

ERCE Oil Price Review - 2016 Q2

18 April 2016



This document reports and summarises the findings of a review and assessment of recent historical and assumed future oil prices based upon literature published in the public domain.

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Review of Crude Oil and Natural Gas Prices

All prices as at 15 April 2016

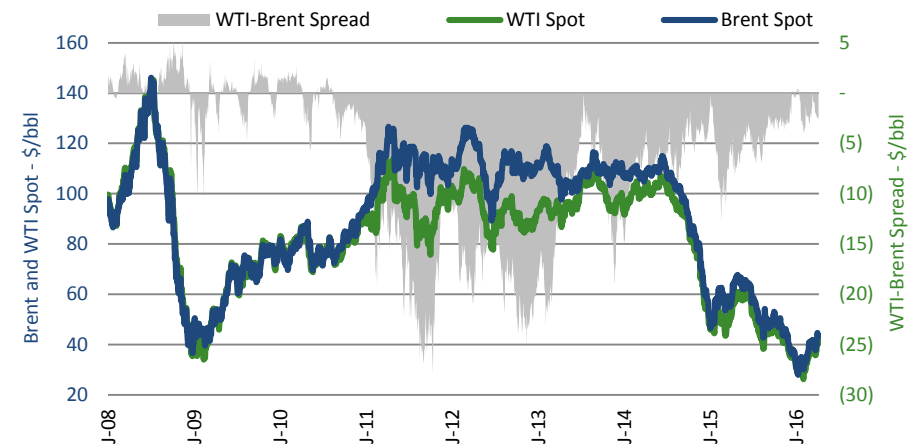
All dollar amounts are in U.S. dollars unless otherwise indicated



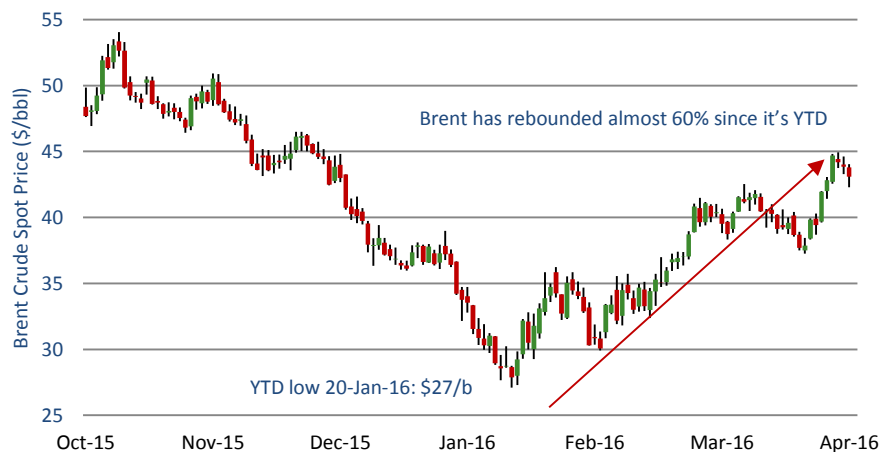
Oil prices rallied in recent months on tightening supply, anticipation of a potential production freeze and US dollar weakness. Some believe that the bottom experienced in January was the end of the nearly two-year price decline. Others continue to warn that oil markets remain in oversupply and that further meetings between major producers will be meaningless for global production. (The next OPEC meeting is due to take place in Vienna on 2 June).

Brent and WTI Crude Oil Spot Price: Current Vs. Historical	Brent		WTI	
	\$/bbl	%Chg vs Current	\$/bbl	%Chg vs Current
15-Apr-16	43.1	-	40.4	-
1M Ago	38.7	↑ 11%	36.3	↑ 11%
3M Ago	28.9	↑ 49%	29.4	↑ 37%
6M Ago	48.7	↓ -12%	46.4	↓ -13%
1Yr Ago	60.3	↓ -29%	56.4	↓ -28%
YTD Low	27.1	↑ 59%	26.1	↑ 55%
YTD High	44.9	↓ -4%	42.4	↓ -5%
2016 YTD Average	36.1	↑ 19%	34.4	↑ 17%

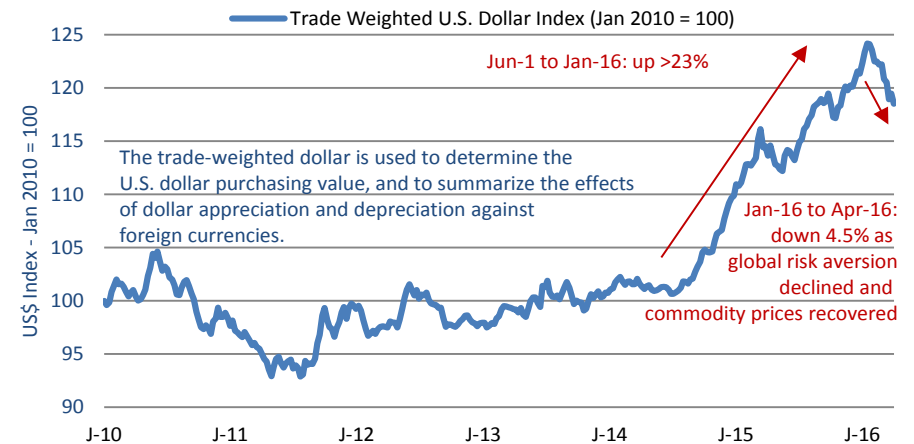
WTI-Brent Spot Price and Spread (Jan 2008+)



Brent Crude Daily Spot Price: 6M Candlestick Chart (15-Oct-15 to 15-Apr-16)

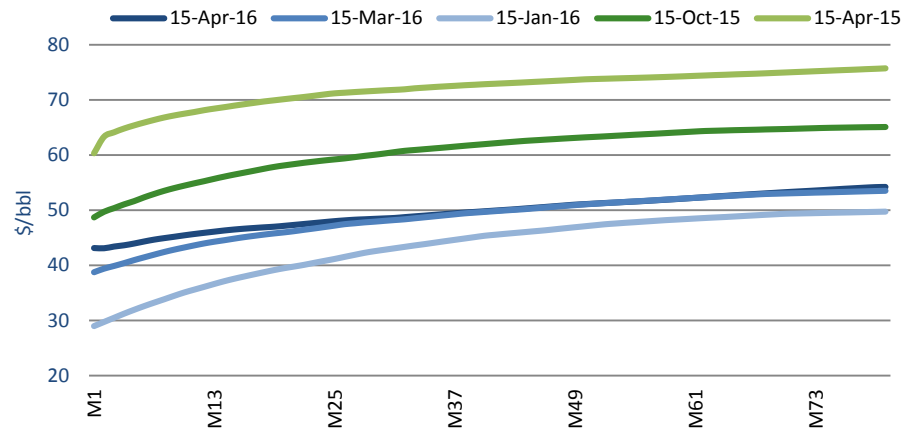


Trade Weighted U.S. Dollar Index (Jan 2010 = 100)

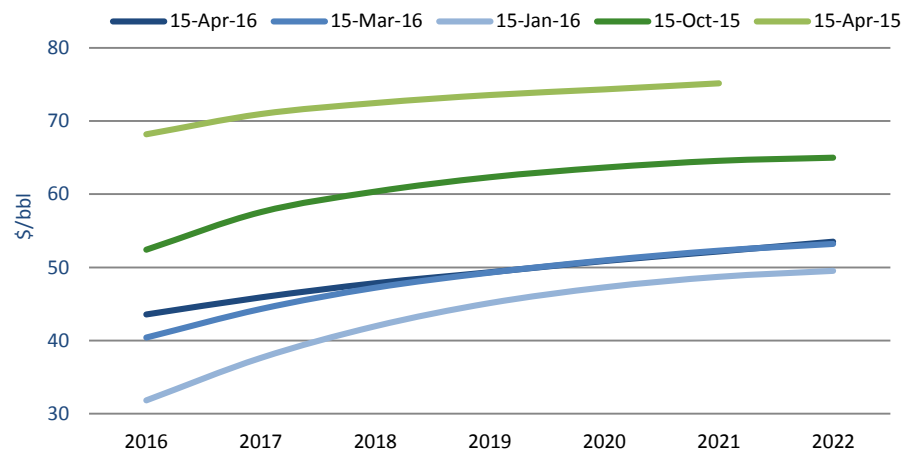


Contango in the Brent futures reduced significantly resulting in a flatter futures curve over the last 3 months following a steady recovery in the spot price from lows earlier in the year. Oil market analysts commented on the potential tighter market outlook reflected in the pricing structure of the Brent futures curve, following outages in Nigeria and Iraq from sabotage, when the spot price (M1) occasionally fluctuated in to backwardation.

