

Oil Markets: Outlook and the Stability Challenge

Plenary Session 1

Introduction

Market context

- Oil prices have reached a fairly stable level at ~50 USD/bbl in the last couple of months, after witnessing the highest volatility since 2008-2009
- While the cycle has been driven by a combination of surging supplies and relatively weak demand growth to date, the market appears poised to rebalance in the near-term
- What's next for the oil market? Is this the end of a cycle and/or is a new global oil market emerging?

Session objectives

- To exchange perspectives on the supply, demand, and other drivers that initiated the price fall and keep shaping government policy and the industry today
- To explore the impacts on the industry and understand what is the outlook
- To discuss how the industry will adapt its investment strategy and what government policies are required to support it

Key Question:

Are we set for a shift away from a supply glut towards scarcity?

Agenda

Key observations on:

What has driven the fall in the oil price?

How have the industry and governments reacted?

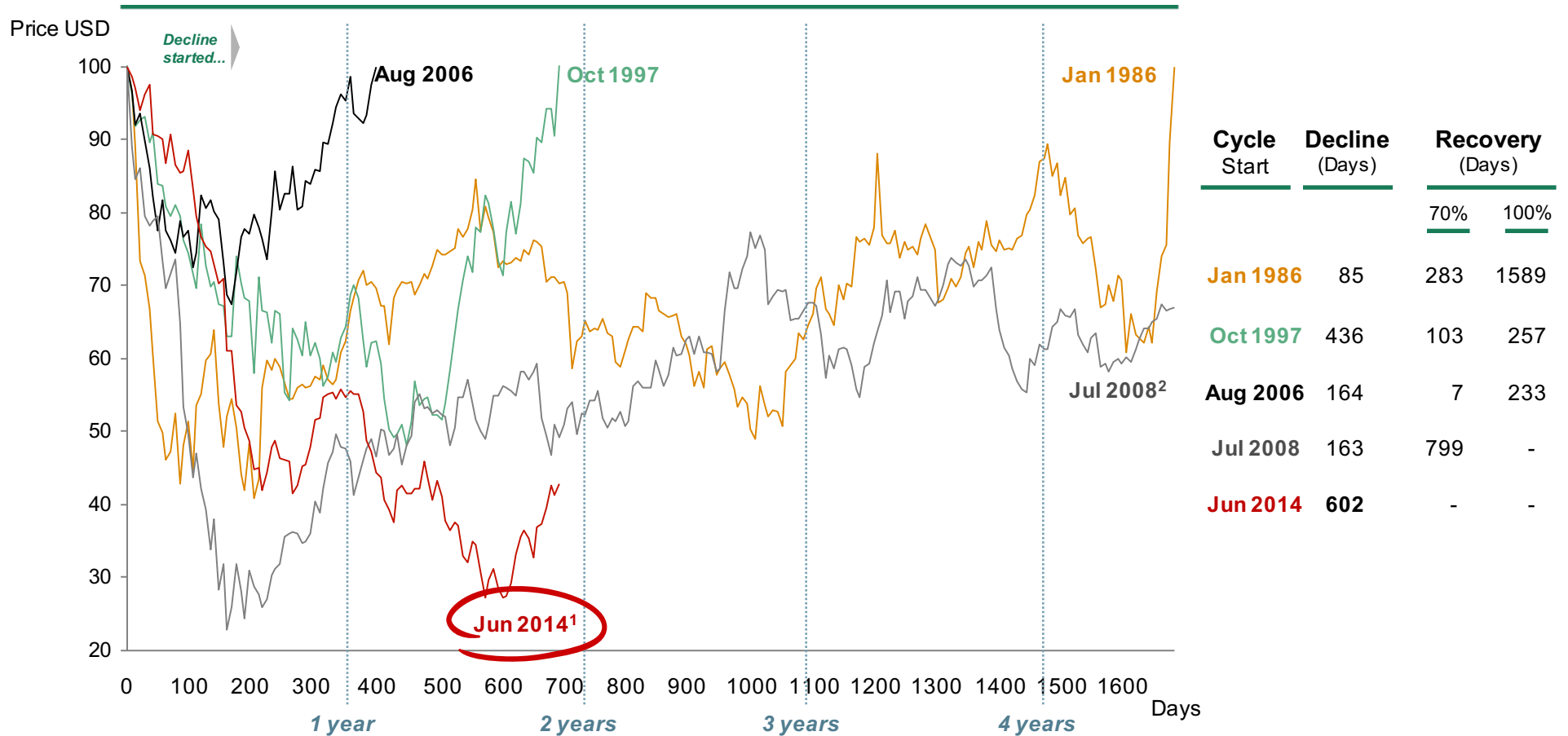
What has happened since the year started?

What is the outlook?

Key questions and discussions

The oil price decline is now, by *far*, the longest and deepest of the last three decades

Major WTI oil price cycles since 1986



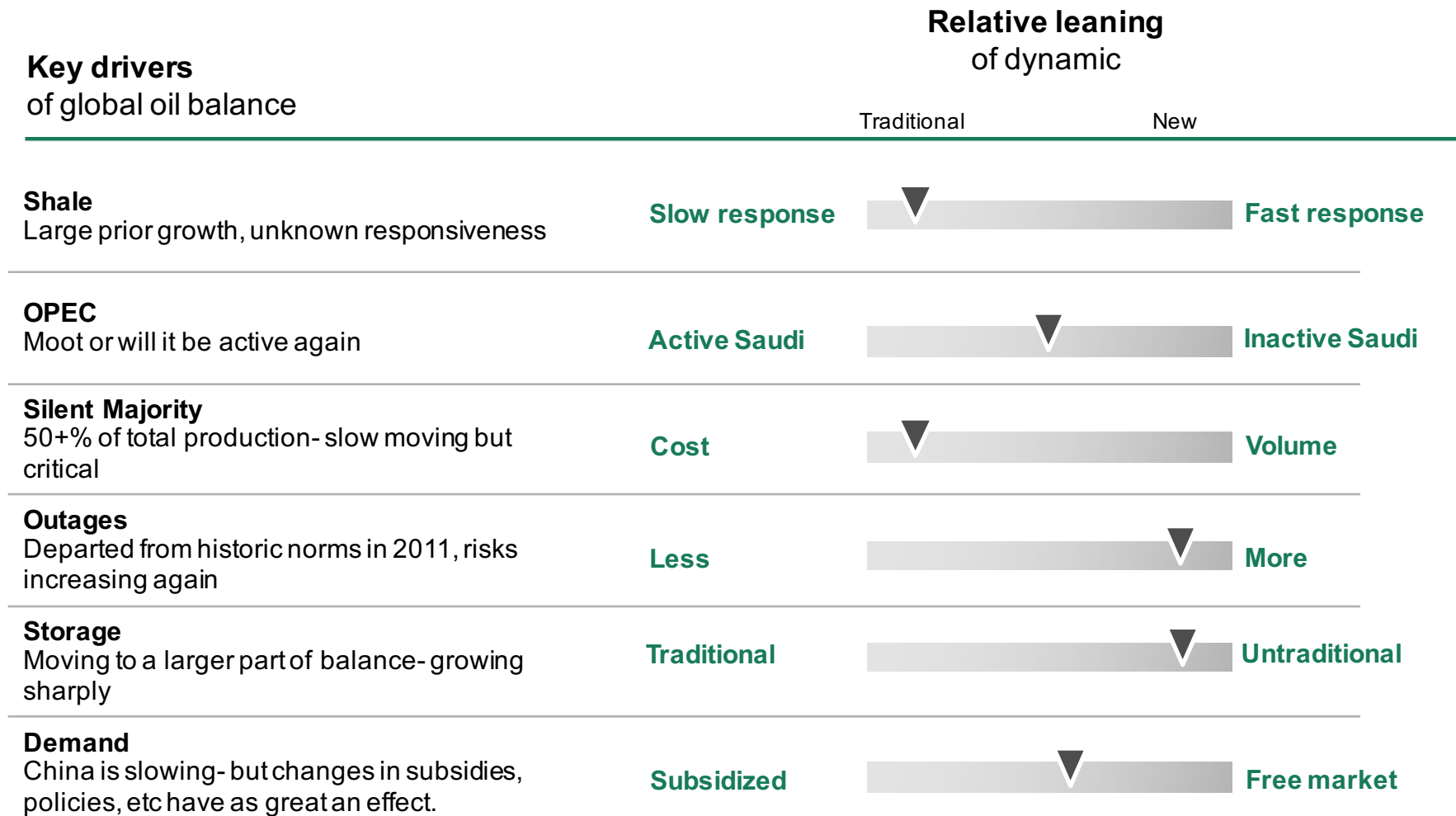
1. Updated 23th May 2016; 602 days decline to date represents the lowest point so far of the ongoing June 2014 cycle

2. In the July 2008 cycle, prices did not recover to their pre-decline peak of \$145.16

Note: Price data plotted every 7 days meaning that some daily troughs may not be fully graphically visible

Source: EIA, BCG Analysis

As a result, the oil market is reorienting itself in fundamental ways



**Not just about the rise of shale:
Many market elements are in flux**

Key observations

Oil prices have fallen by 60% to ~\$50/bbl since mid 2014, with prices temporarily stabilizing over the summer of 2016

- Oversupply of ~1-2 Mbb/d emerged in 2014 and has been sustained until early 2016, driven by supply factors, but aided by weak demand growth in 2014
- Supply further increased in 2015, growing by 3.1 Mbb/d in July y-o-y driven by US tight oil, Iraq, and the broader OPEC
- Demand growth for 2016 has slowed to 1.23-1.3 Mbb/d, a still high level, but lower than 2015's 1.5-1.8 Mbb/d
- Storage locations around the world have taken up the oversupply in the interim causing concerns about inadequate storage capacity given the length and scale of the oversupply

In the face of strong non-OPEC growth, OPEC chose not to take up its traditional role as the swing supplier

- Since 27 November 2014, OPEC has not implemented its last production target of 30 Mbb/d or agreed new target levels
- OPEC is currently producing at around 33.24-33.47 Mbb/d, its highest level in three years
- In response, most oil companies announced 2015 capex cuts of 10-30%, and US drilling activity has fallen by over 50%
- US shale has been slow to react even as declines are now accelerating

The length of the decline has been the longest in the last three decades

- Current prices around \$50 only support 33% of potential new production
- Average lifting costs are \$35-40, but companies often choose to keep producing even if prices are below this, given cost realities, logistics and concerns about field damage in the event of a shut in
- Marginal economics should, in the longer-term, demand prices around \$70/bbl or more under the industry's current cost structure

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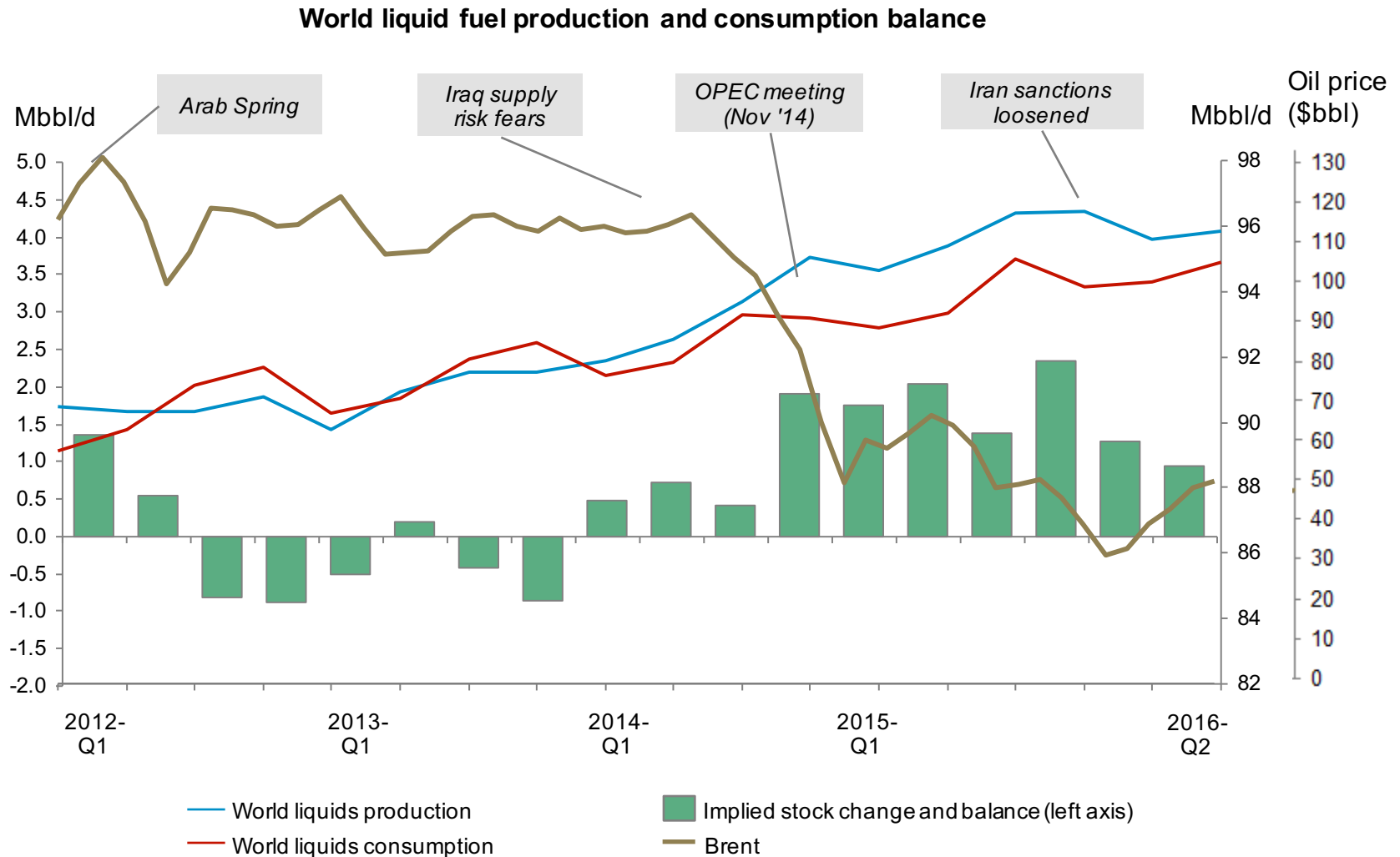
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10 consecutive quarters of surplus led to an oil price decline

