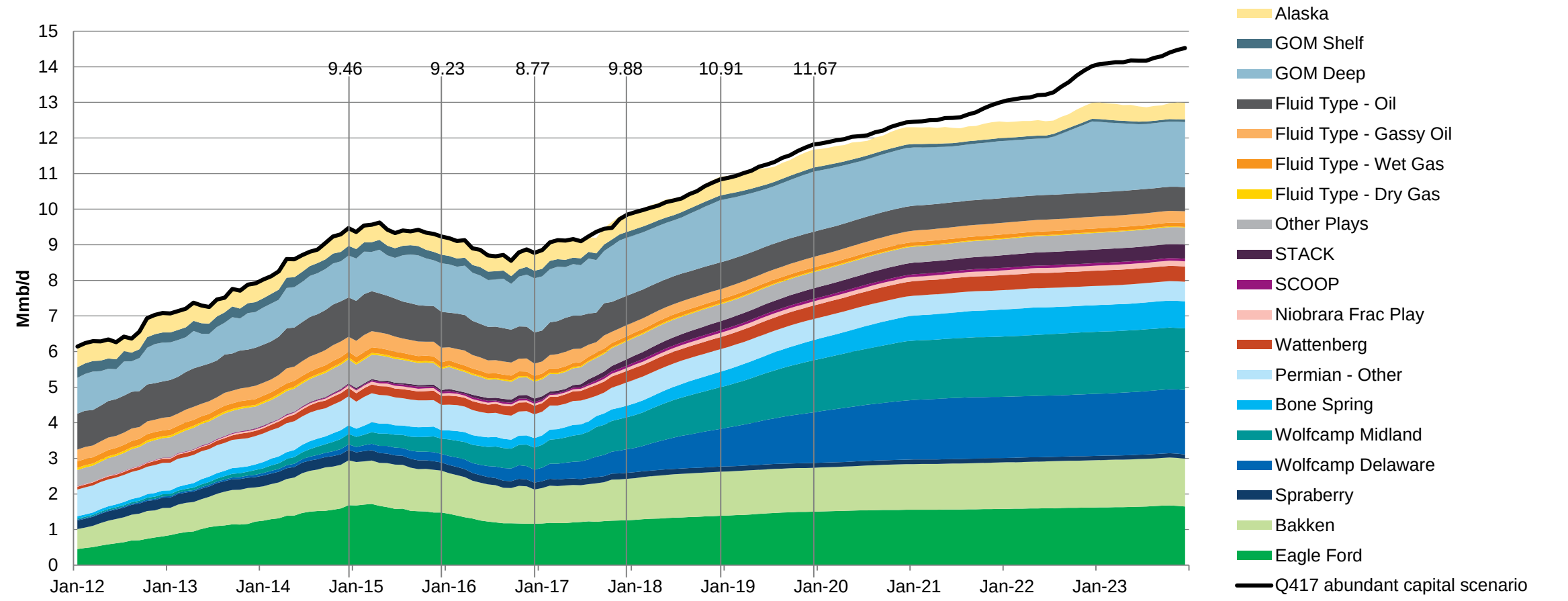
US oil production volumes by break-even price



Source: IHS Markit

US crude oil production will reach nearly 11.0 MMb/d by the end of 2018, representing exit-rate growth of over 1.0 MMb/d from 2017 levels

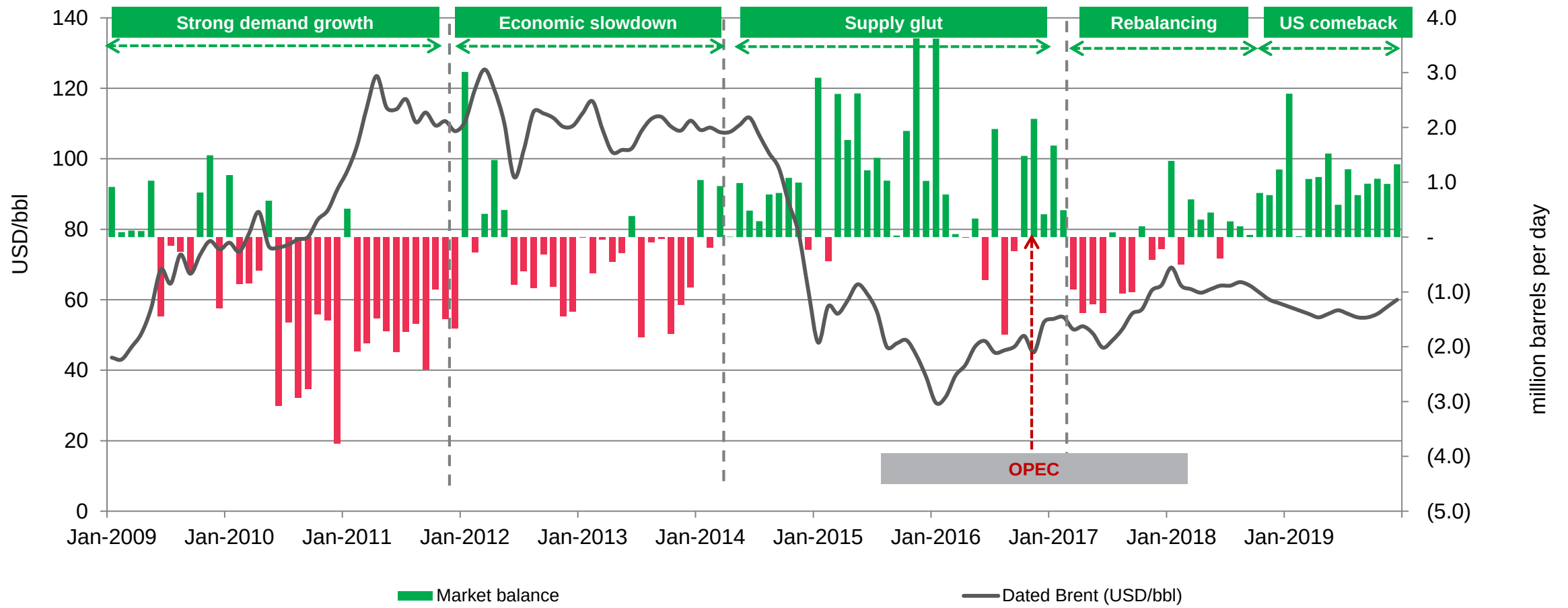
US crude oil production by play, 2012-23: Rangebound (median) case