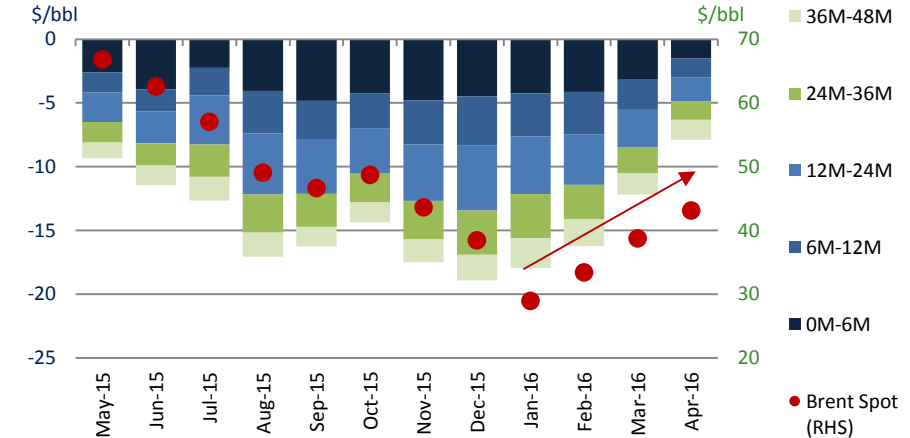
Brent Crude Futures Curve: Current, 1M, 3M, 6M and 1Yr Ago



Brent Curve: Annual Averages - Current, 1M, 3M, 6M and 1Yr Ago



Brent Futures Curve Spread (12M Ago to Current)



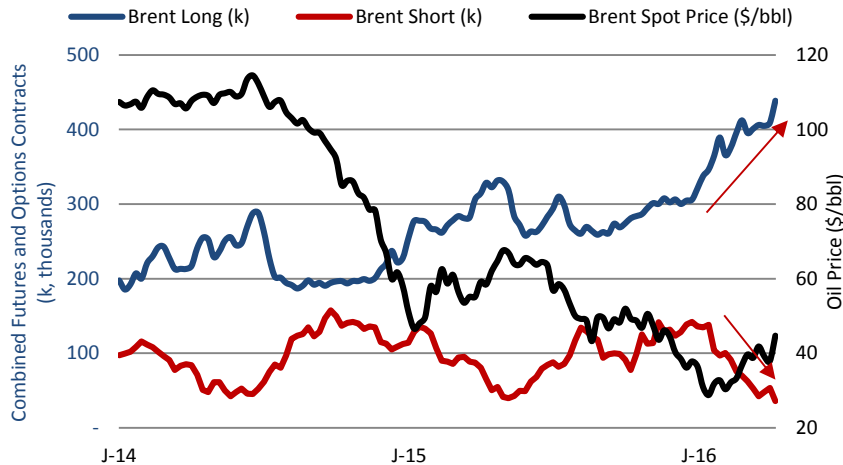
Annual Averages of Brent Futures Contracts (Current Vs 1M, 3M, 6M and 1Yr Ago)

\$/bbl	2016*	2017	2018	2019	2020	2021	2022
15-Apr-16	44	46	48	49	51	52	54
15-Mar-16	40	44	47	49	51	52	53
15-Jan-16	32	38	42	45	47	49	50
15-Oct-15	52	58	60	62	64	65	65
15-Apr-15	68	71	72	74	74	75	

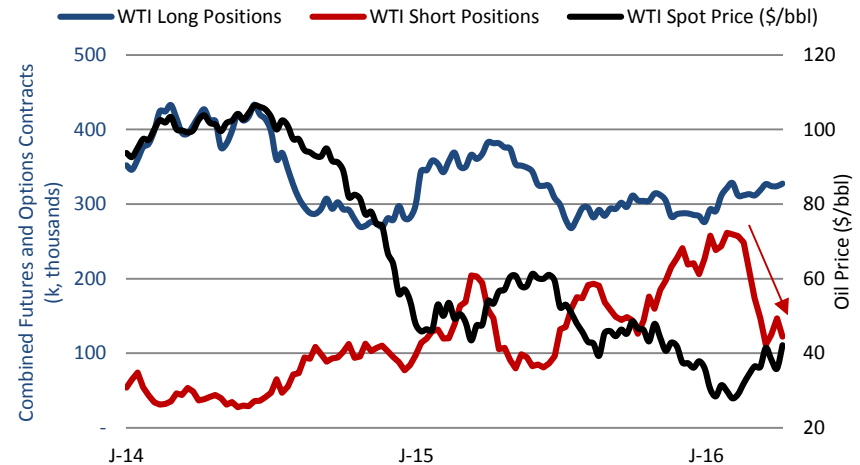
Money Managers' (Hedge Funds, Pension Funds etc) Positions on Oil Contracts (Combined Futures and Options)

Hedge funds and other big speculators increased their net long positions for crude futures and options during the lead up to the major crude producers' meeting in Doha in mid April.

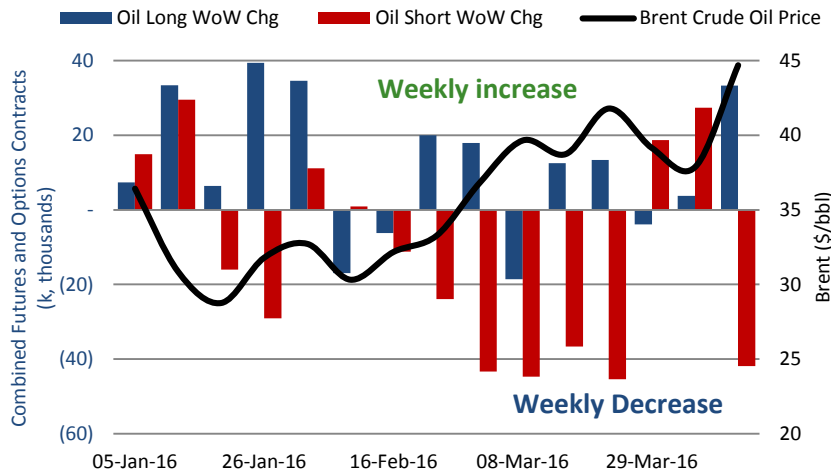
Money Managers Positions on Brent Crude Contracts (ICE)



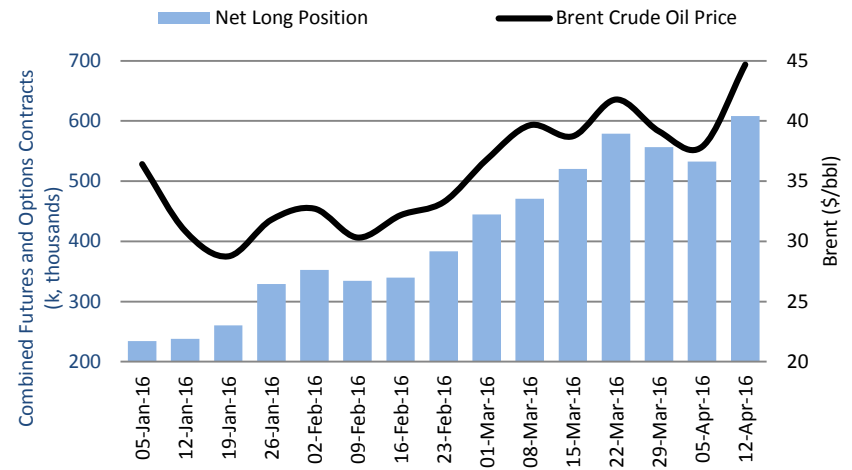
Money Managers Positions on WTI Crude Contracts (ICE & NYMEX)