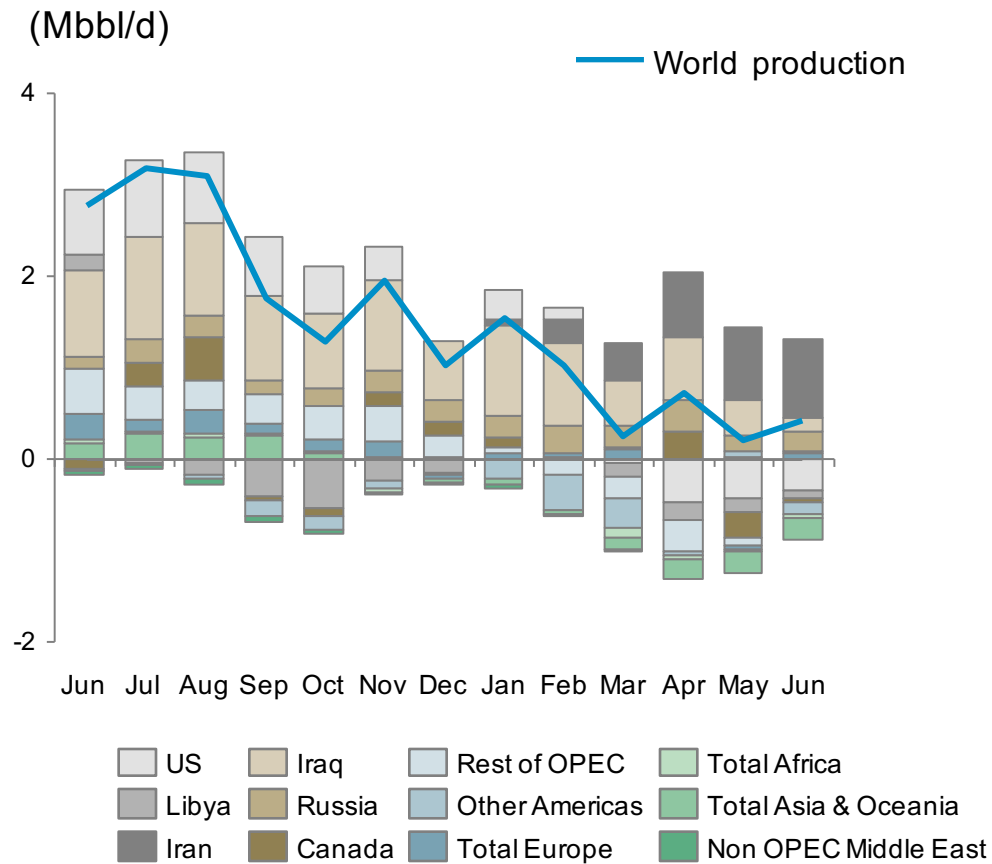
Global production has finally started to decline



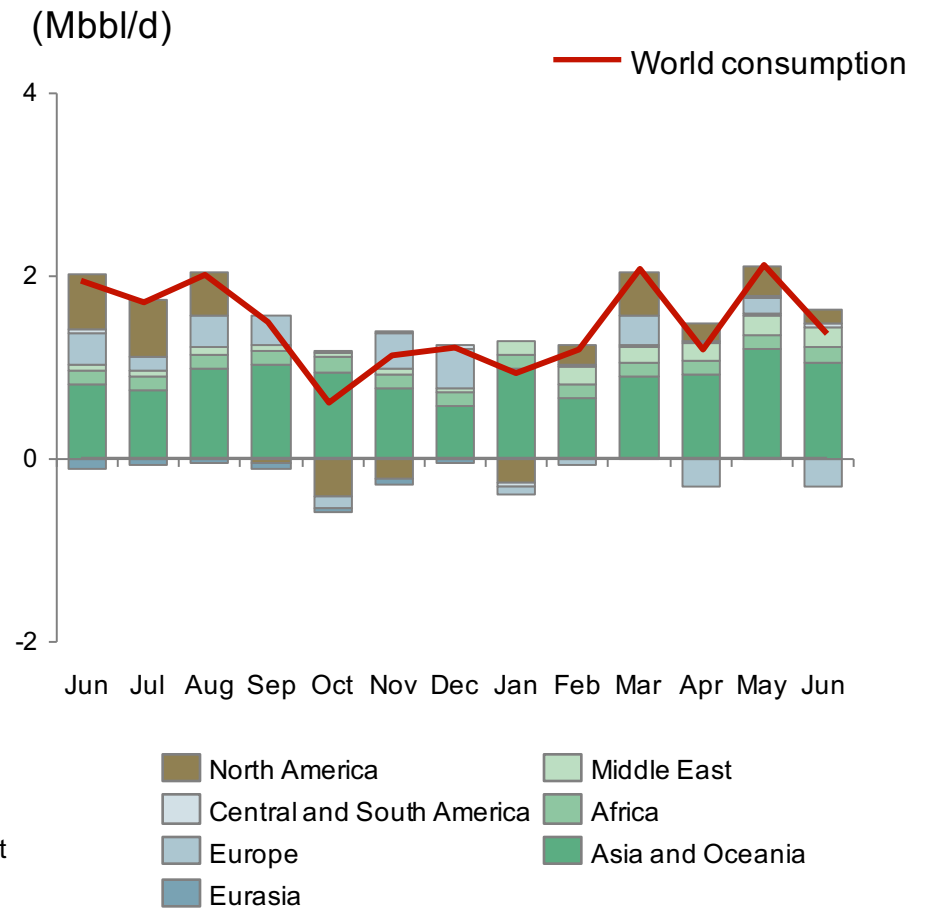
Updated: 15th Jul 2016
 Source: EIA (STEO, 12th Jul, 2016), Bloomberg, BCG analysis

While supply growth has stalled, demand grows, helping to rebalance oil markets

World Liquids Production Growth (Year on Year, 2016/2015)

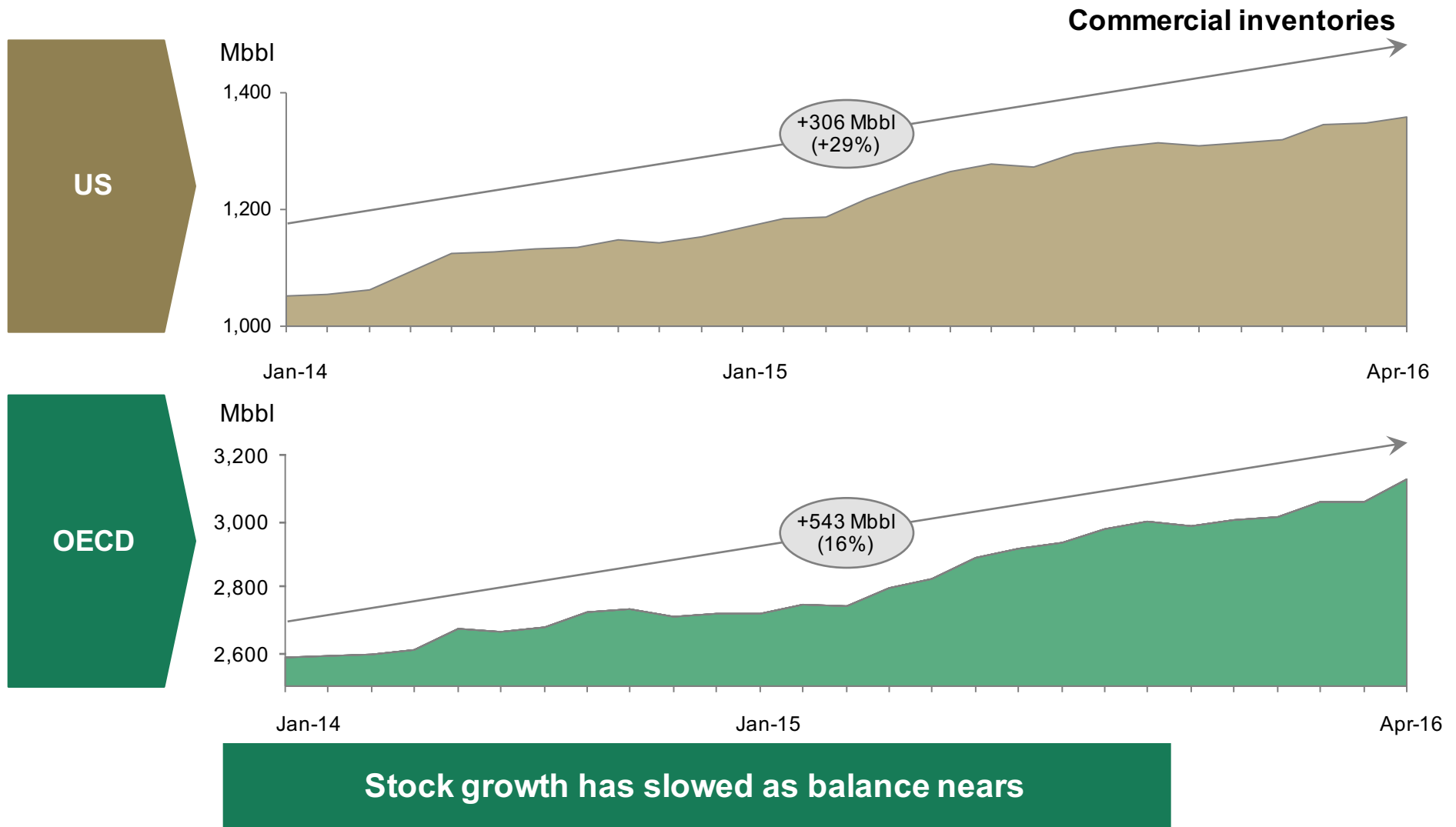


World Liquids Consumption Growth (Year on Year, 2016/2015)



Source: EIA, BCG analysis

Stock builds absorbed the oversupply – US leads the way



The issue of large stockpiles: Too much for current capacity? Need to draw down?

Storage Issues: Overhang or build in security?

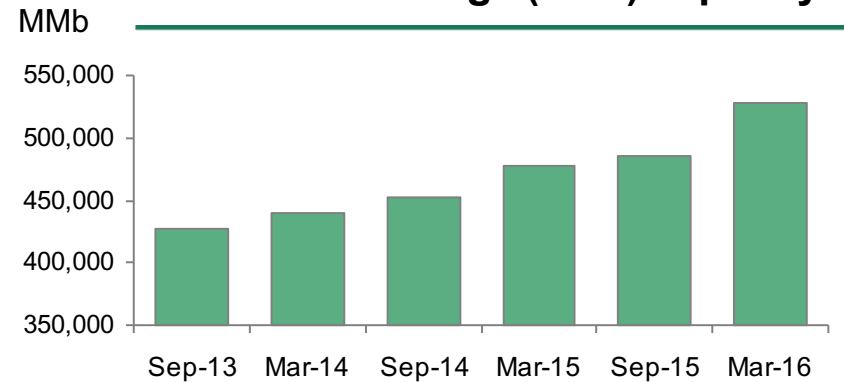
Concerns of "too much storage" may be overblown

- Forward curve contango has remained limited relative to oversupply.
- Floating storage is rising, and is now near 2009 levels (~100 MMb), however this is driven not by the economics of oversupply but logistical issues.
- Storage capacity can be quickly expanded - US alone is up more than 83 MMb since early 2014.