Source: IHS Markit

As inventories again start to build, prices should come down later this year

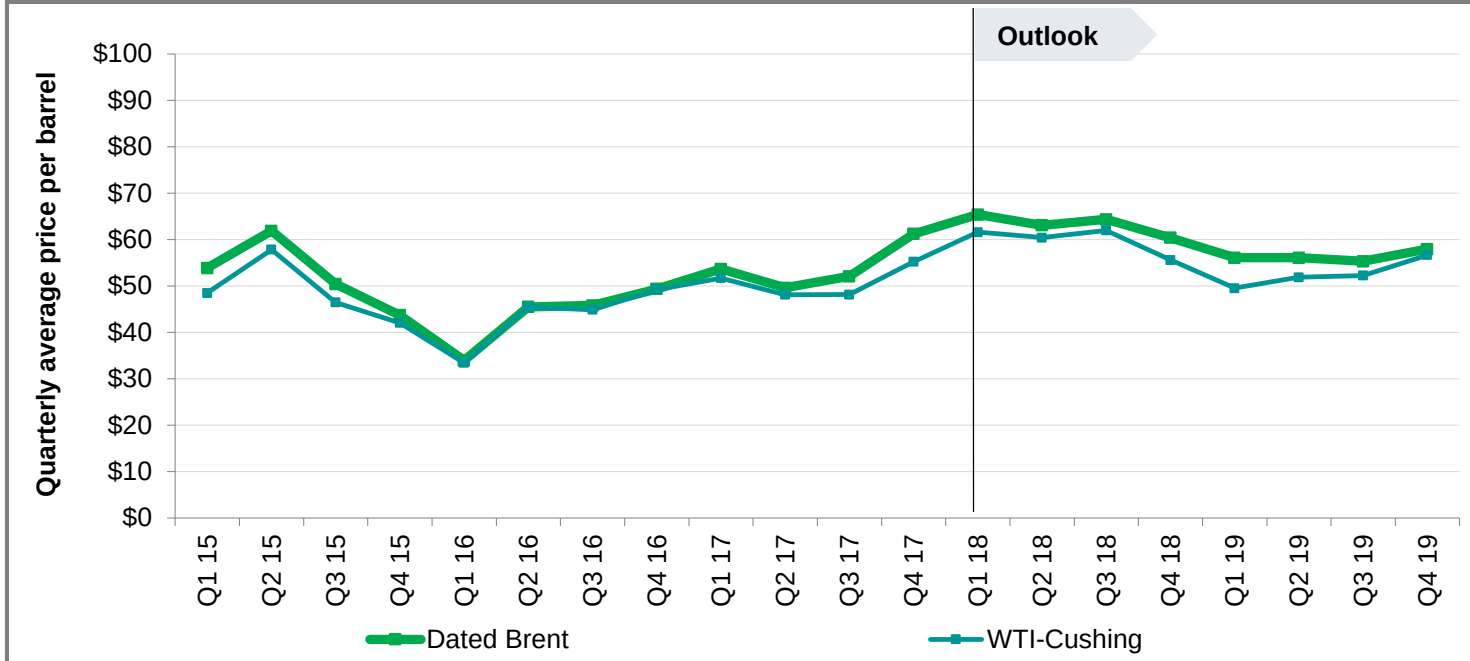
Market balance and oil price development



Source: IHS Markit

Oil prices to fall from recent highs as balance reverts to loosening trend

Dated Brent and WTI-Cushing crude oil price outlook to 2019



Notes: WTI = West Texas Intermediate.
Source: IHS Markit, Argus Media Limited (historical)

Assumptions

- **World demand.** World liquids demand growth stays robust this year, at 1.9 MMb/d, fueled by strong non-OECD Asia refined product and US NGLs demand gains. Growth eases to 1.6 MMb/d in 2019; partly as US NGLs demand growth slows.
- **OPEC and Russia production.** OPEC and Russia maintain output restraint through 2018 to continue supporting prices.
- **US production.** With WTI prices averaging well above $50/bbl, US crude output rises at a blistering annual pace of 1.3 MMb/d in 2018 and 0.9 MMb/d in 2019.
- **Global liquids balance.** Fast-rising US output will moderate upward price pressure from continued robust world liquids demand growth.

Benchmark crude price outlook (dollars per barrel)

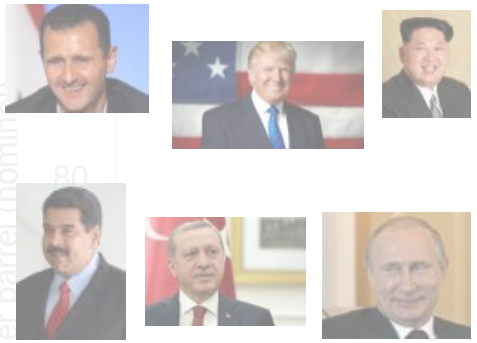
	3Q 2016	4Q 2016	1Q 2017	2Q 2017	3Q 2017	4Q 2017	1Q 2018	2Q 2018	3Q 2018	4Q 2018	1Q 2019	2Q 2019	3Q 2019	4Q 2019
Dated Brent	$45.80	$49.35	$53.66	$49.58	$52.07	$61.22	$65.38	$63.07	$64.34	$60.38	$56.09	$56.07	$55.32	$57.94
WTI	$44.88	$49.23	$51.70	$48.11	$48.16	$55.23	$61.58	$60.43	$61.96	$55.59	$49.52	$51.87	$52.24	$56.67

Source: IHS Markit, Argus Media Limited (historical)

Our long term oil price expectation is bound to face the realities of our world

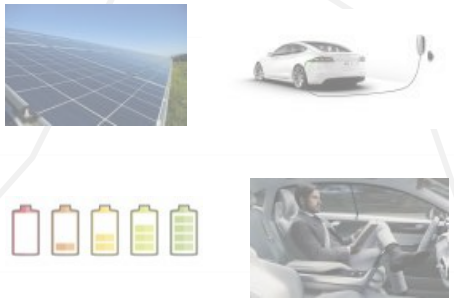
Dated Brent price outlook to 2022 in three IHS Markit Scenarios