Oil Long and Short Positions Week on Week Change Vs. Brent Crude Price

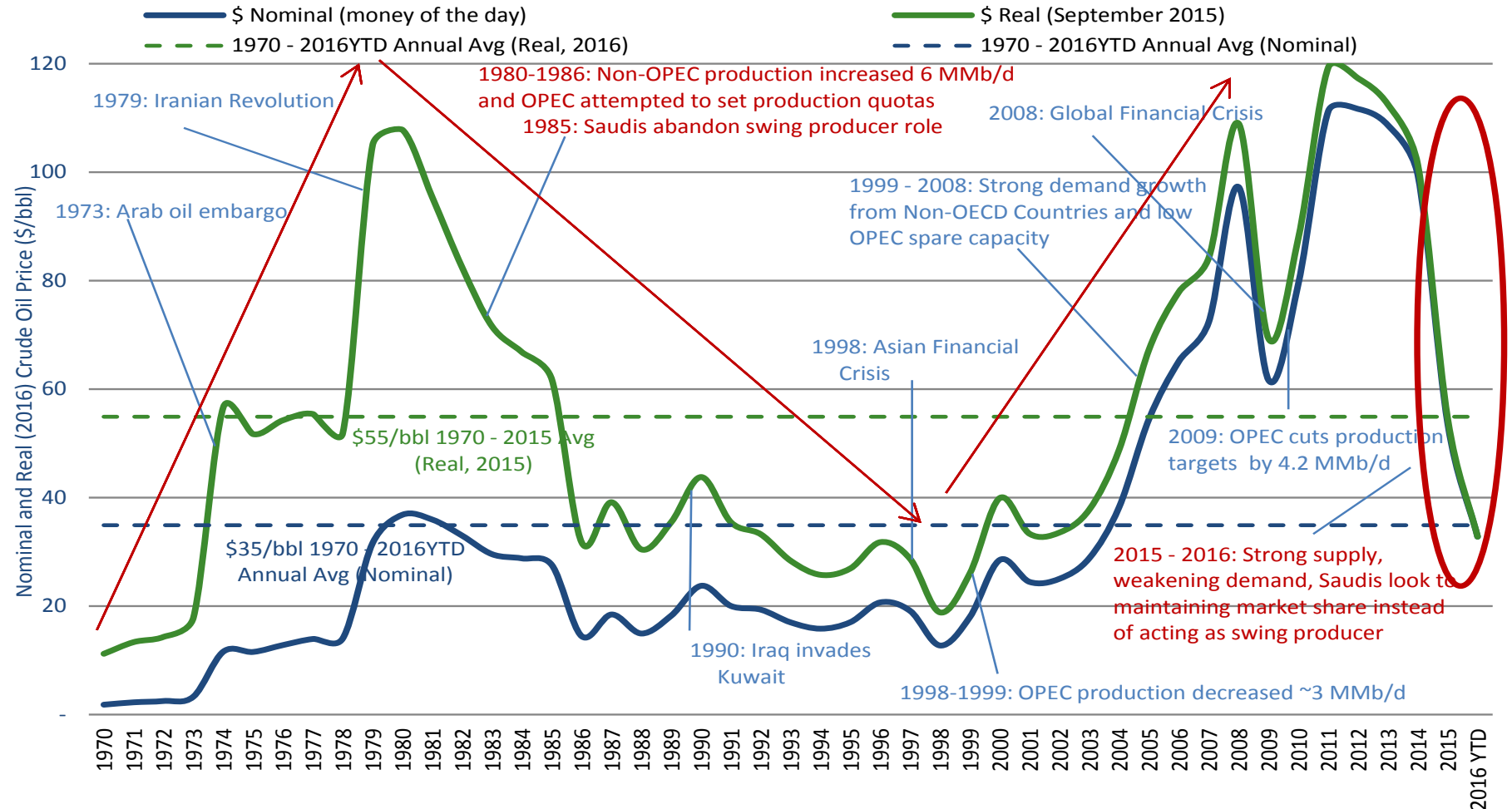


Money Managers' Net Long Position of Brent & WTI Vs Brent Crude Oil Price



Longs are bets on higher prices while shorts are wagers on price drops. The net position squares off the two.

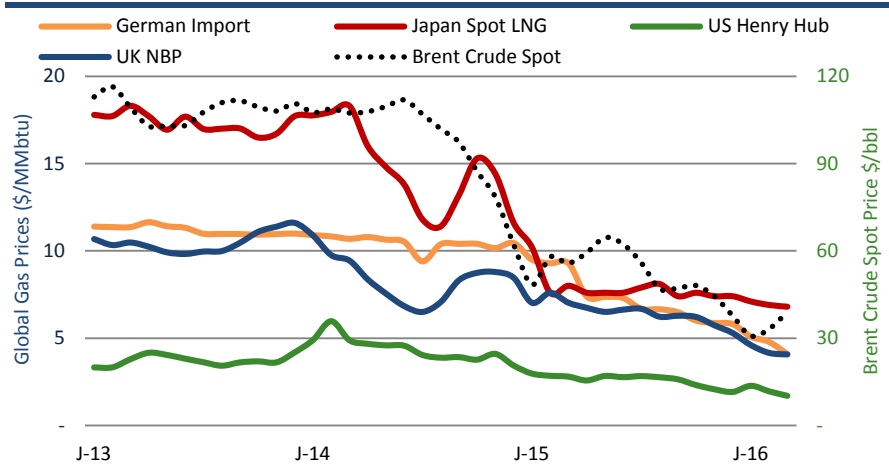
Oil Price History: Long-Term Crude Oil Price (Real Vs. Nominal)



- **Nominal** - economic value expressed in historical nominal monetary terms, also known as “money-of-the-day”.
- **Real** - Economic value that has been adjusted from a nominal value to remove the effects of general price level changes over time (using the CPI from US Bureau of Labour Statistics) and is thus measured in terms of the general price level in some reference year (the base year in this case 2016).
- 1970-1983 Arabian Light posted at Ras Tanura; 1984-2013 Brent dated; 2014+ Brent spot.

Global gas prices continued to fall through 1Q 2016 on rising supply, lacklustre demand and weak crude oil prices. A mild winter across Europe pushed the UK NBP spot price to six-year lows. European gas storage facilities are at unusually high levels contributing to downward pressure on European hub futures over the summer.