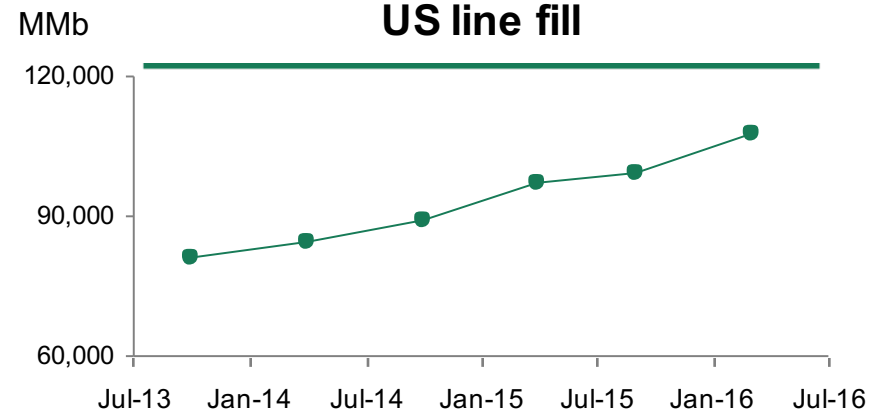
"Need" to draw down may not be as acute as thought

- Increased stocks for strategic purposes (China), line fill (US and others) and operational stocks (refiners globally) are unlikely to be drawn down.
- Changing market balancing requirements may make these stocks less an overhang and more an insurance policy in times of market tightness.

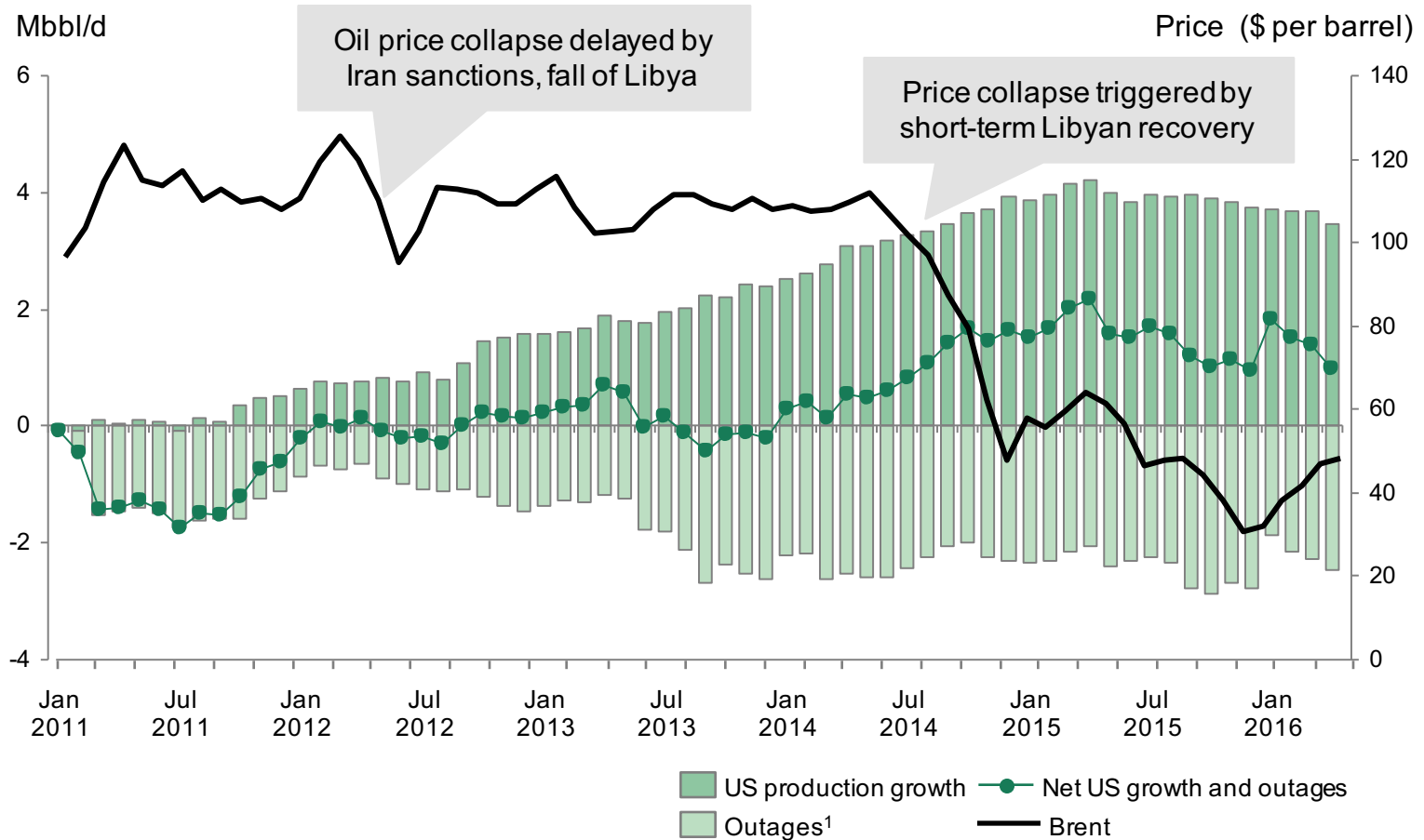
US crude storage (tank) capacity



US line fill



Outages delayed the oil price drop to 2014



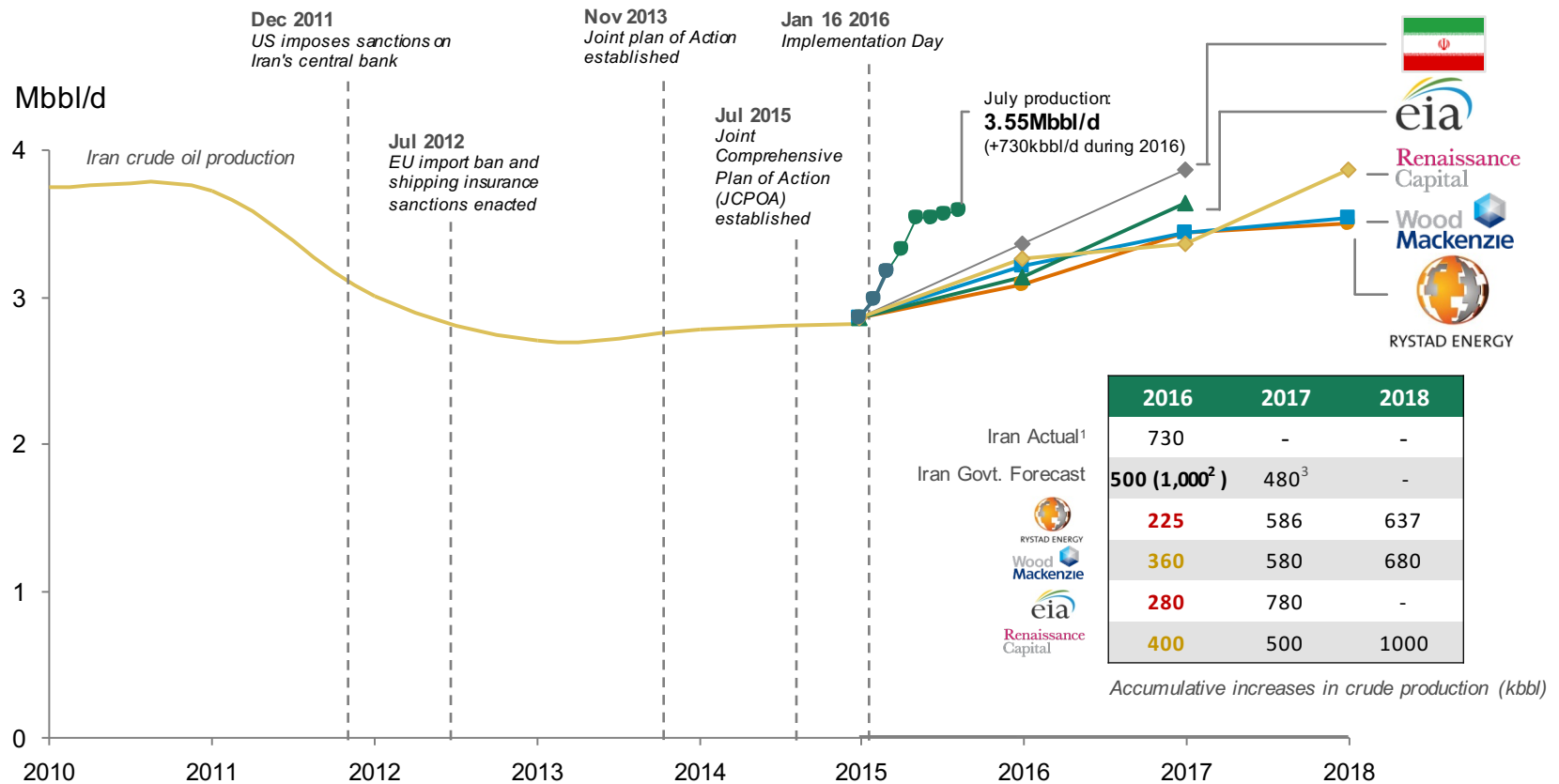
1. Includes outages from Saudi Arabia, Kuwait, Iraq, Indonesia, Nigeria, Libya and Iran

Note: This analysis is only looking at a small subset of the global oil picture to illustrate key dynamics. Demand changes add another layer of nuance

Source: EIA, BCG analysis

Iran's oil production has increased faster than expected

Production increased 730kbb/d since start-2016¹, with a further 270kbb/d forecast by year-end²



1. Iran production increase up to and including July 2016, 2. Revised 2016 production target of 1Mbb/d, 3. Iran announced a production target of 4.3 Mbb/d by the 2017-end, 480kbb/d is the difference between 2016-end target (3.82Mbb/d) and 4.3Mbb/d

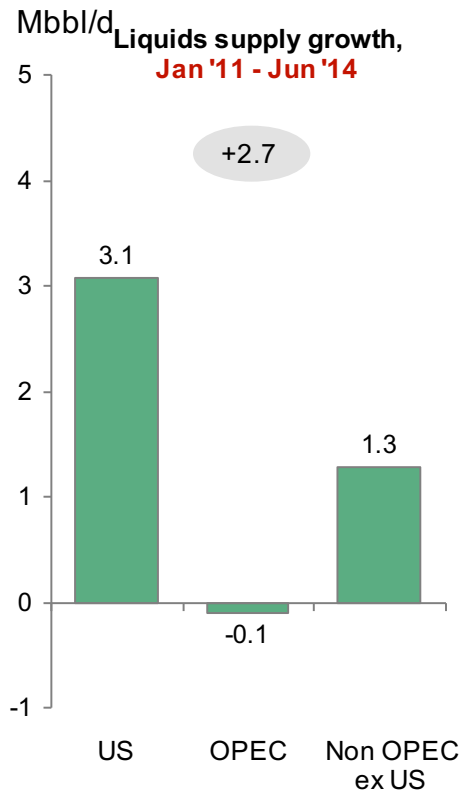
Note: Renaissance Capital forecast comprised of IEA, EIA and internal forecast data. Forecasts kept from January 2016.

Source: IEA, OPEC, Rystad Energy, EIA, Wood Mackenzie, Financial Times

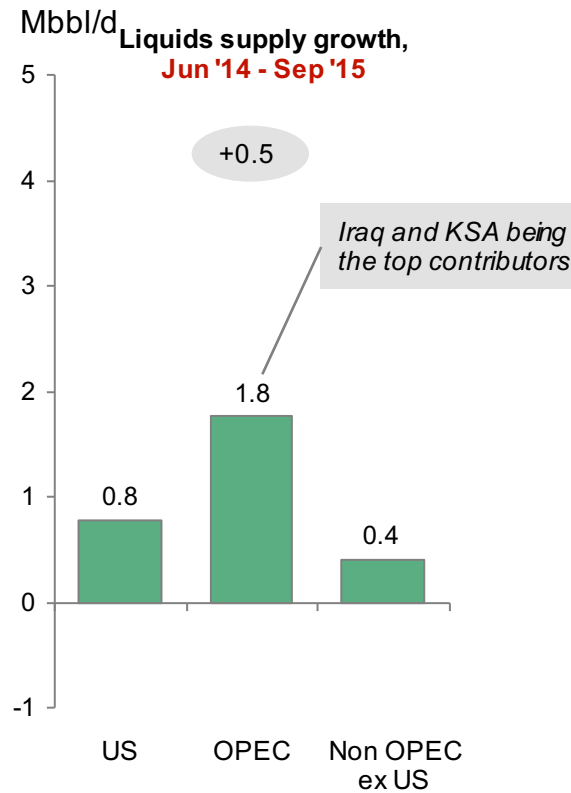
Non-OPEC supply growth contributed to the price fall