Increasing geopolitical tension



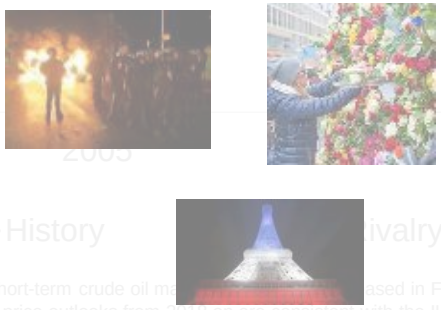
Nationalist movements

Renewables and technology

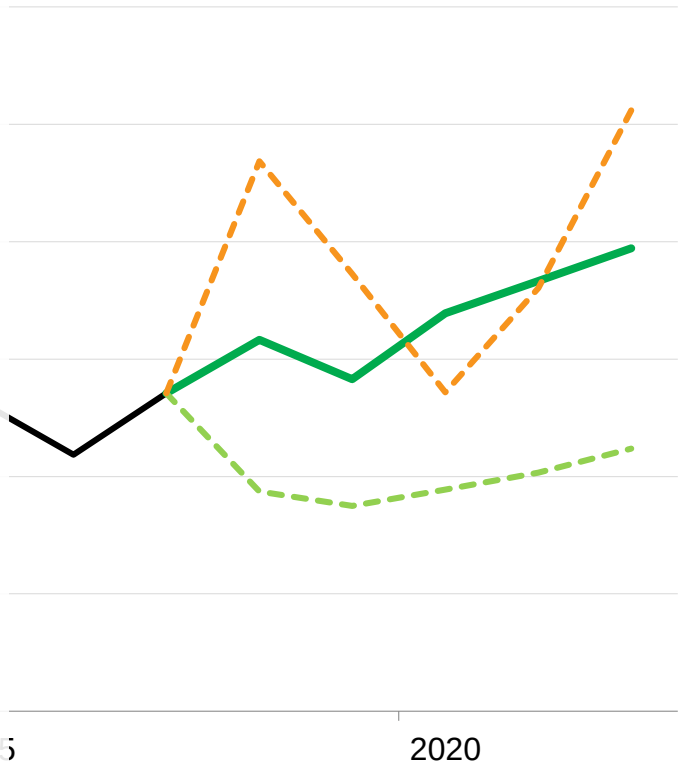


Crisis and natural disasters

Civil unrest and terror incidents



Industry development



Markit *Global Crude Oil Markets Long Term Price Outlook: Fourth Quarter*

What you need to know: Upstream

- **Increased capex will drive higher production growth, reaching 10.9 MMb/d by December 2018**, representing year-over-year growth of over 1.0 MMb/d. Oil prices began strengthening in the third quarter 2017, as US companies locked in hedges for 2018 and set capital plans. Higher prices will enable the 1.0 MMb/d of growth, but with stronger cash flows than in prior years, when growth came at the expense of cash flow. Consequently, US onshore capital expenditure continues its upward February, with upstream spending expected to increase from $69.2 billion in 2017 to $96.9 billion in 2018. We expect companies will achieve production growth in 2018 similar to that in 2014 despite 2018 capex remaining 40% below the 2014 peak of $161 billion.
- **Oil production growth of 1.0 MMb/d in 2018 is nearly certain.** Rising oil output is fueled by supportive Permian, Eagle Ford, and STACK economics in a mid-$50/bbl price environment, in addition to a recent price rally that has enabled companies to lock in approximately 25% of 2018 oil volumes at an average strike price of $53.40/bbl. The ever-prolific Permian Basin, for its part, will remain insulated from possible price declines through mid-2019 because Permian-focused companies have hedged approximately 63% of 2018 oil
- **Continued well productivity gains.** Operators continue to optimize logistics and well configuration. The Eagle Ford and Permian plays continue to be developed with ever-longer lateral lengths and higher proppant loads, leading to greater volumes from fewer wells. IHS Markit has modeled type curve improvements both from lateral lengths and completion operations, though continued productivity growth is expected to taper off through 2020 as operators reach the limits of well designs.
- **Fleeting drilling efficiency improvements.** Following several years of impressive drilling efficiency gains, average drill days per well are expected to remain largely unchanged in 2018 and 2019. Contributing factors include rig reactivations undertaken by less experienced crews, as well as ongoing increases in average lateral lengths.
- **Well counts increase, despite flattening rig count, because of DUC conversions.** US onshore rigs averaged 855 in 2017, up from 502 in 2016. Well additions during those two years remained stagnant, hovering below 15,000 wells each year. In 2018, IHS Markit expects the onshore rig count to average 919, a 7% increase over the previous year. Onshore well counts, however, are projected to increase by 20% over 2017 levels, primarily because of an anticipated drawdown in the number of DUC wells: IHS Markit forecasts a total of 17,955 well additions during 2018, of which 1,172 are DUCs. These rigs are drilling longer laterals and more productive wells to provide wedge volumes of 2.9 MMb/d, countering a base decline of 1.7 MMb/d, to grow US volumes by about1.0 MMb/d.
- **Strong production growth in 2017; the cycle continues into 2018.** Despite slower associated gas production growth because of a pullback in oil-directed drilling, expanded takeaway capacity in Appalachia will spur a rapid expansion in Marcellus and Utica output. In total, US gas production is expected to increase by 5.5 Bcf/d during 2018, surpassing a total of 80.0 Bcf/d by year-end.
- **Growth moderates post-2018, but nevertheless remains significant.** Although production from 2019 onward is likely to grow more slowly than in 2017-18, IHS Markit forecasts that US natural gas volumes will rise by an average of nearly 3.8% per year through 2023, reaching 89.2 Bcf/d.
- **Appalachia and associated gas remain the twin drivers of US supply growth.** Combined, Marcellus, Utica, and associated gas production currently make up nearly 62% of total US output, up from just 20% in 2011. By 2023, IHS Markit projects that combined Appalachian and associated gas volumes will account for 75% of total US production.

Risks and assumptions

Assumptions

- **Debottlenecking the Permian.** We project that Permian drilling activity will continue at a furious pace in 2018, averaging 377 active rigs through 2018, including 328 targeting the three major unconventional Permian plays. This level of activity cannot be matched by the undersupplied service sector, which is particularly constrained by labor shortages for completions crews. Nevertheless, service sector bottlenecks are expected to ease somewhat during the second half of 2018, bringing completions activity into alignment with drilling levels. As completions activity ramps up, oil production growth will accelerate as newly completed wells bring additional volumes to market. As a result, any change in the timing of the ending of service sector bottlenecks will alter the short-term outlook for production growth.