Global Gas Prices (Jan 2013-2015) Monthly Average Prices

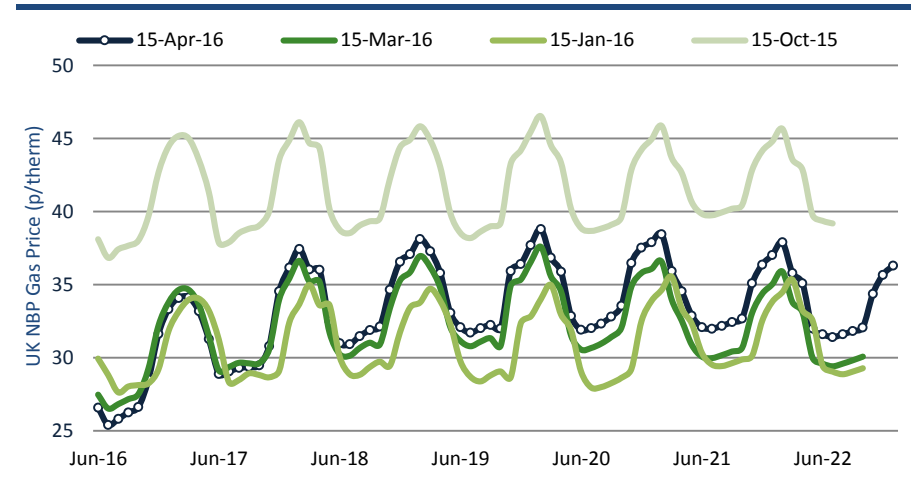


Global Gas: Monthly Average Spot Prices	Jan-15 (\$/MMBtu)	Mar-16 (\$/MMBtu)	Jan to Mar 2016 % Chg
UK NBP	4.61	4.07	↓ -12%
German Import	5.09	4.09	↓ -20%
US Henry Hub	2.27	1.70	↓ -25%
Japan LNG	7.10	6.80	↓ -4%
Brent Crude (\$/stb)	30.80	39.07	↑ 27%

UK Natural Gas NBP Daily Spot Price: 6 Month Candlestick Chart



UK Natural Gas NBP Futures Curve (Current Vs 1M, 3M, 6M and 1Yr Ago)

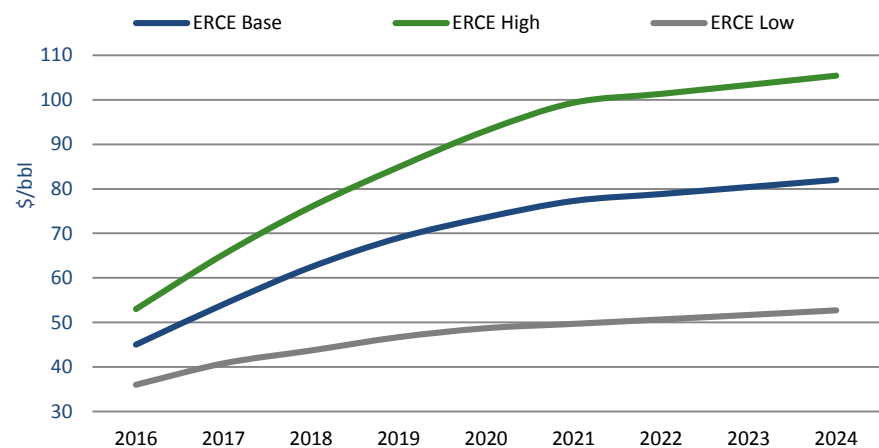


ERCE Brent Oil Price Assumptions And Price Decks Assumed by Petroleum Consultants and Analysts

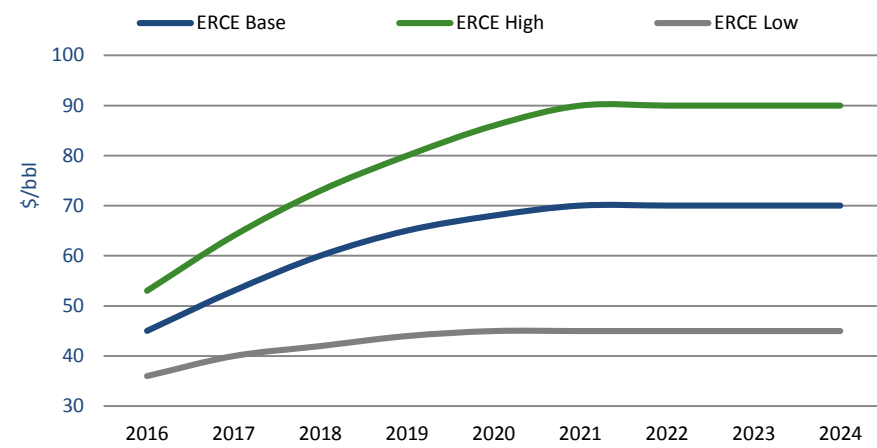
In the absence of guidance from a client in relation to oil price assumptions, ERCE would assume the oil price scenarios presented in the following slide. These oil price scenarios are derived in context of the information available in the public domain and should not be construed as oil price forecasts, predictions or projections by ERCE.

The low and high oil price paths depicted in the following slide(s) are not intended to provide lower and upper bounds for future oil prices but rather to allow the analysis of possible future world oil market conditions that differ significantly from those assumed in the base case.

ERCE Nominal Brent Oil Price Assumptions



ERCE Real (Real 2016) Brent Oil Price Assumptions



Low Case ERCE Brent Assumptions (\$/bbl)	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025+
Real (Constant \$, 2016)	36	40	42	44	45	45	45	45	45	45
Nominal (\$ of the day)	36	41	44	47	49	50	51	52	53	+2.0% pa

Escalation rate p.a. 2.00%

Base Case ERCE Brent Assumptions (\$/bbl)	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025+
Real (Constant \$, 2016)	45	53	60	65	68	70	70	70	70	70
Nominal (\$ of the day)	45	54	62	69	74	77	79	80	82	+2.0% pa

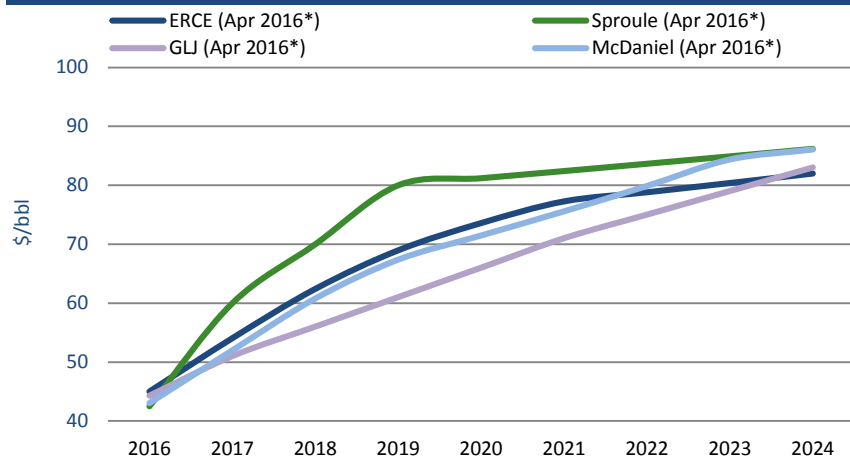
Escalation rate p.a. 2.00%

High Case ERCE Brent Assumptions (\$/bbl)	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025+
Real (Constant \$, 2016)	53	64	73	80	86	90	90	90	90	90
Nominal (\$ of the day)	53	65	76	85	93	99	101	103	105	+2.0% pa

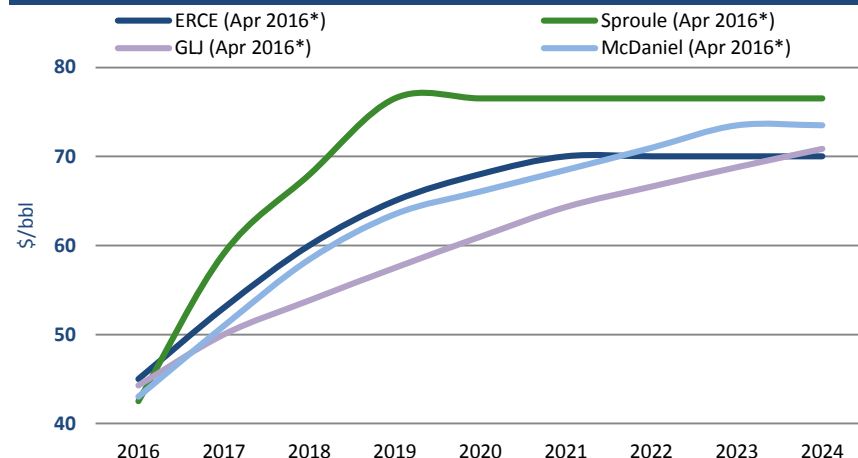
Escalation rate p.a. 2.00%

Brent Futures (15-Apr-16)	44	46	48	49	51	52	54
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Nominal (Money of the Day) Brent Oil Price Assumptions