...while OPEC production growth rebalances the markets on a lower cost structure

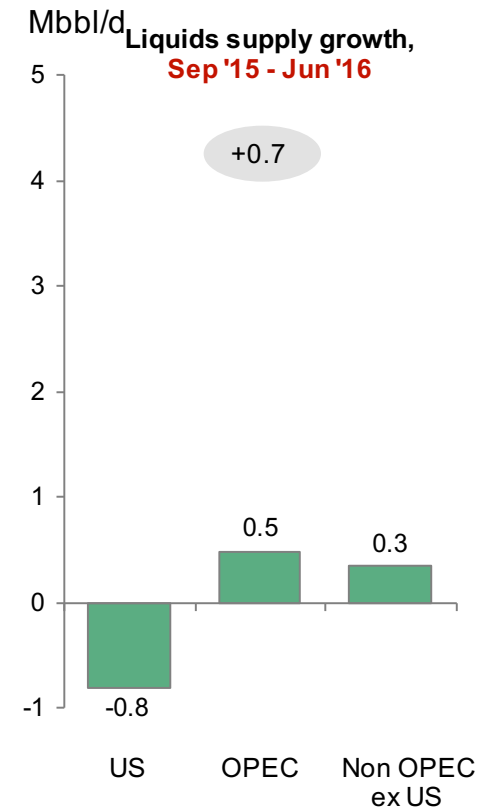
US shale outpaced global liquids supply



Middle East Producers increased production and market share



More recently, US supply started to decline

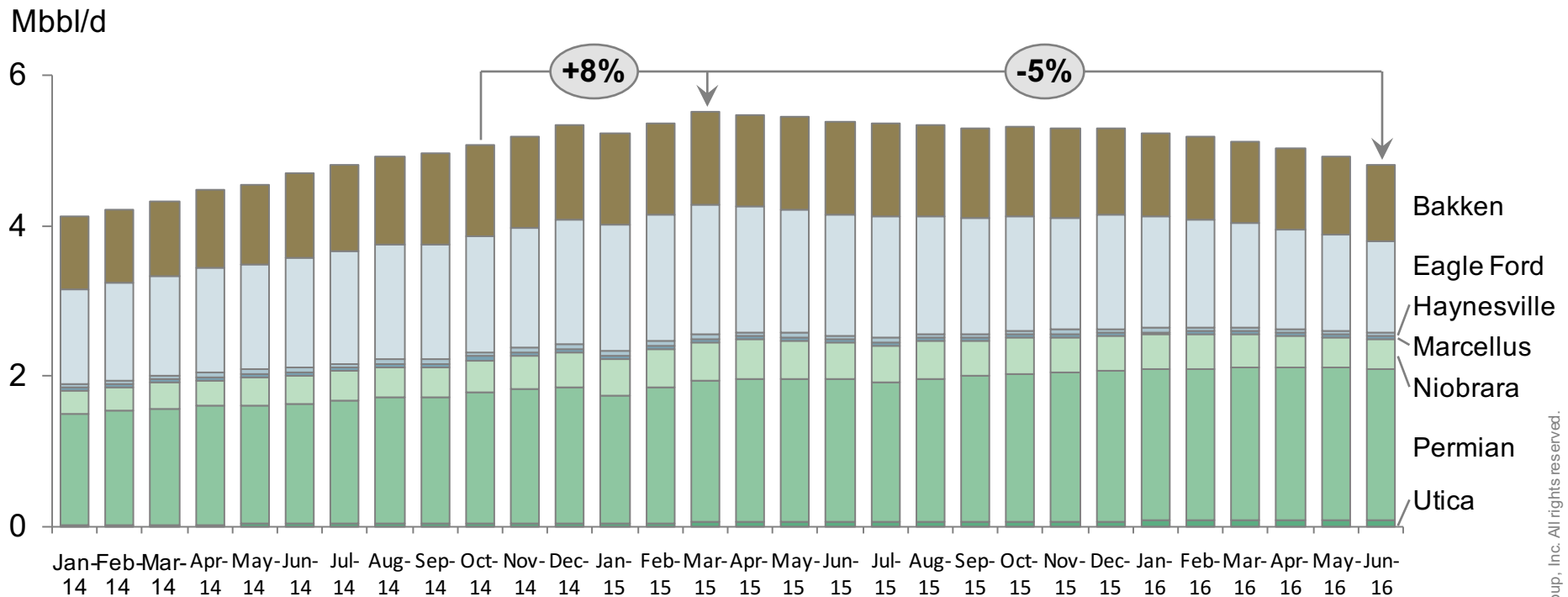


Mbb/d Oversupply growth

Source: EIA, BCG analysis

The new swing supplier?

US shale took ~6 months to slow & decline: how fast can it rebound?



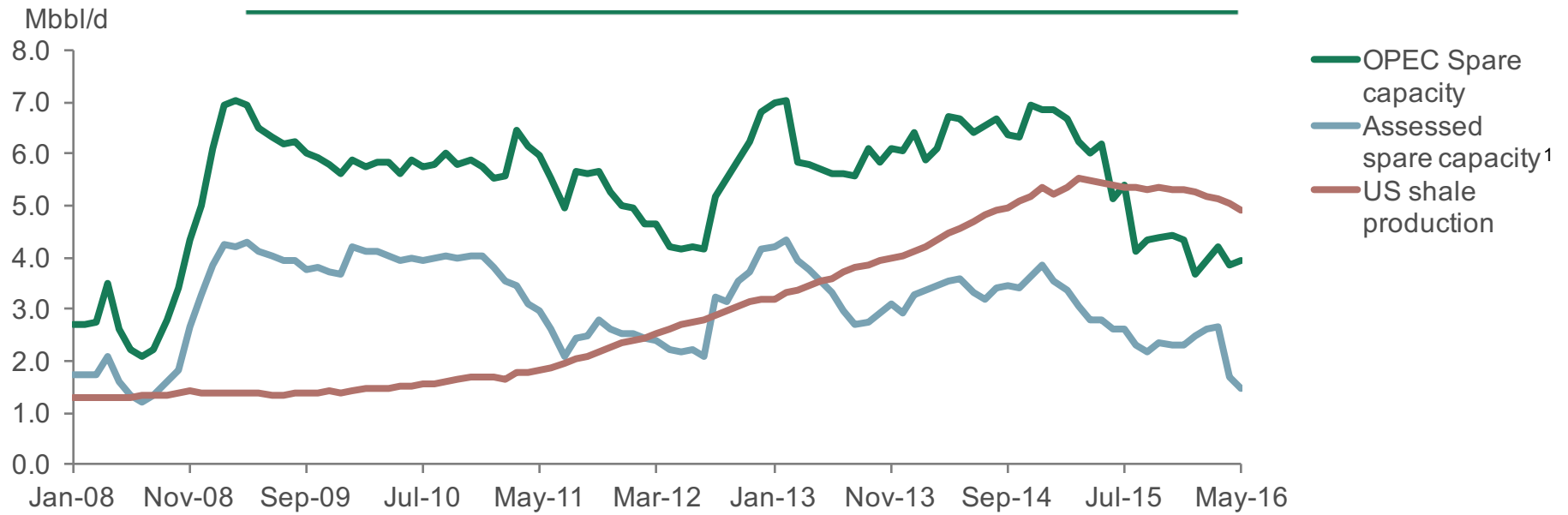
Underlying factors for the slow slowing of US shale:

- "Cheap money" and accommodating credit terms
- "Sweet Spots" and efficiency gains
- Debt service-, reserve- and field management requirements
- The return rate of drilled but uncompleted wells
- Improved industry resilience after the shake out

Source: EIA

Assessing the sufficiency of shale supplies as a swing supplier

OPEC spare capacity against shale production



Shale has grown, but still too little too late

- Shale production is now above any measure of OPEC spare capacity
- Even in the fastest growth years, it took shale 3 years to gain enough volumes to equal assessed spare capacity¹ - faster than conventional but too slow to keep market steady

1. 'Effective' spare capacity i.e. the difference between nominal capacity and the fraction of that capacity actually available to markets
Source: OPEC, JODI, EIA

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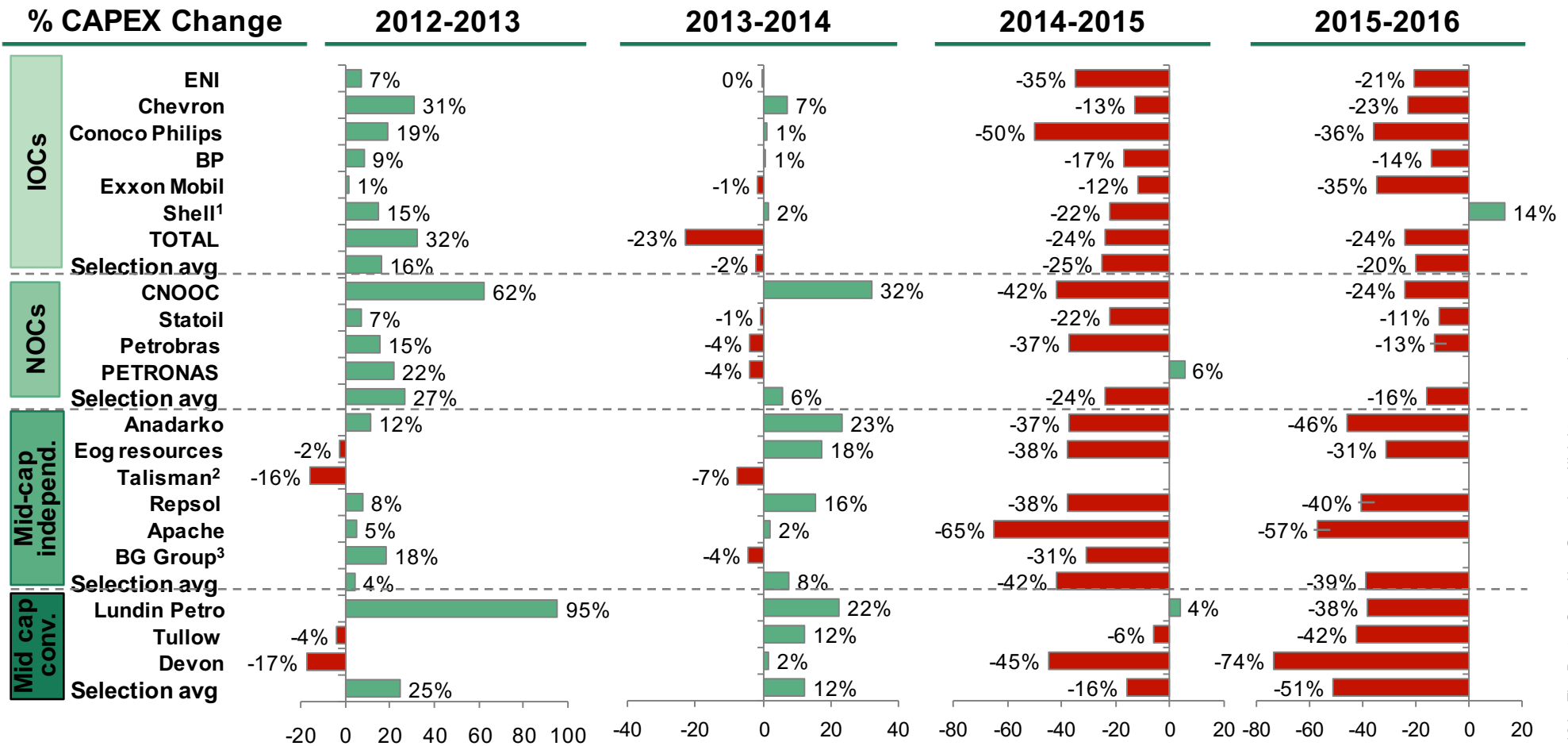
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Key questions and discussions

Operators aggressively cut investment to cope with severely decreased oil upstream revenues