- **Productivity gains in the Eagle Ford and Delaware Basin.** IHS Markit research shows continued improvements in well productivity across several plays, particularly in the Eagle Ford and in the Wolfcamp Delaware in the Permian Basin. Operators continue to achieve incremental productivity improvements through ever-increasing lateral lengths and proppant intensities. Should these productivity improvements not materialize as expected, IHS Markit's current projections for December 2018 oil production could be reduced by as much as 275,000 b/d.

Risks

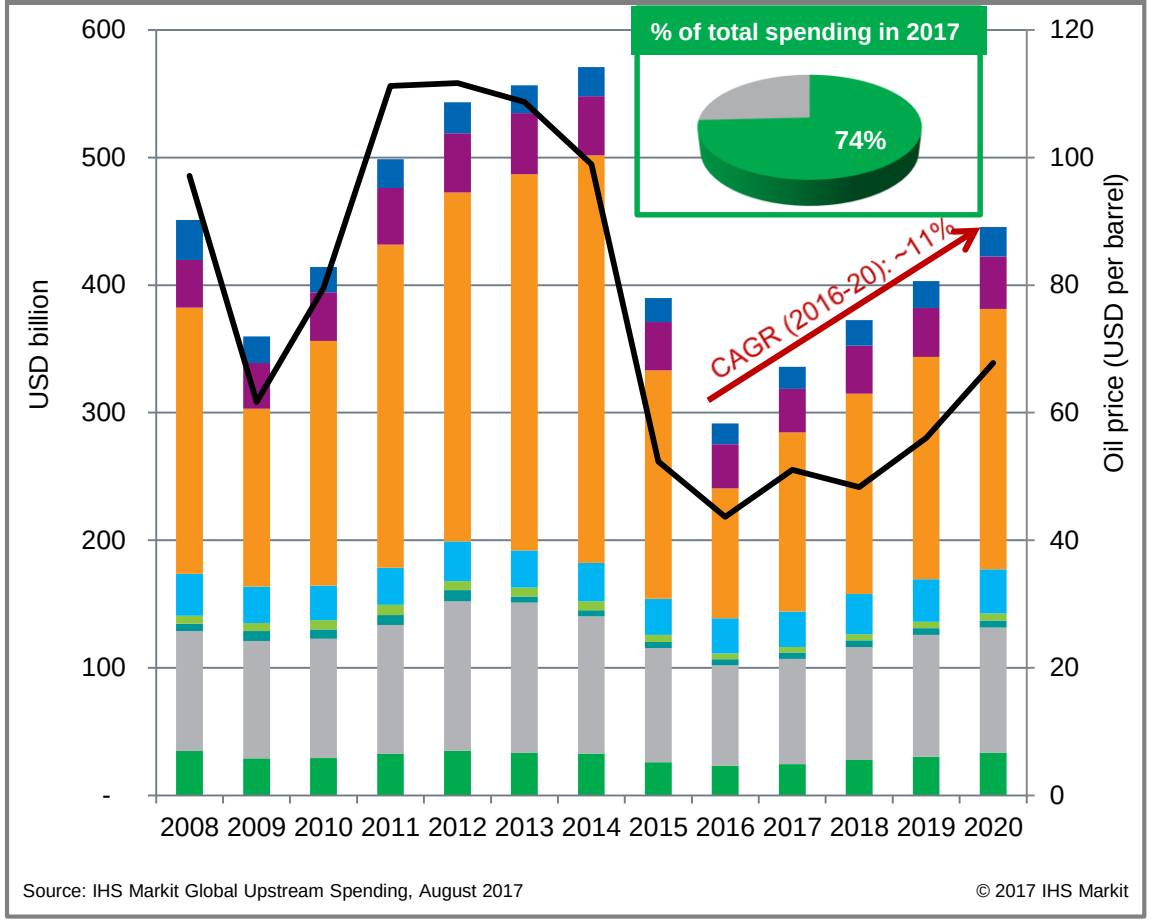
- **OPEC/Non-OPEC agreement and geopolitical issues.** All signs point to continued adherence to the OPEC/Non-OPEC agreement, with the top-line volume restrictions being respected. However, the political situation in the Middle East, particularly Iran, could trigger a breakdown in cooperation. If the existing agreement were to collapse, oil prices would likely face dramatic downward pressure, leading to declining activity in non-Permian oil plays such as the Bakken and the Eagle Ford. Nevertheless, such a price decline would likely take at least six months to affect drilling activity, creating the potential of a more prolonged downturn.

- **In-field execution.** Despite the impressive acceleration in onshore activity achieved during the second half of 2017, some execution risk remains because of continued growth in lateral lengths and completions intensity. This risk is compounded by relatively inexperienced service-sector crews. As a result, delays and inefficiencies are more likely now than at any time since 2014, though the overall impact on production would be relatively minor.