Real 2016 (Constant US\$) Brent Oil Price Assumptions



Petroleum Consultants

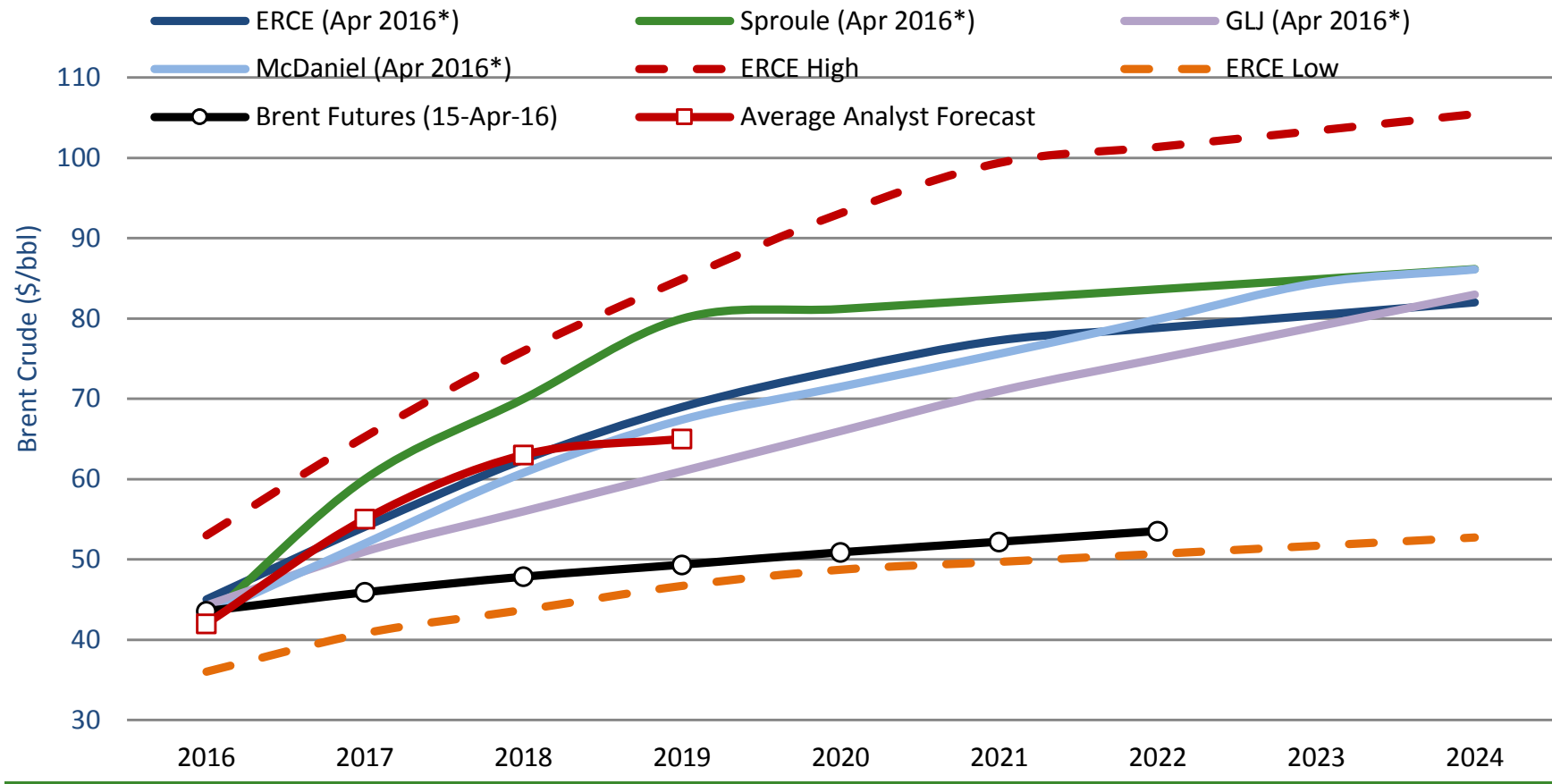
Updated: 15-Apr-15

Brent Nominal (\$/bbl)	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025+
ERCE (Apr 2016*)	45	54	62	69	74	77	79	80	82	+2.0% pa
Sproule (Apr 2016*)	43	60	70	80	81	82	84	85	86	+1.5% pa
GLJ (Apr 2016*)	44	51	56	61	66	71	75	79	83	+2.0% pa
McDaniel (Apr 2016*)	43	52	61	67	72	76	80	84	86	+2.0% pa
<i>Average</i>	<i>44</i>	<i>54</i>	<i>62</i>	<i>69</i>	<i>73</i>	<i>77</i>	<i>79</i>	<i>82</i>	<i>84</i>	
Brent Futures (15-Apr-16)	44	46	48	49	51	52	54			

Brent Real (\$/bbl)	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025+
ERCE (Apr 2016*)	45	53	60	65	68	70	70	70	70	70
Sproule (Apr 2016*)	43	59	68	77	77	77	77	77	77	77
GLJ (Apr 2016*)	44	50	54	57	61	64	67	69	71	72
McDaniel (Apr 2016*)	43	51	58	64	66	68	71	73	73	73
<i>Average</i>	<i>44</i>	<i>53</i>	<i>60</i>	<i>66</i>	<i>68</i>	<i>70</i>	<i>71</i>	<i>72</i>	<i>73</i>	<i>73</i>

	ERCE	Sproule	GLJ	McDaniel
Escalation rate p.a.	2.00%	1.50%	2.00%	2.00%

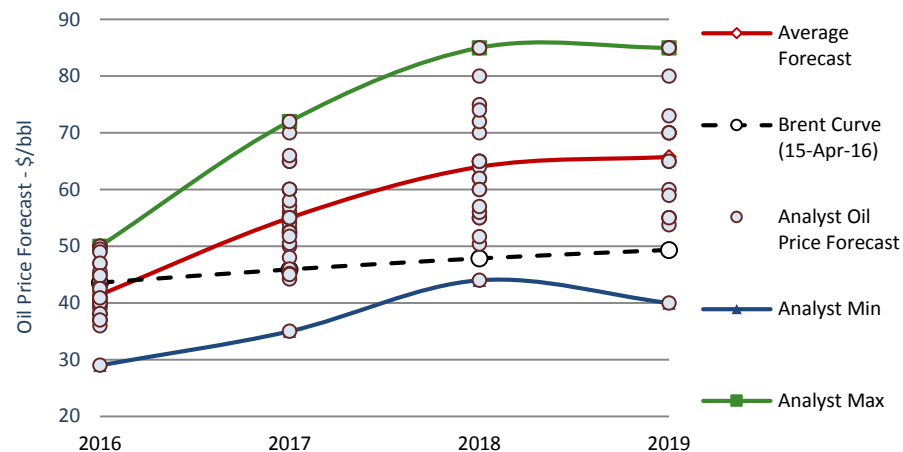
Nominal Brent Oil Price Assumptions by Petroleum Consultants, Analysts Vs. Brent Futures Curve



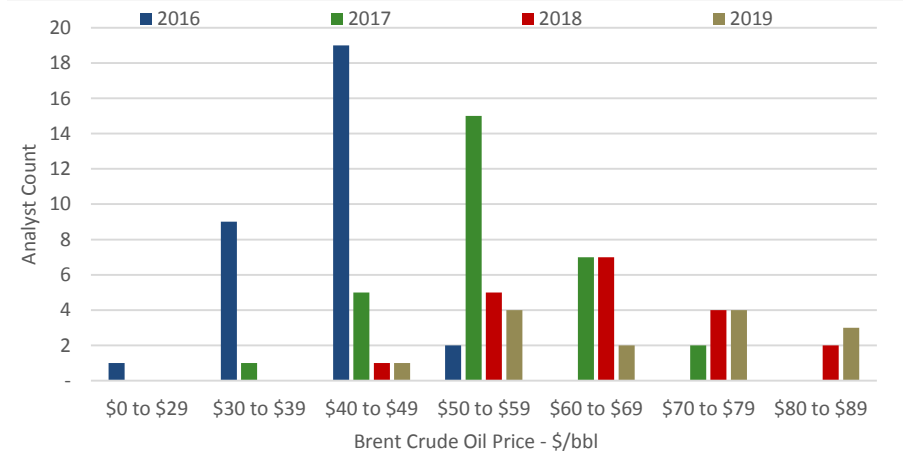
Financial analysts raised their average price forecasts for 2016 for the first time in 10 months, but cautioned that investor sentiment may sour short-term without solid improvement in market fundamentals, according to a Reuters poll (31 March 2016).