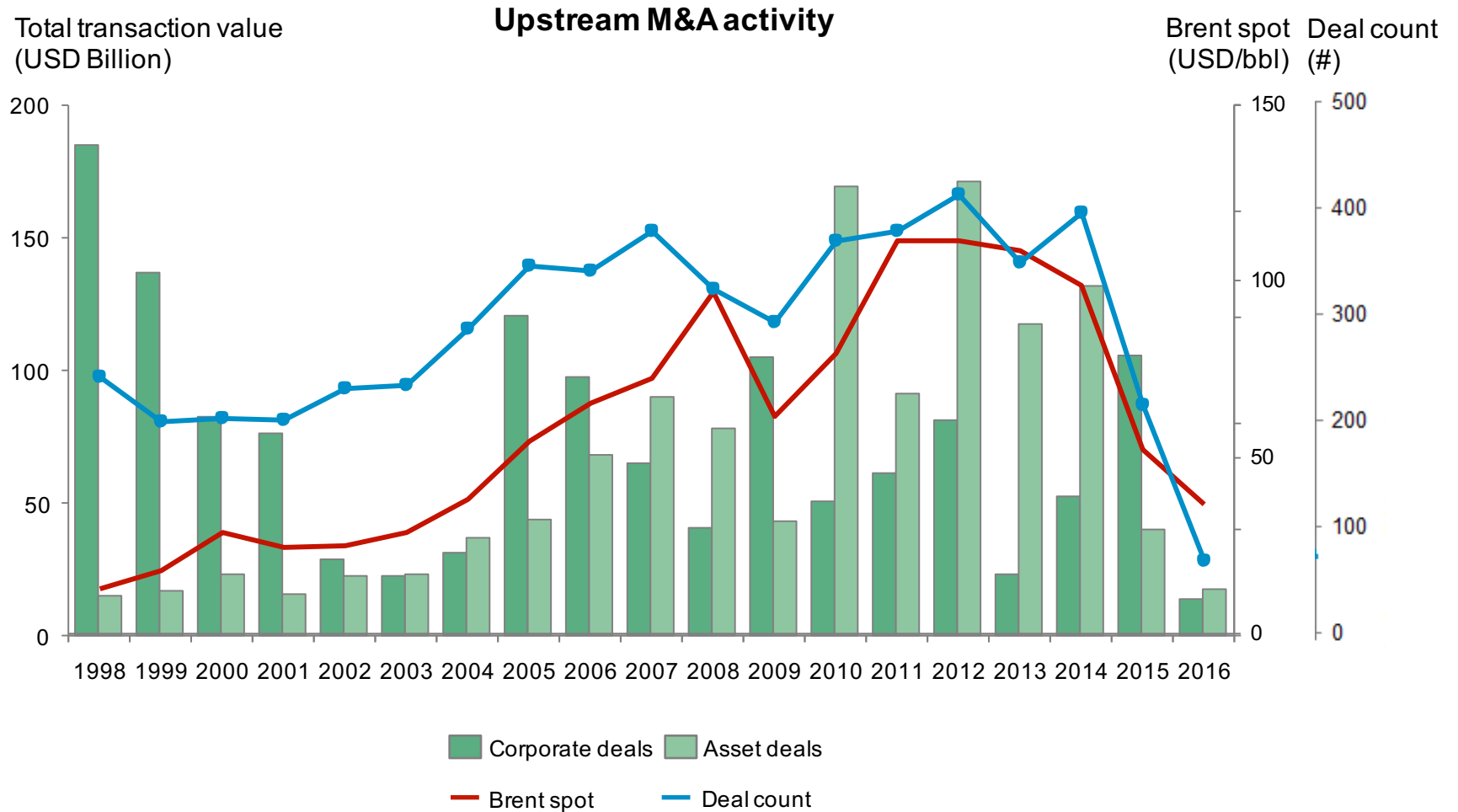
Updated in April 2016

1. CapEx considered for year 2016 for Shell includes BG

Note: Total Capital Spending 2. Acquired by Repsol in 2015 3. Acquired by Shell

Source: Press search, IHS Herold

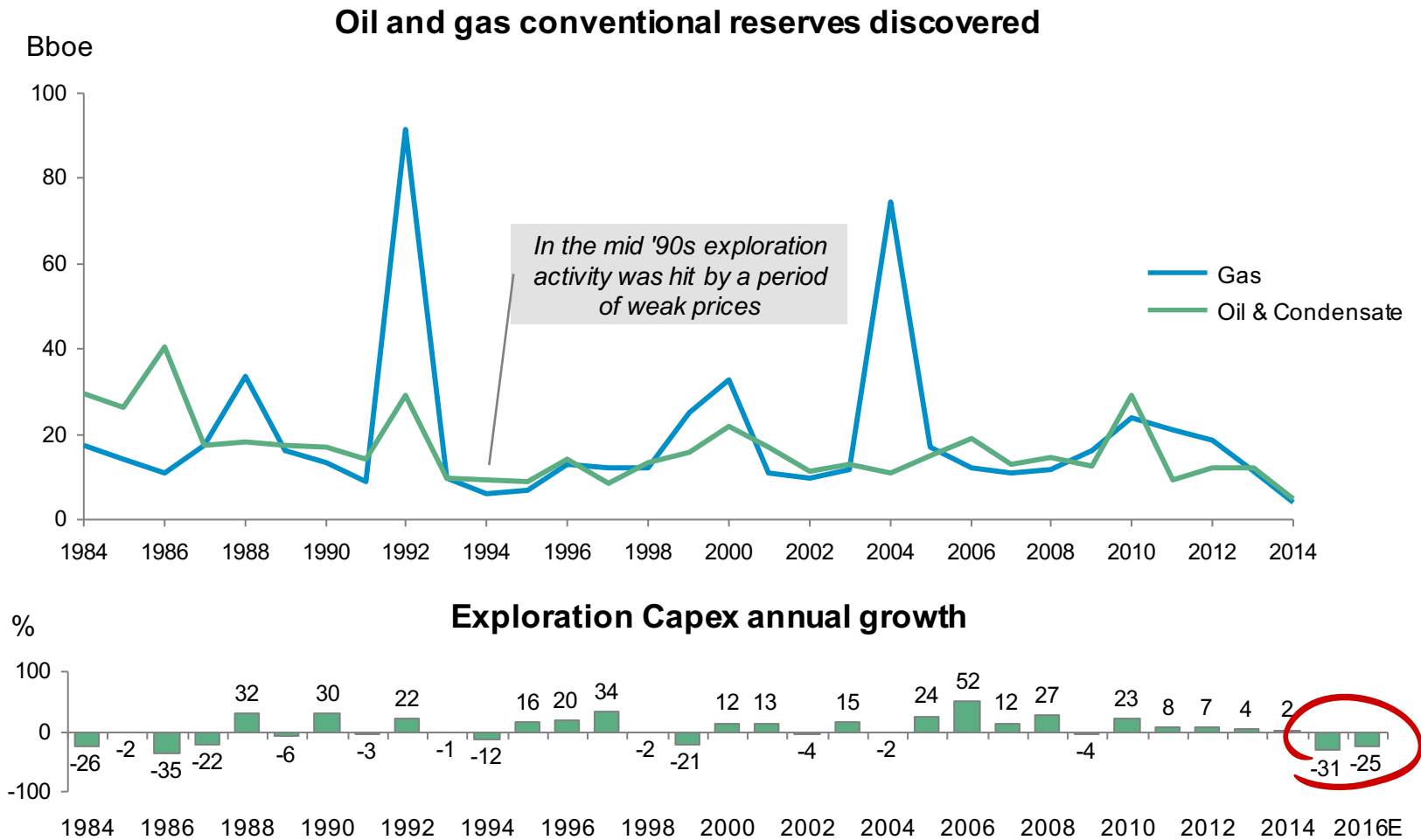
M&A deals have frozen to a 15-year low



Note 1: It include M&A deals until 23th May 2016; Note 2: Deal count for E&P deals over \$10 M
 Source: JS Herold, BCG analysis

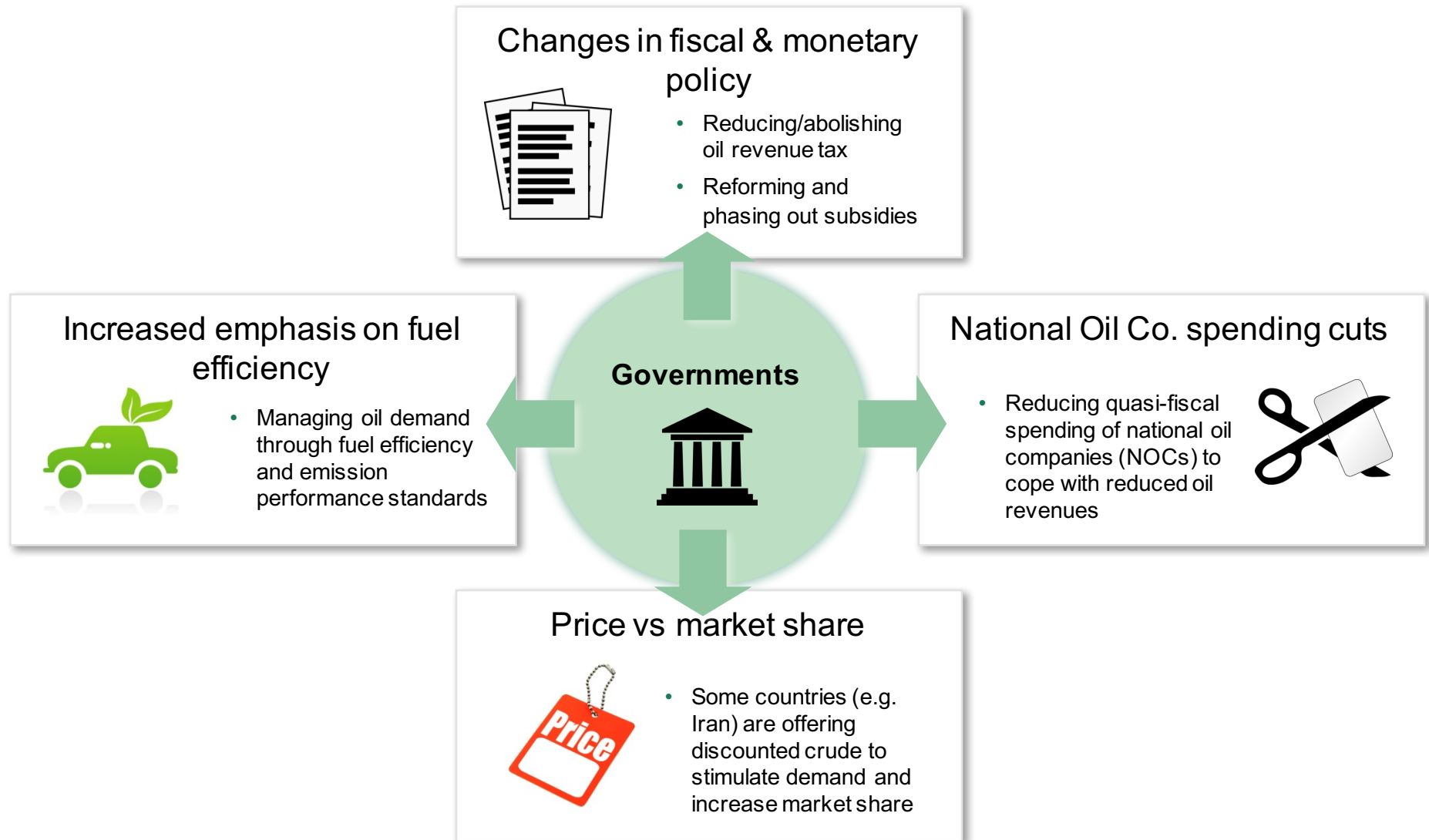
Exploration: Conventional discoveries are at historic lows

...and the collapse in exploration spend points to a bleak outlook



Source: IHS (Feb 2015), Rystad Energy

Governments have taken various actions in response to the oil price fall



Source: BCG research

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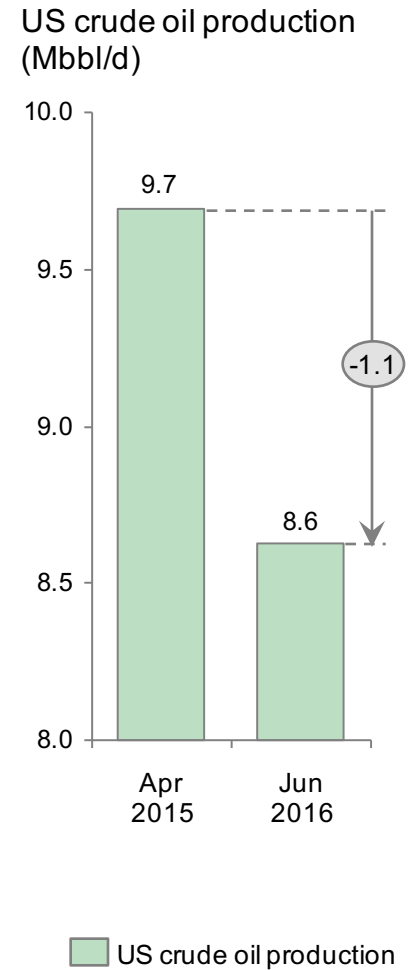
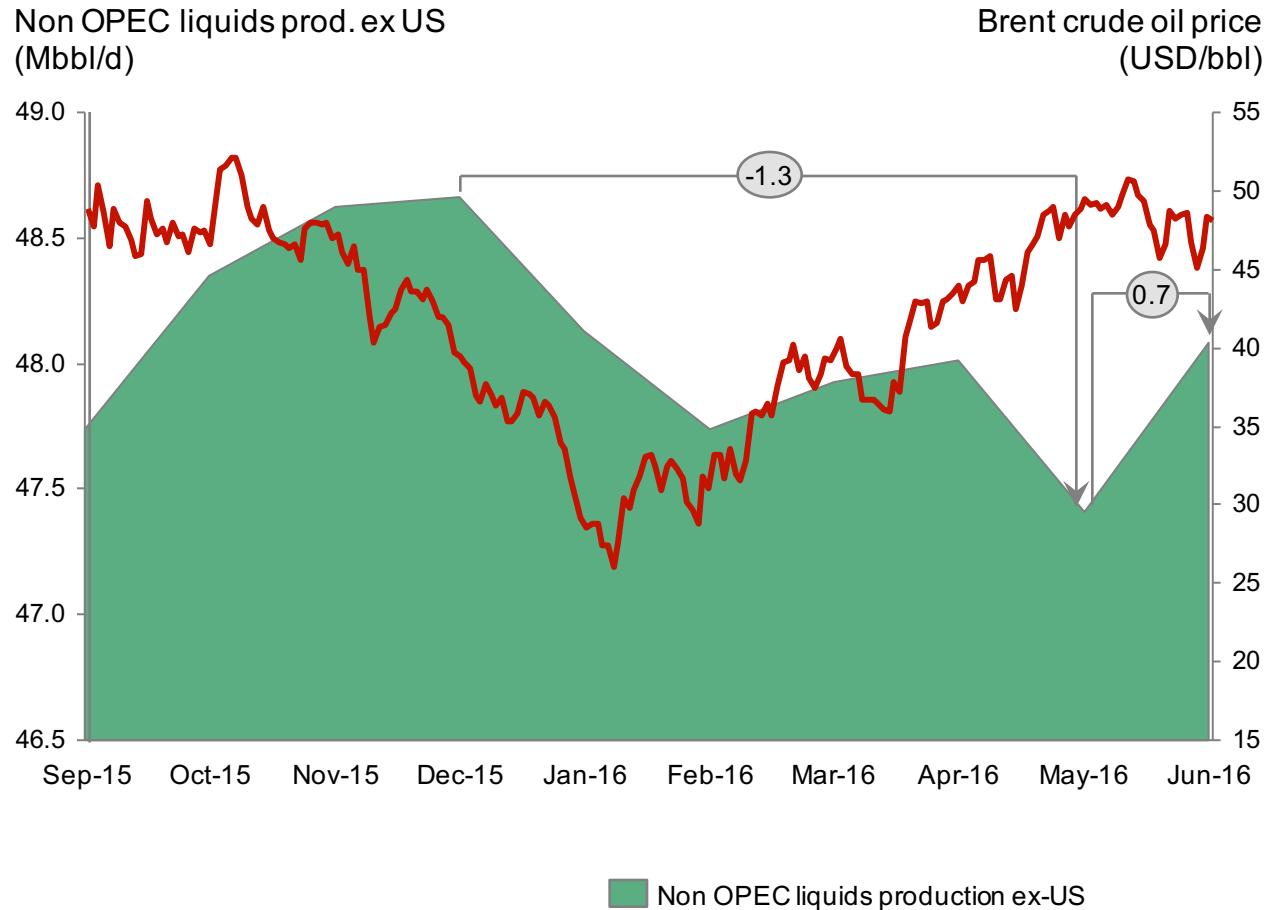
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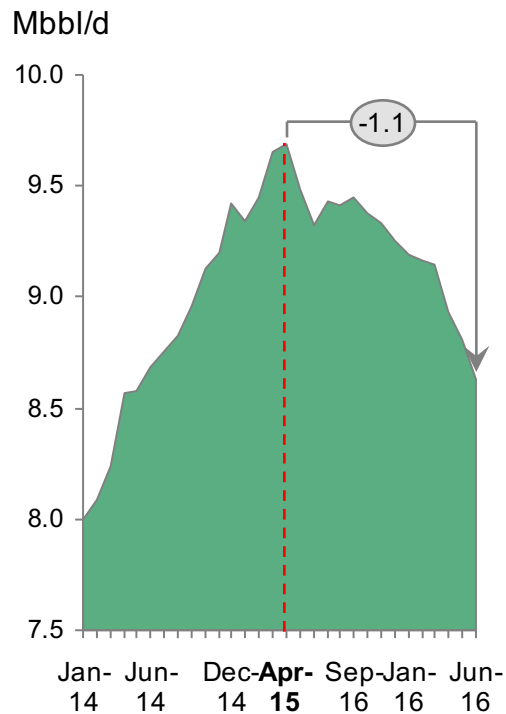
The start of a decline in US volumes has supported an 85% price recovery since January's trough