Cost Trends

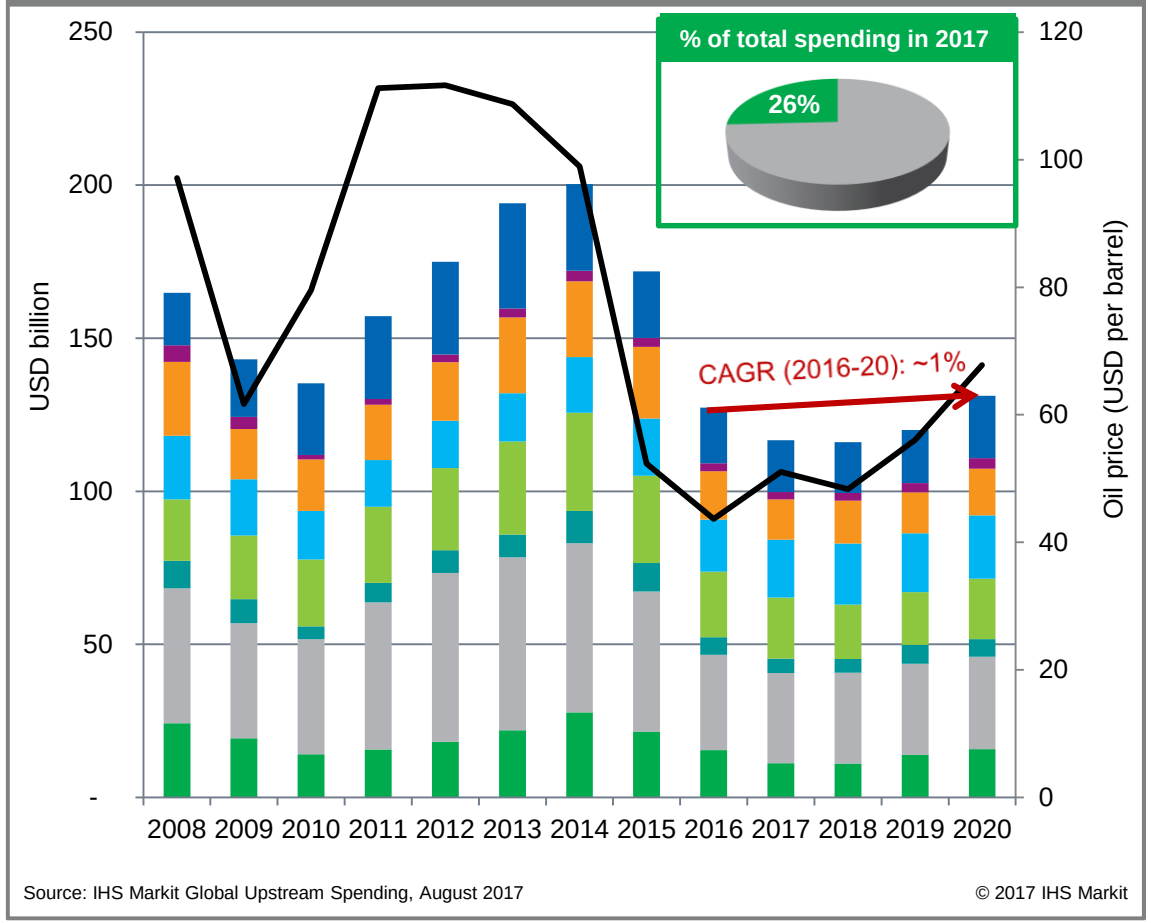
Following two years of massive spending cuts, global upstream spending bottomed out in 2016 and is now expected to rise as costs have come down

Onshore upstream spending by region (USD billion)



Source: IHS Markit Global Upstream Spending, August 2017

Offshore upstream spending by region (USD billion)

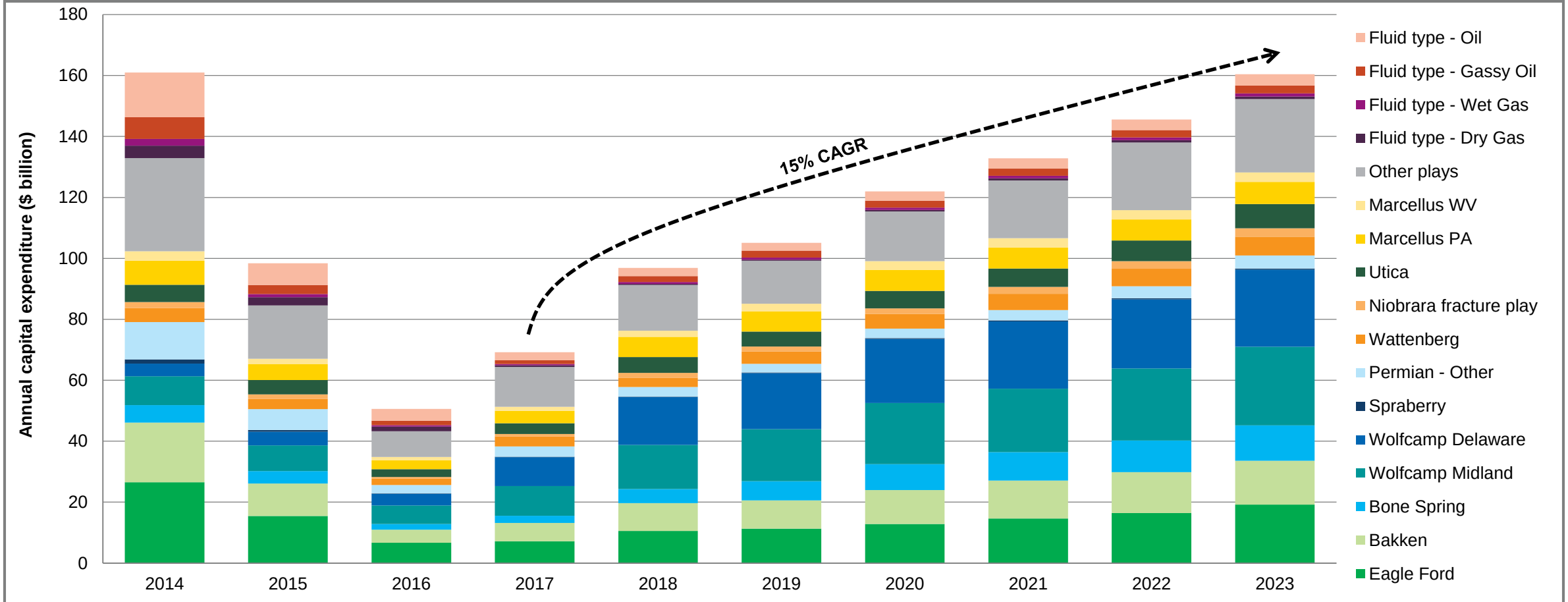


Source: IHS Markit Global Upstream Spending, August 2017

South America | Russia & Caspian | North America | Med. & Middle East | Europe | Central America | Asia Pacific | Africa | Date Brent oil price (nominal)

Onshore US capex reaches nearly $97 billion in 2018 and $105 billion in 2019, with 41% deployed in the Permian Basin