Source: Bloomberg	2016	2017	2018	2019
ABN AMRO Bank NV	50	60		
Alliance Bernstein	50	70	80	80
Bank of Nova Scotia/The	41	56	62	73
Barclays PLC	37			
BMI Research	40	53		
BMO	45	55	65	70
BNP Paribas SA	37	46		
Capital Economics	37	54		
Citigroup Inc	40	60	64	
Commerzbank AG	42	57		
Danske Bank A/S	41	52		
DNB ASA	47	65	70	
Emirates NBD PJSC	39	55		
Goldman Sachs	50	65	65	60
HSBC Holdings PLC	45	60	75	
Investec	40	50	55	55
Itau Unibanco Holding SA	46	55	55	55
Jeffries	43	58	72	85
LBBW	40			
Lloyds Bank PLC	43	66		
Morgan Stanley	49	72	85	85
MPS Capital Services	36			
Natixis SA	38	48	56	70
Norddeutsche Landesbank Girozentrale	38	46		
Prestige Economics LLC	41	51		
Promsvyazbank PJSC	47	45	50	54
Raiffeisen Bank International AG	39	55	62	
RBC Capital Markets	43	60	74	
Santander UK PLC	40	53	60	65
Societe Generale SA	38	53	65	70
UniCredit Markets & Investment Banking	37	45		
Wells Fargo Securities LLC	41	52	57	59
Westpac Banking Corp	29	35	44	40
Mean	41	55	64	66
Median	41	55	64	68
Max	50	72	85	85
Min	29	35	44	40
Brent Curve (15-Apr-16)	44	46	48	49

Oil Price Forecasts by Financial Analysts

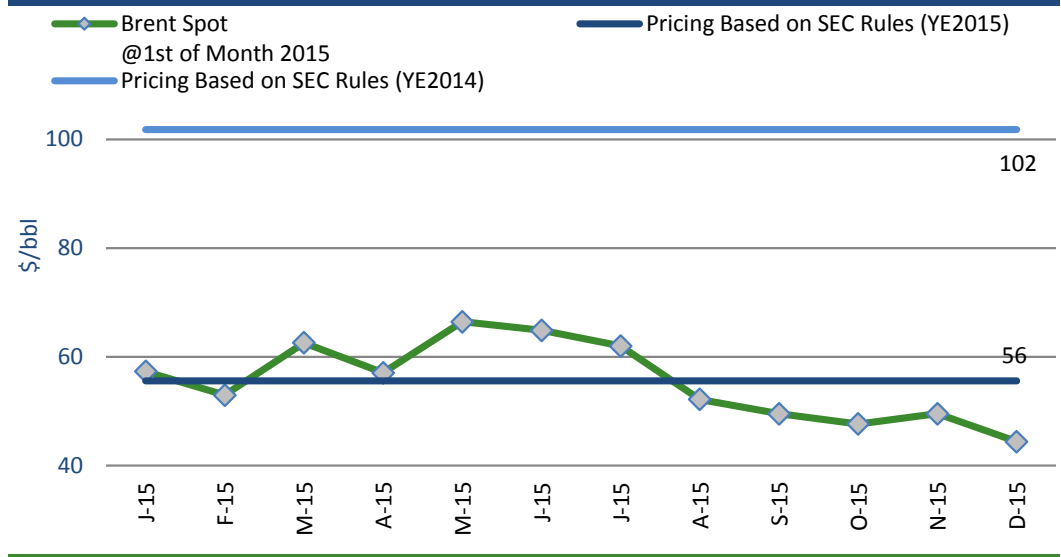


Histogram of Annual Brent Crude Oil Price Forecasts by Financial Analysts



Rolling 12M Date	Brent Spot @1st of Month 2015 (\$/stb)	Rolling 12M Date	Brent Spot @1st of Month (2014) (\$/stb)
01-Dec-15	44	01-Dec-14	73
01-Nov-15	50	01-Nov-14	86
01-Oct-15	48	01-Oct-14	94
01-Sep-15	50	01-Sep-14	103
01-Aug-15	52	01-Aug-14	105
01-Jul-15	62	01-Jul-14	112
01-Jun-15	65	01-Jun-14	109
01-May-15	66	01-May-14	108
01-Apr-15	57	01-Apr-14	106
01-Mar-15	63	01-Mar-14	109
01-Feb-15	53	01-Feb-14	106
01-Jan-15	57	01-Jan-14	111
12M Arith. Avg	55.57	12M Arith. Avg	101.80

Brent Pricing - SEC Regulations

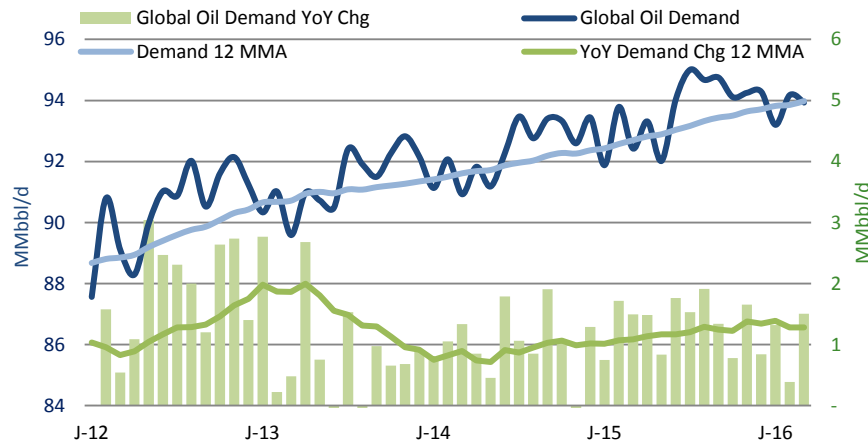


- Shown for reference purposes only, the data above indicates the current Brent price as Defined by SEC Regulations.
- This is calculated by taking the 12-month unweighted arithmetic average of 1st-day-of-the-month Brent prices.
- **Definition 22.V (31 December 2009):** "Existing economic conditions include prices and costs at which economic producibility from a reservoir is to be determined. The price shall be the average price during the 12-month period prior to the ending date of the period covered by the report, determined as an unweighted arithmetic average of the first-day-of-the-month price for each month within such period, unless prices are defined by contractual arrangements, excluding escalations based upon future conditions."