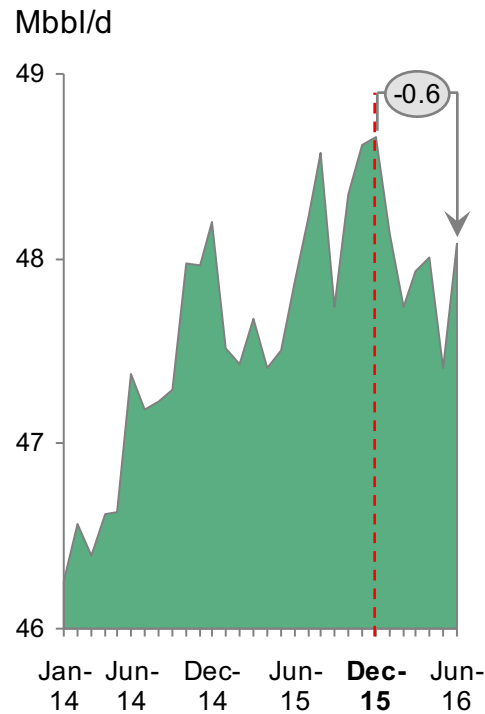
Source: EIA, BCG analysis

Crude oil production started to decline in all regions, but the global trend reversed recently, except in the US

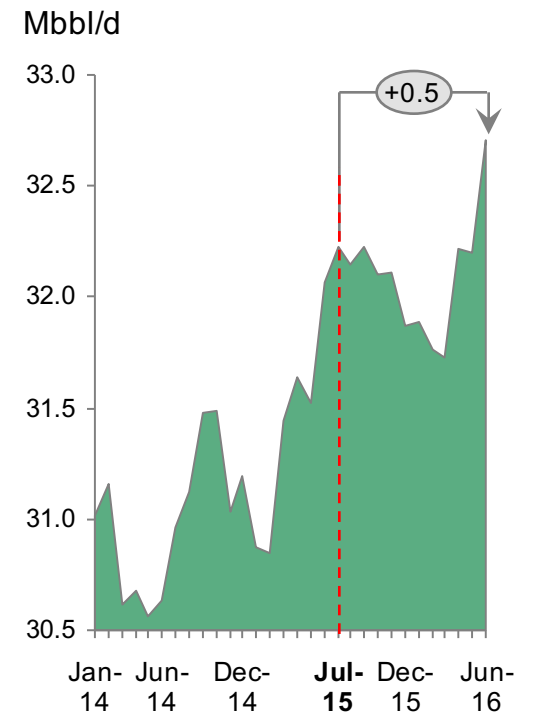
US crude oil



Non Opec Liquids ex US

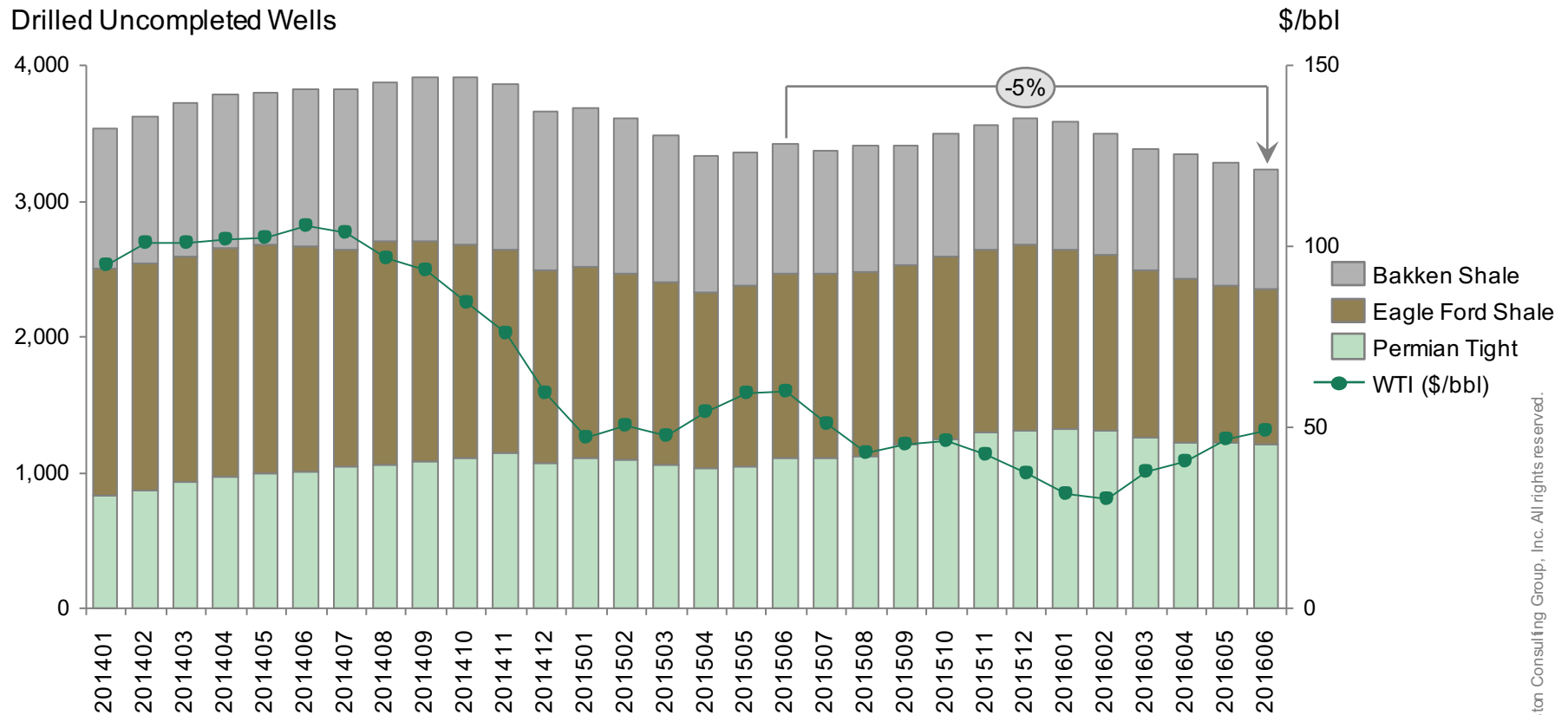


OPEC crude oil



Source: EIA, Apr 2016

Drilled Uncompleted Well inventory can spur production and suppress prices

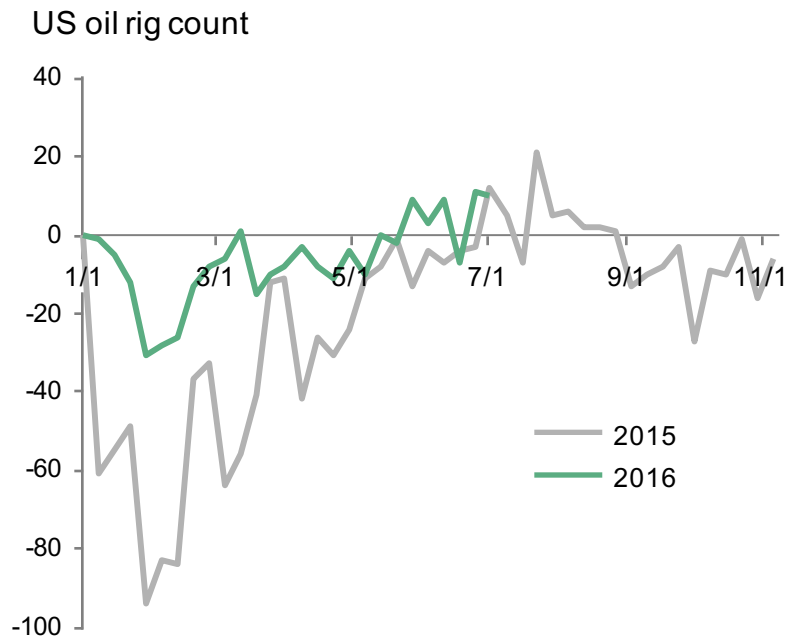


DUC will never reach zero- but represent potential of rapid production increases

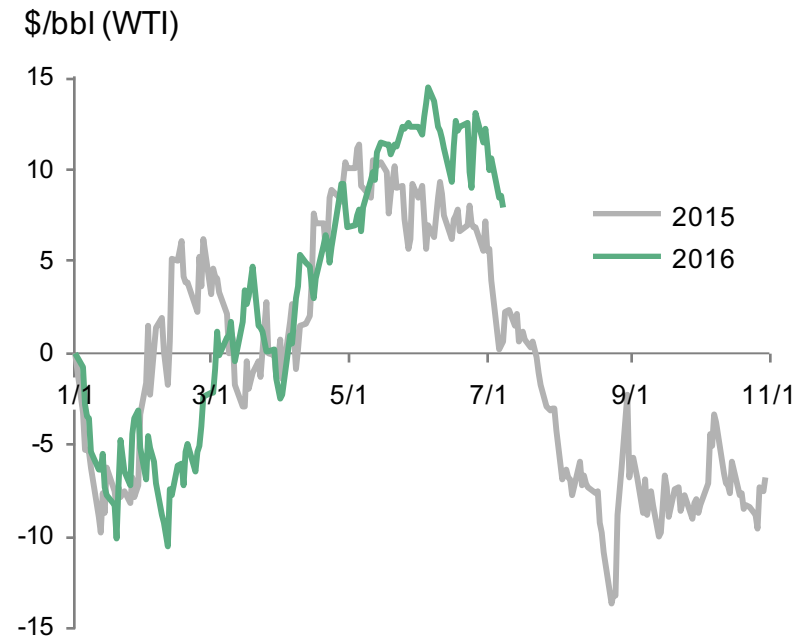
Source: Rystad NASCube

Is 2016 following 2015?

YTD changes in US oil rig count



YTD changes in oil prices



Is 2016 following 2015's lead?

The price rally in early-2015 was spurred in part by rapidly declining rig counts.