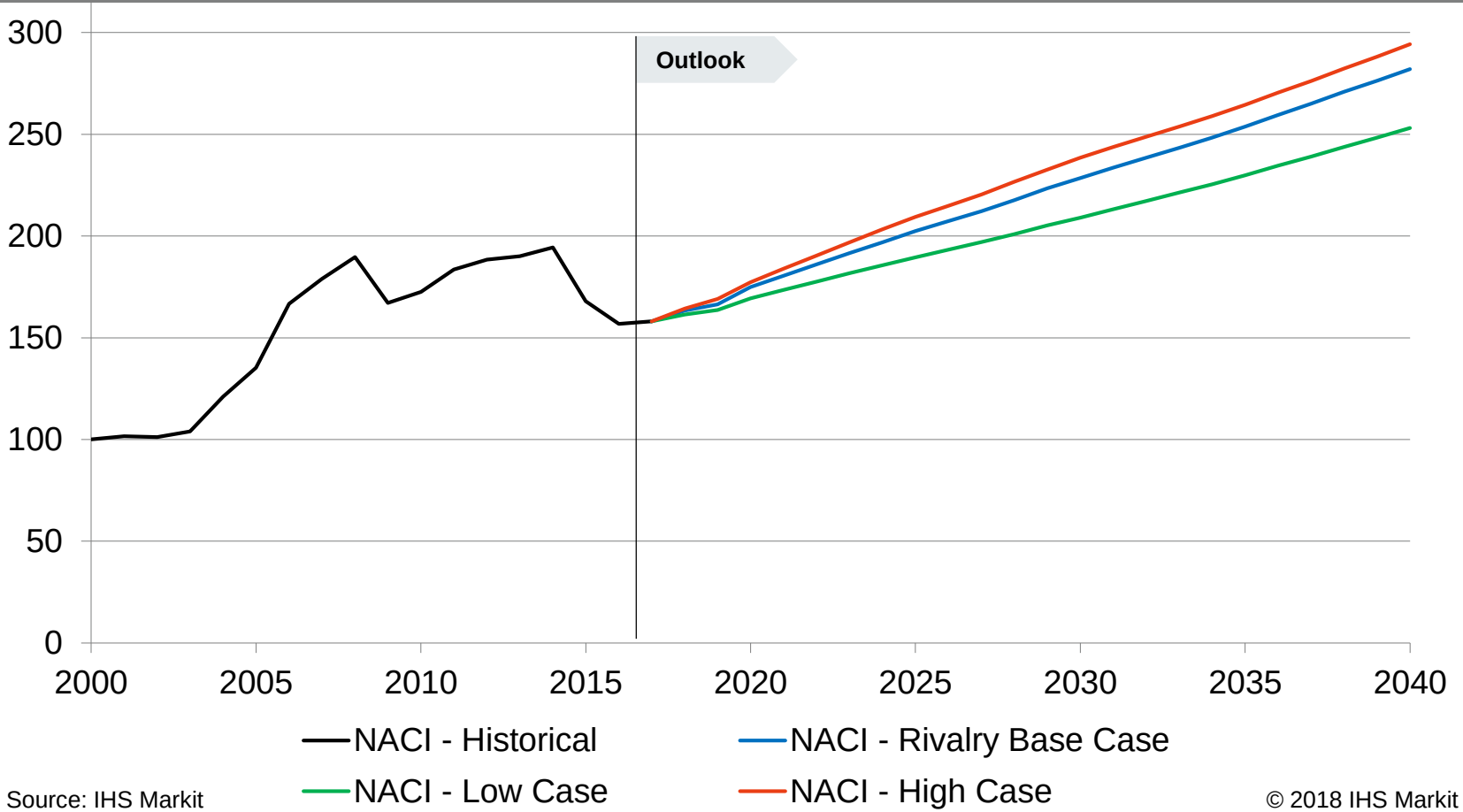
US onshore capex by play, 2012-23



Source: IHS Markit

The North American Capital Cost Index is forecast to increase significantly under all three scenarios

North American Capital Cost Index Historical and Forecast Values



Source: IHS Markit

- Similarly to the Upstream Capital Cost Service and Upstream Operating Cost Service, the North American Cost Service tracks a portfolio of North American projects, both onshore (conventional and unconventional) and in the Gulf of Mexico
- There was little movement in the markets in Q4 2017, with the exception of onshore drilling & completions
- For both of these areas, the largest increases came from the Permian; it is expected that in 2018, overall costs will increase there nearly 13%
- Canada is showing strong signs of increasing activity in completions, largely due to the fact that this area is in a recovery phase following a deep trough
- Turning offshore, costs are only expected to increase about 1% overall in 2018

Technology Trends

Dramatic activity increases, and an improved oil price environment have resulted in several changes, and challenges for the industry

Equipment

- Increased demand for equipment, coupled with regulations, and poor quality of cold stacked equipment has resulted in demand for equipment and parts, and thereby long lead times
- Long lead times in some segments has resulted in a short term rental model as companies wait on equipment orders but are not willing to have additional downtime or lose production time
- As companies continue to develop their preventative maintenance programs, we expect maintenance issues and related downtime to decrease, however, at the moment shortages in parts, and maintenance challenges have also driven demand for extra horsepower on location to compensate