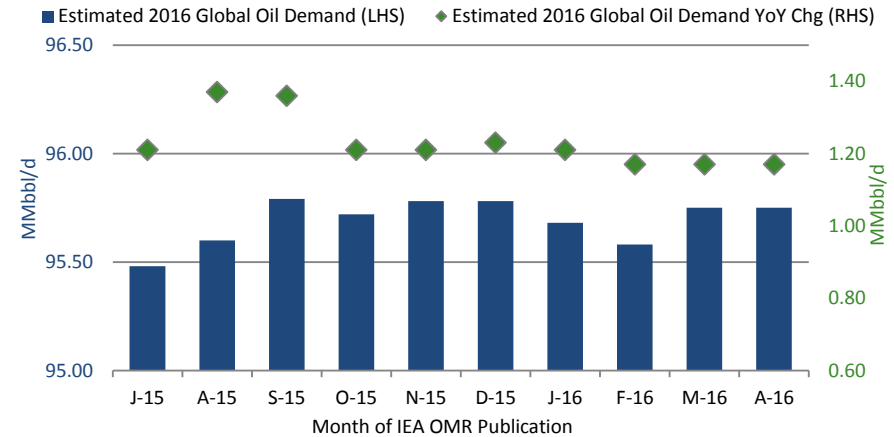
A Review of Global Oil Macro Fundamentals

Energy agencies forecast demand growth to ease considerably in 2016 due to slowdowns in the US, Europe, China and Latin America. They have readjusted their 2016 demand growth numbers from estimates made in 2015, lowering predicted demand growth to 1.2 MMbbl/d. The EIA's prediction for 2017 demand growth is 1.3 MMbbl/d. In its World Economic Outlook the IMF downgraded it's global growth forecast for this year by 0.2%, to 3.2%.

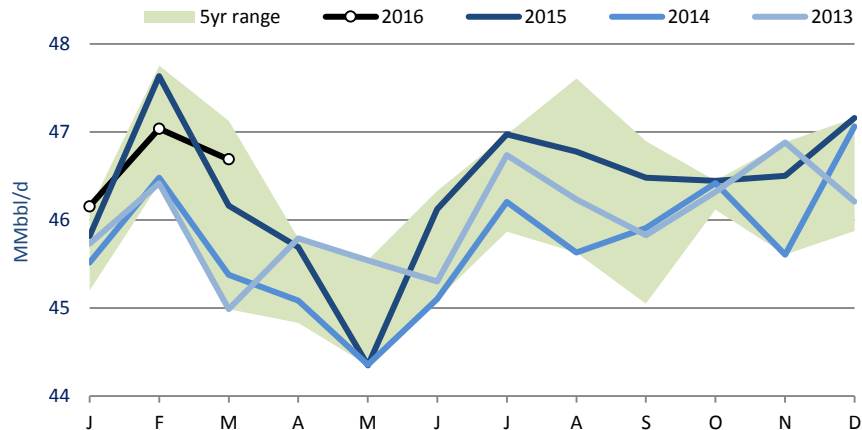
Global Oil Demand and YoY Change



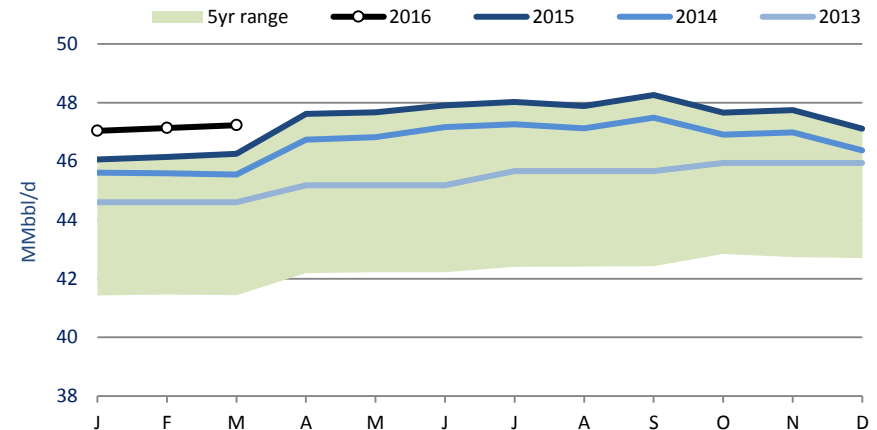
IEA Expected 2016 Global Oil Demand Growth



Seasonal OECD Oil Demand and 5 Yr Range

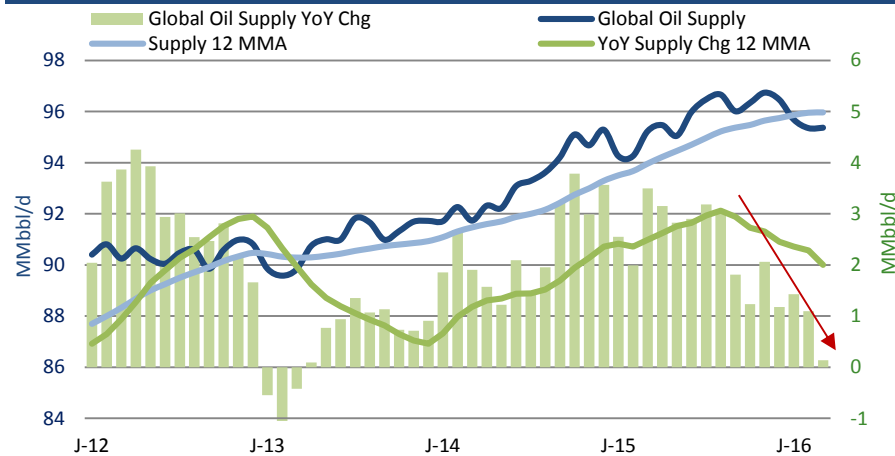


Seasonal Non-OECD Oil Demand and 5 Yr Range

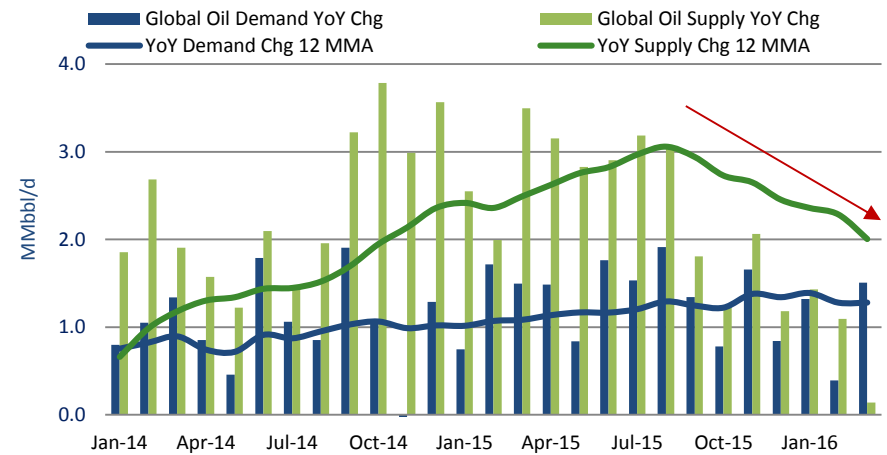


The global oil supply YoY growth continues its steady decline with losses from both OPEC and Non-OPEC countries. OPEC output declined this quarter, resulting from violence and instability in several countries. The U.S. and North Sea lead declines from Non-Opec producers. The IEA expects oil markets to balance by the end of 2016, whereas the EIA forecasts oversupply to continue until mid 2017.