- After sharp production falls did not follow the rig count, prices began to fall again
- 2016 has also experienced a sharp price rally as production fell**
- However concerns of oversupply continue as rig counts begin to rise

43 developments, representing 3Mbb/d of production have been delayed or suspended since mid 2014

Project	Country	Theme	Plateau ('000 boe/d)	Reserves (million boe)	Operator	Old Start	New Start	Capex (\$ billion)
Chissonga	Angola	Deepwater	103	200	Maersk Oil	2019	2020	3.1
Nene Marine Phase 3	Congo	Shallow water	60	140	Eni	2019	2022	1.4
Gazelle/Hippo	Cote d'Ivoire	Shallow water	5	31	Vitol Exploration	2017	2019	0.5
Akasa (MTA Complex)	Ghana	Deepwater	11	16	Kosmos Energy	2021	2024	0.4
Banda	Mauritania	Offshore gas	9	100	Tullow Oil	2017	2019	0.8
Kudu	Namibia	Offshore gas	26	190	NAMCOR	2020	2021	1.5
Bonga Southwest Aparo	Nigeria	Deepwater	200	825	Shell	2019	2022	14.5
Ihubesi South	Africa	Onshore	13	96	Sunbird Energy	2018	2021	1.2
Lingshui 17-2	China	Shallow water	60	420	CNOOC	2019	2021	1.7
Lihua 11-1	China	Shallow water	25	80	CNOOC	2018	2020	1.5
Lihua 16-2	China	Shallow water	19	60	CNOOC	2018	2020	1.2
Gendalo-Gehem (IDD-2)	Indonesia	Deepwater	215	600	Chevron	2020	2023	10.8
Ande-Ande Lumut	Indonesia	Shallow water	36	120	Santos	2017	2018	0.8
Simrit (Ain Sifni)	Iraq	Onshore	41	125	Hunt Oil	2020	2023	1
Tengiz Future Growth	Kazakhstan	Onshore	219	2500	Tengizchevroil	2019	2020	8.8
Kasawari	Malaysia	Offshore gas	137	770	Petronas	2019	2022	4.5
Idd El Shargi North Dome Phase-5	Qatar	Shallow water	27	100	Oxy	2017	2019	1.3
Bab Sour Gas	United Arab Emirates	Onshore	78	650	ADCO	2020	2022	7.5
Ham Rong	Vietnam	Shallow water	22	53	Petronas	2018	2020	0.7
Cash-Maple	Australia	LNG	27	124	PTTEP	2020	2022	1.2
Arrow LNG	Australia	LNG	395	1300	Shell	2022	2025	28
Cossack North	Australia	Shallow water	9	11	Woodside	2017	2023	0.1
Tommeliten Alpha	Norway	Shallow water	39	140	ConocoPhillips	2021	2025	2.5
Vette	Norway	Shallow water	26	45	Premier Oil	2019	2020	1
Johan Castberg	Norway	Deepwater	206	657	Statoil	2021	2023	10.3
Snorre Late Life	Norway	Deepwater	82	250	Statoil	2023	2023	6.5
Buzzard Phase 2	United Kingdom	Shallow water	18	55	CNOOC	2019	2021	0.8
Kirby North Ph 1	Canada	Oil sands	36	350	Canadian Natural Resources	2017	2019	1.8
Christina Lake Ph G	Canada	Oil sands	45	450	Cenovus Energy	2017	2018	2.5
Narrows Lake Ph A	Canada	Oil sands	41	375	Cenovus Energy	2018	2020	1.8
Foster Creek Ph H	Canada	Oil sands	27	300	Cenovus Energy	2017	2018	1.1
Sunrise Ph 2A	Canada	Oil sands	32	325	Husky Energy	2020	2022	1.5
White Rose Extension	Canada	Deepwater	33	110	Husky Energy	2020	2021	3.7
Mariana Oil Sands Thornbury	Canada	Oil sands	36	205	PTTEP	2023	2025	1.8
Carmon Creek Ph 1	Canada	Oil sands	36	300	Shell	2018	2034	1.8
Pierre River Ph 1	Canada	Oil sands	90	750	Shell	2024	2043	4
MacKay River Ph 2	Canada	Oil sands	36	165	Husky Energy	2019	2020	0.8
Frontier Oil Sands	Canada	Oil sands	250	3000	Beck Resources	2021	2026	16.2
Mad Dog 2	United States	Deepwater	89	650	BP	2020	2021	11
Greater Mooses Tooth	United States	Onshore	23	100	ConocoPhillips	2018	2021	1.2
Pungarayacu Ph 1	Ecuador	Heavy oil	44	200	PetroAmazonas	2018	2023	1.6
Sea Lion Phase 1A	Falkland Islands	Deepwater	41	150	Premier Oil	2020	2022	2.3
Ayin	Mexico	Shallow water	24	110	Pemex	2017	2019	1
			2,991	17,198				167.7

Source: Petroleum Intelligence Weekly based on data from Rystad Energy (January 2016)

Additionally, 19 developments, representing 1.2Mbbbl/d have been delayed or suspended for non-commercial reasons

Project	Country	Theme	Plateau ('000 boe/d)	Reserves (million boe)	Operator	Old Start	New Start	Capex (\$ billion)
Ahnet	Algeria	Onshore	63	700	Sonatrach	2020	2025	4.5
Isongo Marine	Cameroon	Shallow water	23	165	New Age	2018	2020	0.8
Usan Future Phases	Nigeria	Deepwater	41	115	ExxonMobil	2018	2019	1.4
Zabazaba	Nigeria	Deepwater	137	345	Shell	2021	2023	6
D-34	India	Deepwater	69	200	Reliance	2019	2022	3.8
Tanggung LNG Train-3	Indonesia	LNG	79	535	BP	2021	2022	4.2
Jambaran	Indonesia	Onshore	29	210	ExxonMobil	2018	2020	2.3
Bina Bawi/Miran	Iraq	Onshore	187	1525	Genel	2018	2020	1
Pearls	Kazakhstan	Shallow water	43	262	Shell	2019	2023	3
Wafra EOR	Neutral Zone	Onshore	65	700	Chevron	2019	2022	5
Elk/Antelope	Papua New Guinea	LNG	90	970	Total	2020	2021	5.5
Urengoykoye Block IV (Achimov)	Russia	Onshore	132	1200	Gazprom	2018	2022	2.4
Kuyumbinskoye Phase 1	Russia	Onshore	68	370	Slavneft	2017	2020	4
Ubon	Thailand	Offshore gas	44	126	Chevron	2019	2020	1.3
Zidane	Norway	Offshore gas	32	120	LetterOne Group	2019	2021	1.8
Yme (redevelop)	Norway	Shallow water	18	66	Repsol	2019	2027	2.5
Jackdaw	United Kingdom	Offshore gas	38	140	BG	2019	2021	2.3
Gato do Mato	Brazil	Deepwater	26	55	Shell	2021	2025	1.5
Junin-2 Ph 1	Venezuela	Heavy	17	90	PDVSA	2014	2019	1
Total			1,201	7,894				54.3

Source: Petroleum Intelligence Weekly based on data from Rystad Energy (January 2016)

Early signs of gasoline demand growing in several key markets

Oil demand growth has picked up in India, China and Russia over the past few months



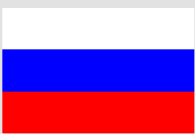
India

- Gasoline consumption rose 14.5% y-o-y as of 1Q 2016
- India is the world's fourth biggest oil consumer behind US, China & Japan



China

- Gasoline consumption is expected to grow ~9% in 2016, according to IEA
 - Gasoline growth outpaces clearly total products growth that will be ~3% in 2016

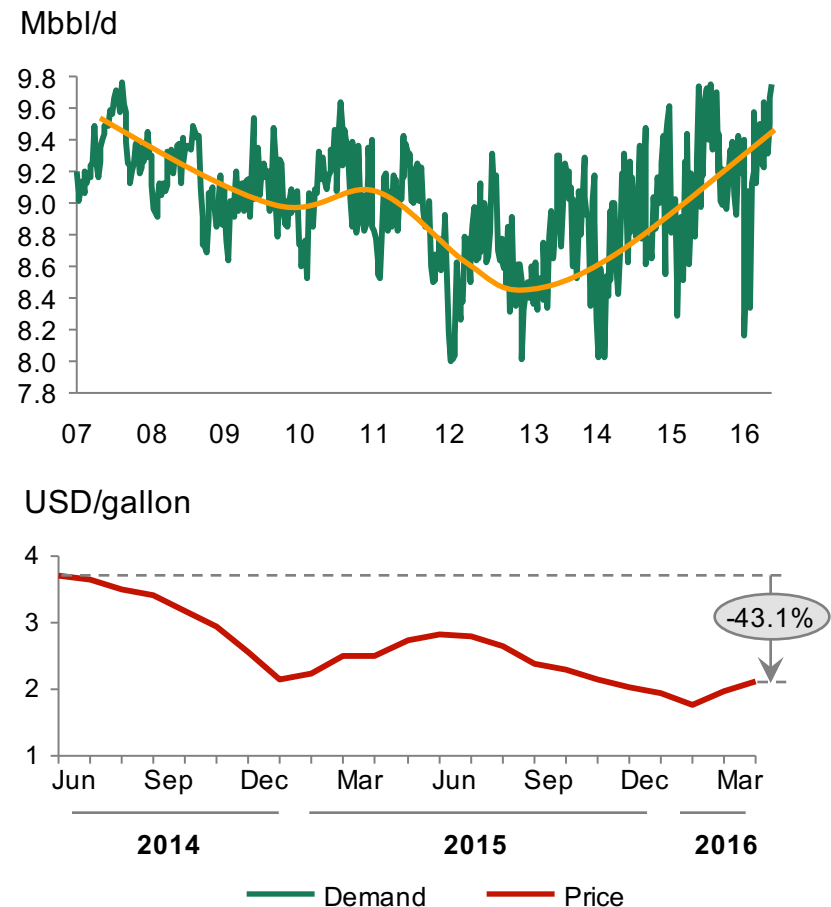


Russia

- Oil demand in 1Q 2016 experienced a y-o-y gain of +205 kbpd
- Oil use in manufacturing starts growing, as industrial activity seems to at least tentatively pick up



Gasoline demand in the US is at a peak since '07, fostered by low fuel prices



Note: motor gasoline prices in the US expressed in real prices as of March 2016
Source: IEA, Bloomberg, EIA

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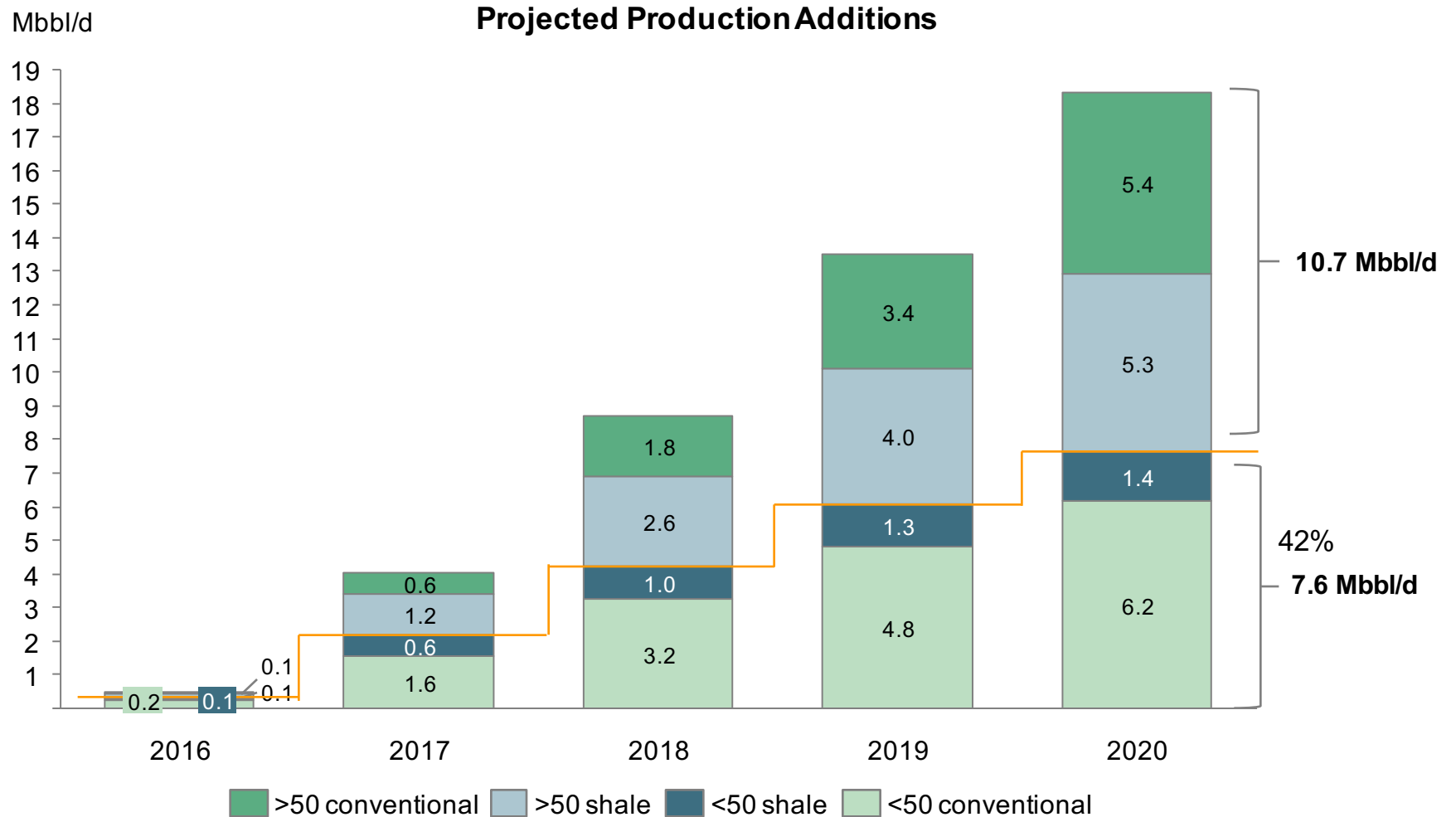
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Outlook: a New Normal?