Labor

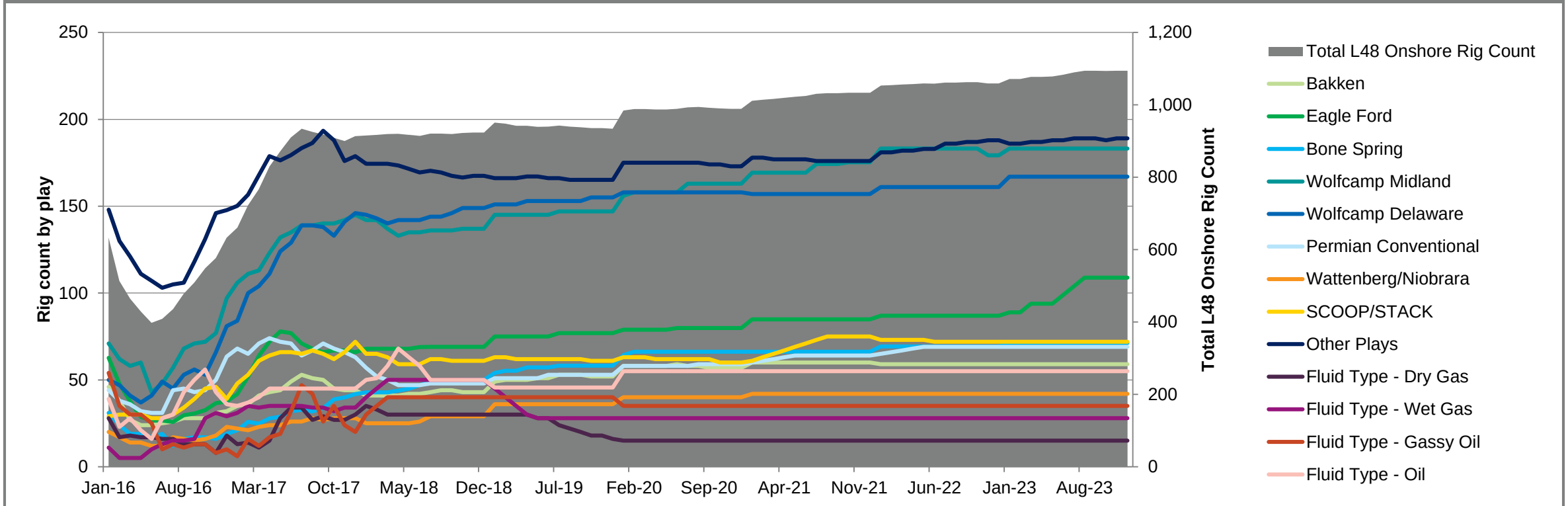
- Downturn driven layoffs resulted in a lean workforce, with many “hands” reluctant to come back to the industry despite improved conditions
- Several companies conducting new hire classes every week, with cannibalization between service companies rampant
- Newer labor force, and associated training requirements, resulting in lower efficiencies and downtime
- Labor shortages go beyond just oilfield services firms, hauling is another major constraint especially for hydrocarbons and sand, but manufacturing, and office locations also reporting shortages

Frac Design

- Frac stages have continued to intensify, with increasing proppant intensities, but recently proppant intensities appear to be levelling off
- An increased incidence of “frac hits”, interference between frac stages and either production, or drilling, on adjacent wells may result in increased focus on improved frac design and control, with an impact on intensity
- While cost remains a focus, with an improved oil price environment, there has been a renewed focus in some of the chemicals and technologies including gelling and diverting agents which could impact proppant and horsepower requirements

Rig counts remain relatively flat through 2018 before returning to growth after 2019 because of increased activity in most liquids plays

US land rig count by play, 2016-23



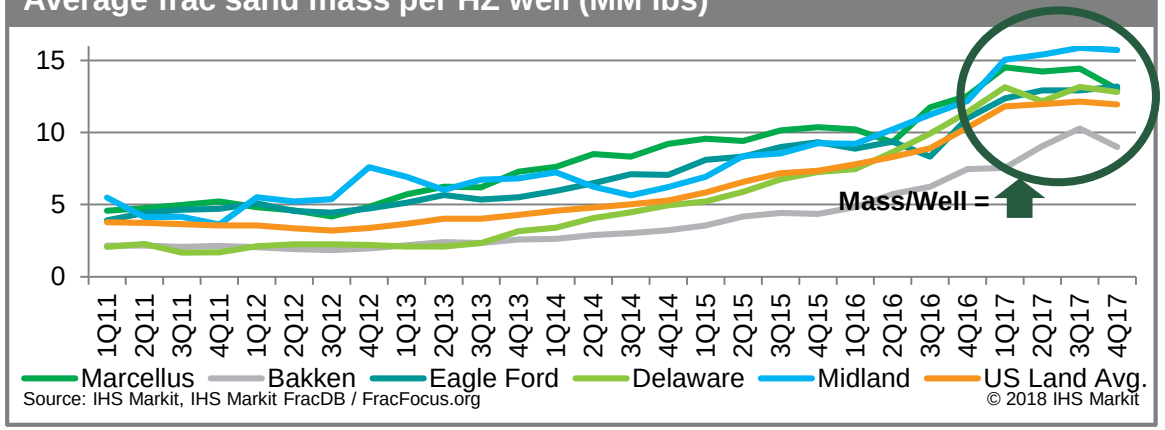
Source: IHS Markit

- Although rig counts remain relatively flat in the short term, IHS Markit projects that the number of completed onshore wells will rise from 14,913 in 2017 to 17,955 during 2018
- Well completions will accelerate faster than rig counts as DUC well inventories start to decline, beginning in the second half of 2018 and continuing through 2019

Permian expected to increase its share of North American proppant market to over 40% by 2022; US average proppant mass per HZ well up 15% since 4Q16

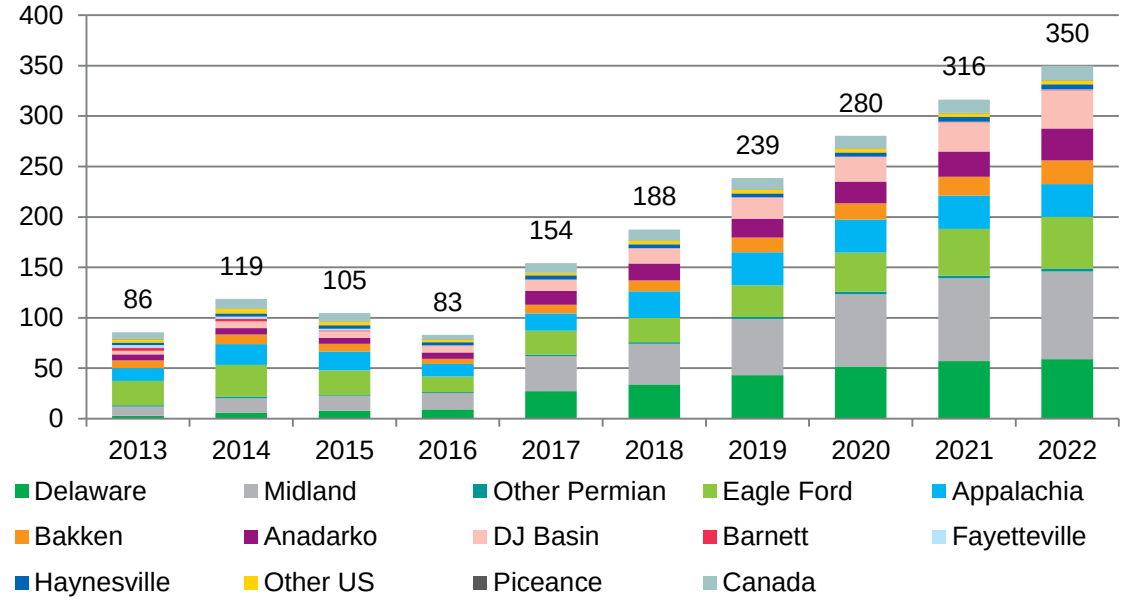
- 3 key regions – Midland, Delaware and Appalachia are expected to account for the majority (54%) of proppant demand in North America in 2018
  - Proppant demand in the Delaware and Midland is expected to increase 24% and 16% in 2018, respectively
  - Canada accounted for 8% of North American proppant demand in 2014 but is expected to decrease its market share to 4% by 2022 due to decreased activity
  - Eagle Ford proppant demand is forecast to be flat in 2018 due to a drilling slow down next year resulting in a lower number of wells frac'ed
- IHS Markit believes there is room for incremental proppant intensity growth in the Eagle Ford, Delaware basin and Marcellus, which could lift frac sand mass/ well estimates higher; but slower rate that previously

Average frac sand mass per HZ well (MM lbs)



Source: IHS Markit, IHS Markit FracDB / FracFocus.org

Regional proppant consumption (billion lbs)



Source: IHS Markit, IHS Markit FracDB / FracFocus.org, IHS Markit WellIQ

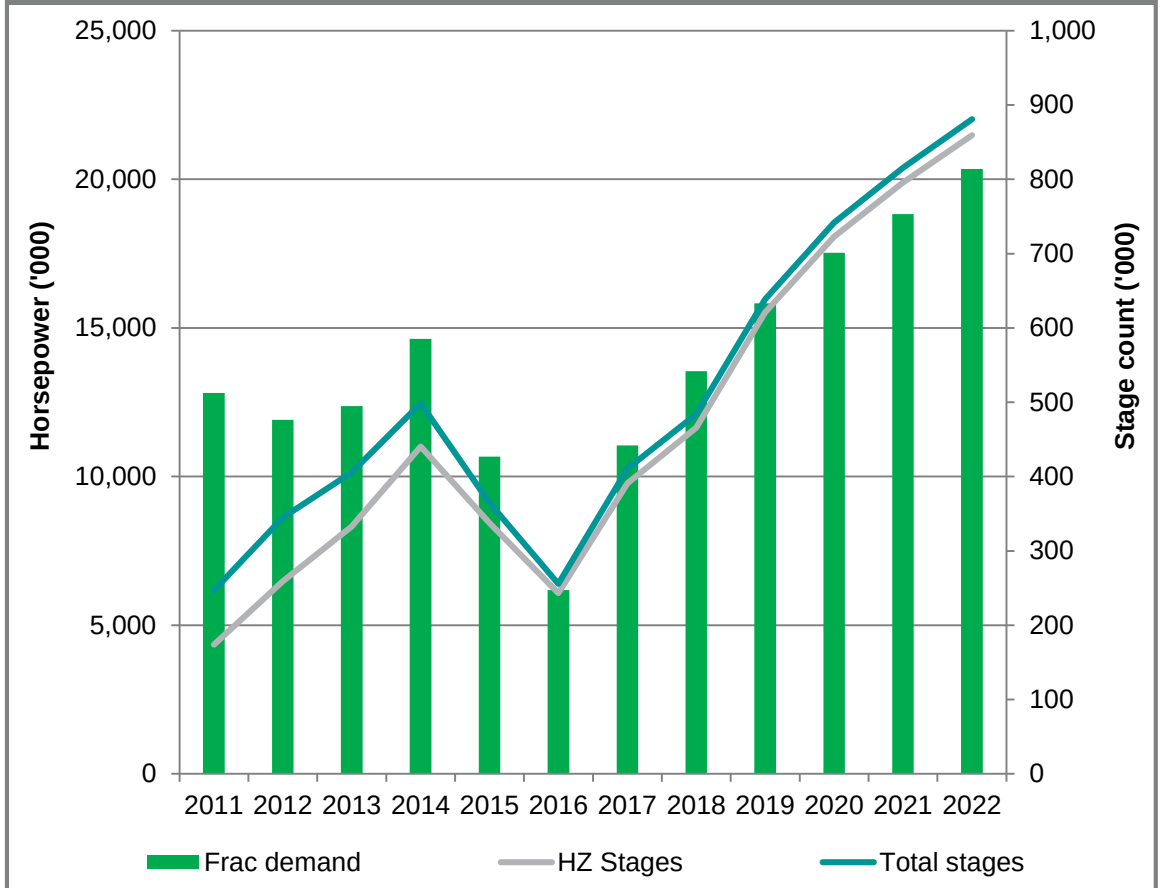
Market Share

% mass	2016	2017	2018	2019	2020	2021	2022
Eagle Ford	19%	15%	13%	13%	14%	15%	15%
Permian	32%	41%	40%	42%	45%	45%	43%
Appalachia	15%	12%	14%	14%	12%	10%	9%
Canada	5%	6%	6%	5%	5%	4%	4%
Total	**70%**	**74%**	**73%**	**74%**	**75%**	**74%**	**70%**

Source: IHS Markit, IHS Markit FracDB / FracFocus.org, IHS Markit WellIQ

While horizontal stage counts remain biggest driver for horsepower demand, frac intensity has driven significant increases

US frac demand and stages



Source: IHS Markit

- IHS Markit has adjusted its activity forecast for 2018; stage count (+18%) and frac demand (+23%) are expected to grow at higher rates than previously projected
- In 2018, frac intensity is expected to have a greater impact on demand in comparison to stages frac'ed
  - Increasing proppant placement, zipper frac's, reduced downtime and maintenance are factors driving the frac horsepower demand
  - While proppant intensity is expected to level out, IHS Markit expects that in the short term horsepower demand will remain high due to frac intensities and equipment conditions but as predictive maintenance programs continue to develop, demand is expected to flatten

US frac data

	2018	2019	2020	2021	2022	2018Δ	2019Δ	2020Δ	2021Δ	2022Δ
Rig count	905	1,080	1,214	1,303	1,370	5%	19%	12%	7%	5%
Frac demand ('000)	13,541	15,822	17,523	18,833	20,346	23%	17%	11%	7%	8%
Stage count ('000)	484	638	742	815	881	18%	32%	16%	10%	8%

Source: IHS Markit

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