Oil prices below 50\$/bbl support only 42% of new production to 2020



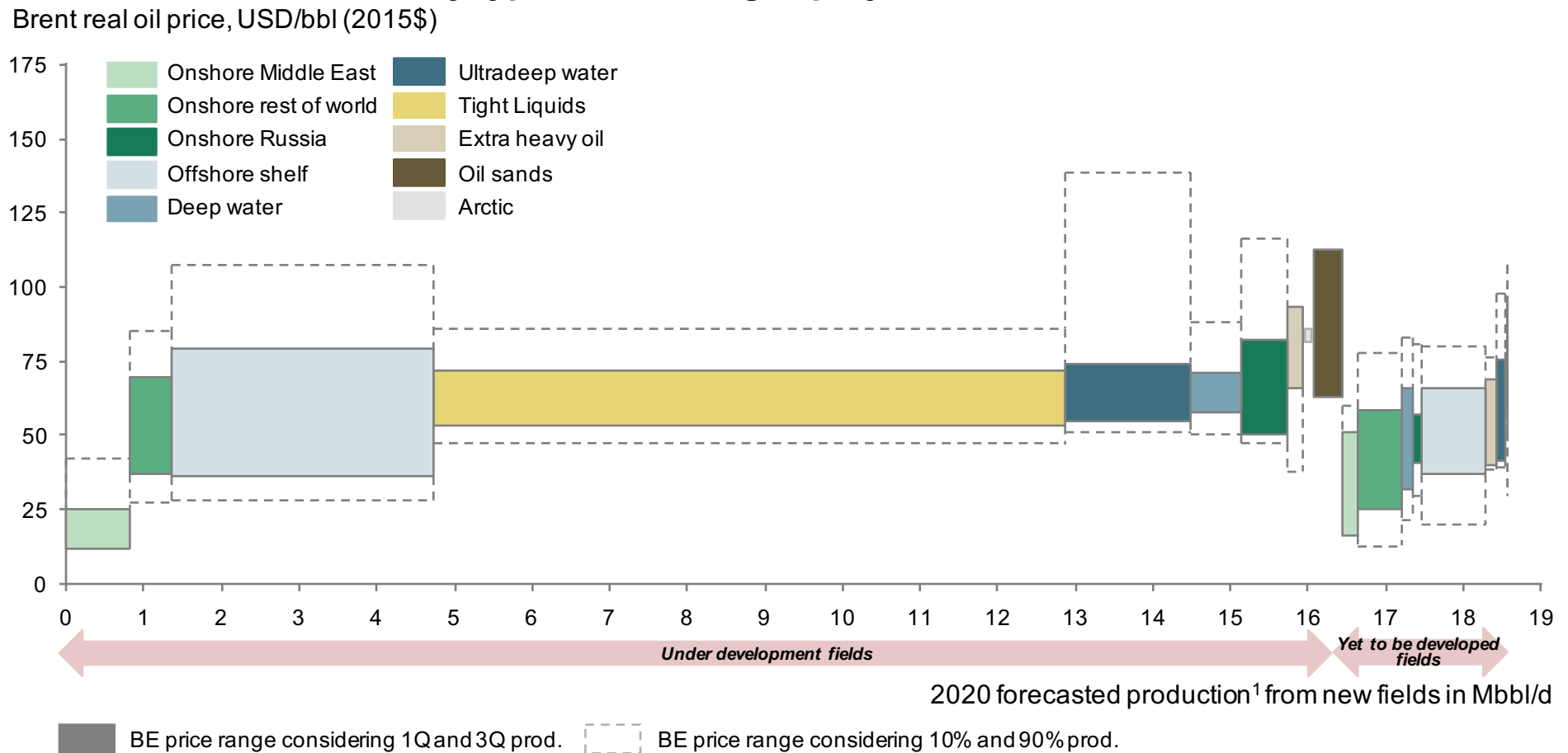
Updated: Apr 2016

Note: analysis assuming current industry cost structure and terms of fiscal regimes. Increased additions from previous versions result from changes in Rystad's methodology to include shale and tight liquids within non-producing life cycle category. Source: Rystad Energy, BCG Analysis

Mid-term reinvestment economics demand ~\$60-70/bbl

Only 3 Mbb/d out of the 18.5 Mbb/d of new production by 2020 is profitable at prices below \$40/bbl

Global production from new fields and break-even prices by types of oil and gas projects – 2020, in \$/bbl



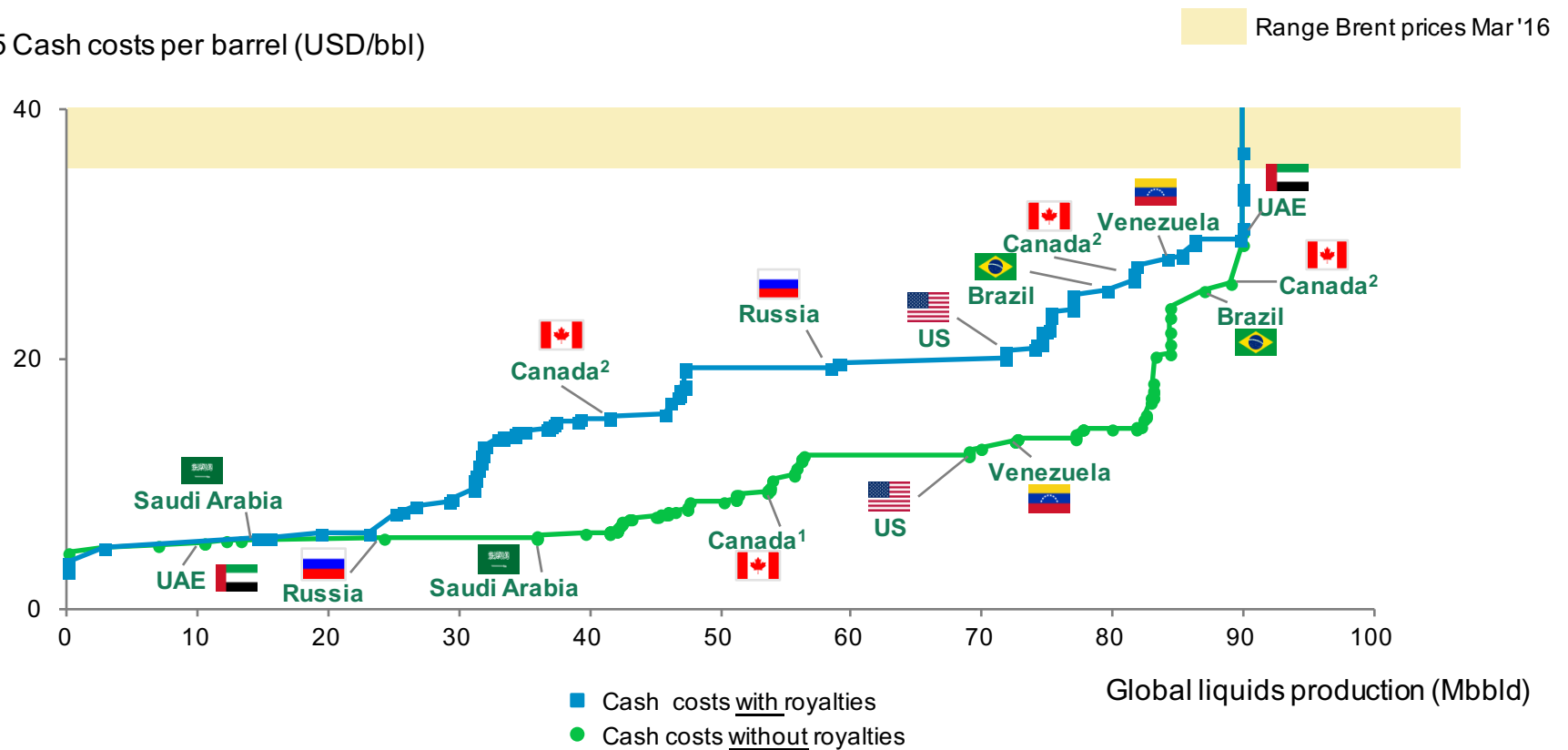
1. Includes crude oil, condensates and NGLs

Note: breakeven prices are calculated considering all cash flows since approval year with a 10% discount rate

Source: Rystad Energy UCube (18 April 2016 release)

Oil prices at ~\$50/bbl are not jeopardizing existing oil production volumes

2015 Cash costs per barrel (USD/bbl)

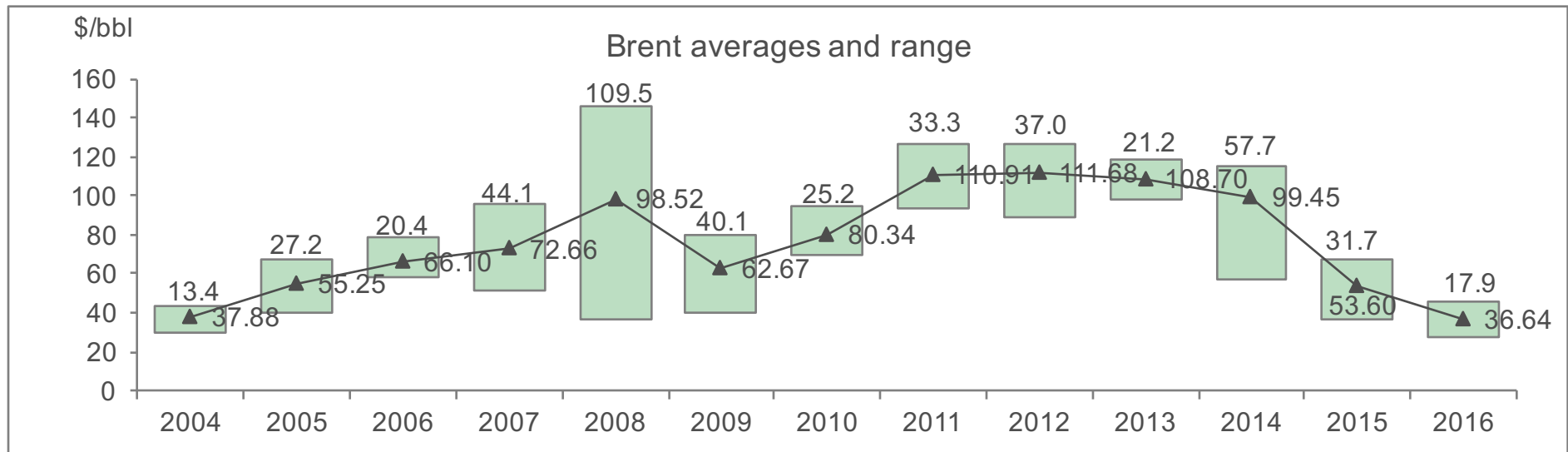


Note 1: Operational costs and production volumes are related to liquids only (crude oil, NGLs and Condensates)

Note 2: Operational costs include production OpEx, transportation OpEx, taxes OpEx, SG&A OpEx and abandonment costs if applicable

Source: Rystad (20th Jan 2016)

Volatility will likely be higher- driving behavioral changes



Volatility implications

Higher volatility likely a persistent feature of market for several years. Several implications:

- Slower decision making
- Push for shorter project cycles
- Resetting project economics lower

Mitigation measures will be put in place:

- As volatility becomes a more permanent fixture, individuals, companies and governments will take measures to offset it or be advantaged by it
- This in turn will have further effects on the market as storage is expanded, trading increased, and consumers look to escape the uncertainty

Source: Bloomberg

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Challenges of a low oil price environment

Key questions

- 1 How do governments attract investment to maintain levels of production needed to meet demand?**
- 2 How do governments and the industry as a whole promote efficient consumption habits despite low oil prices?**
- 3 What are the necessary steps to facilitate an orderly process of price formation (e.g. mechanisms and role of governments, market actors, and agencies)?**
- 4 Does the low oil price environment change requirements for spare capacity and stock build?**
- 5 What concerted government and industry actions could improve market security and energy sector performance in the short-, medium- and long-term?**


Opportunities of a low oil price environment

Key questions

- 6** Could the price fall catalyze a refresh of fiscal terms among producer and consumer governments to improve investment attractiveness or longer-term security of supply and demand?

- 7** Is this an opportunity to further unwind inefficient energy sector subsidies ?

- 8** Is it the time to address the emerging tax gap in some countries? If so, how?

-  How can governments increase the quality and availability of oil market data to improve decisions and achieve shared goals (JODI)?

Disclaimer

The observations presented herein are meant as background for the dialogue at the 15th International Energy Forum Ministerial Meeting. They have been prepared in collaboration with the Boston Consulting Group, and should not be interpreted as the opinion of the International Energy Forum or the Boston Consulting Group on any given subject.



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