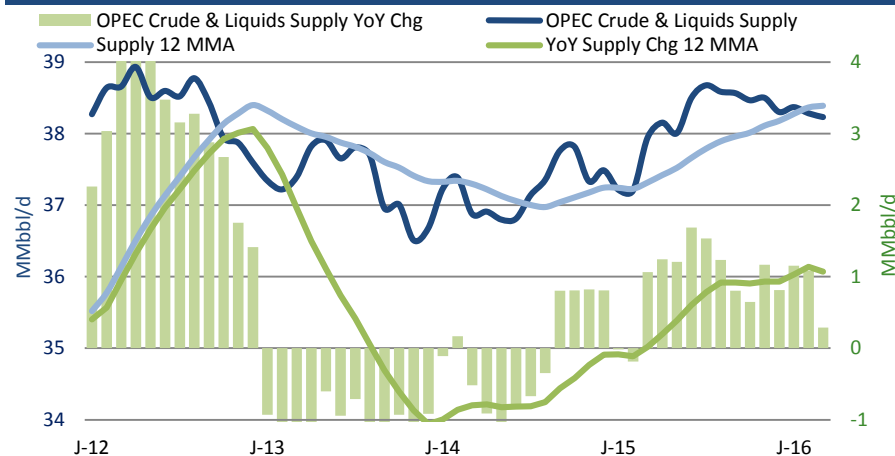
Global Oil Supply and YoY Change



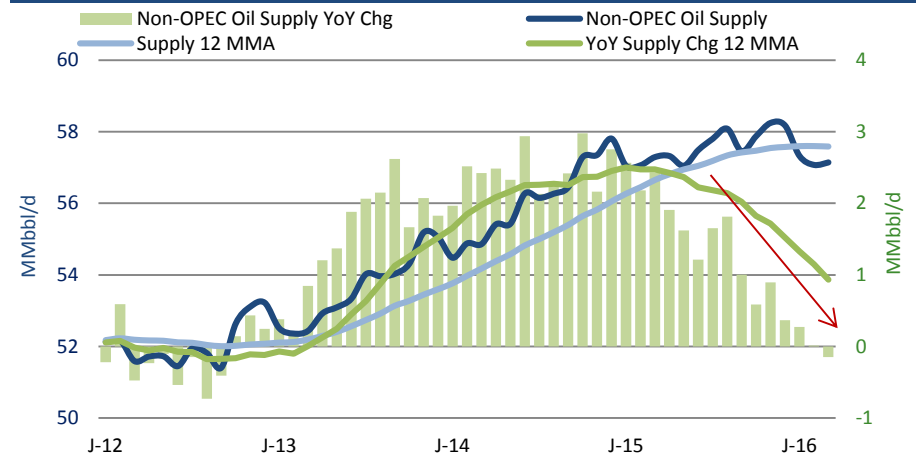
Global Oil Demand YoY Change Vs. Global Oil Supply YoY Change



OPEC Crude Oil & Liquids Production and YoY Change

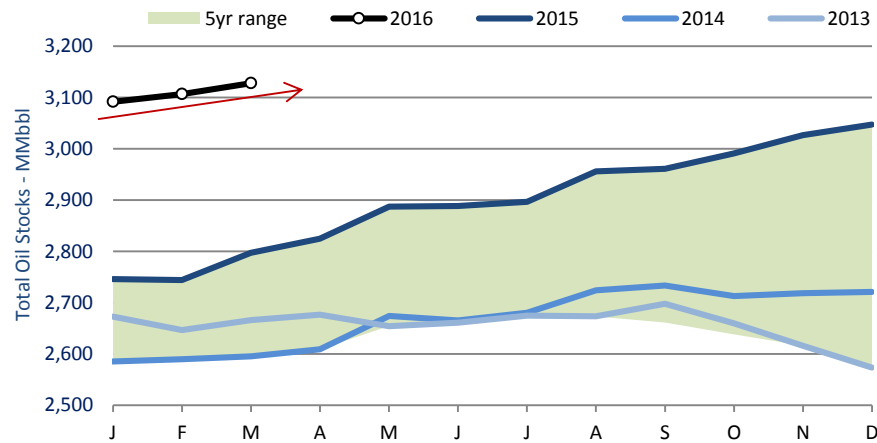


Non-OPEC Crude Oil and Liquid Fuels Supply

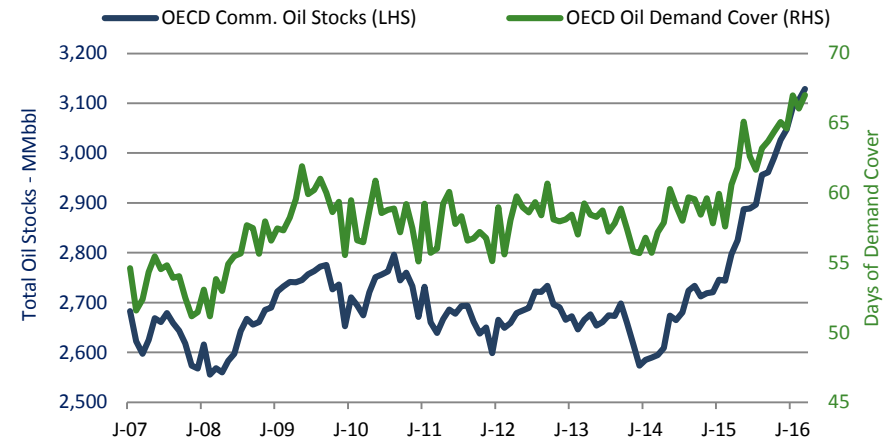


Commercial oil inventories continue to build beyond their 5-year-range both in and out of the US. The EIA forecasts the rise in stocks to continue until end 2017 due to oil production being un-expectedly resilient to low prices. In the US, a seasonal drop in refined products ahead of the U.S. driving season was more than offset by a rise in crude stocks despite the recent slowing of regional production growth.

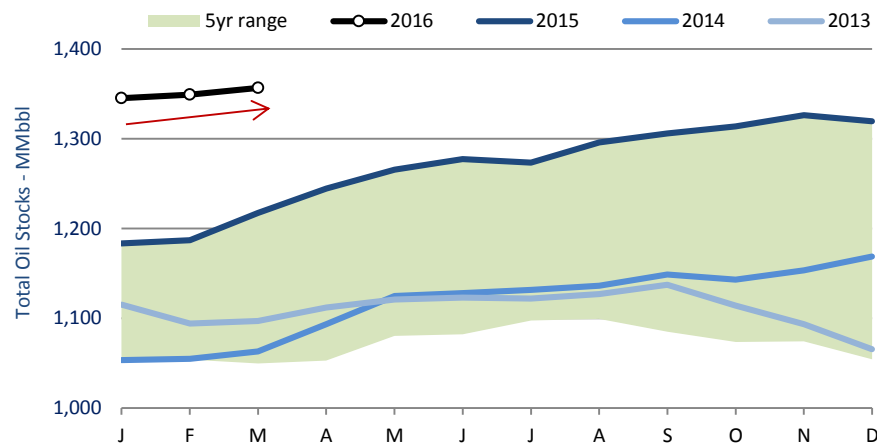
Total OECD Commercial Oil Stocks



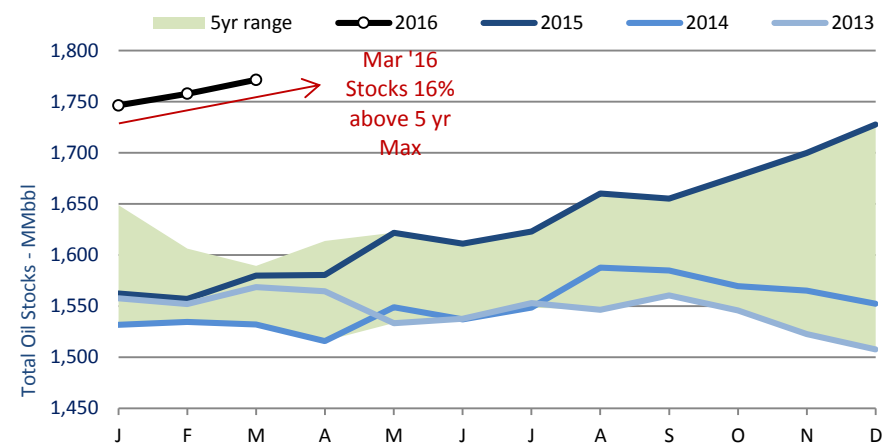
Total OECD Commercial Oil Stocks and Demand Cover



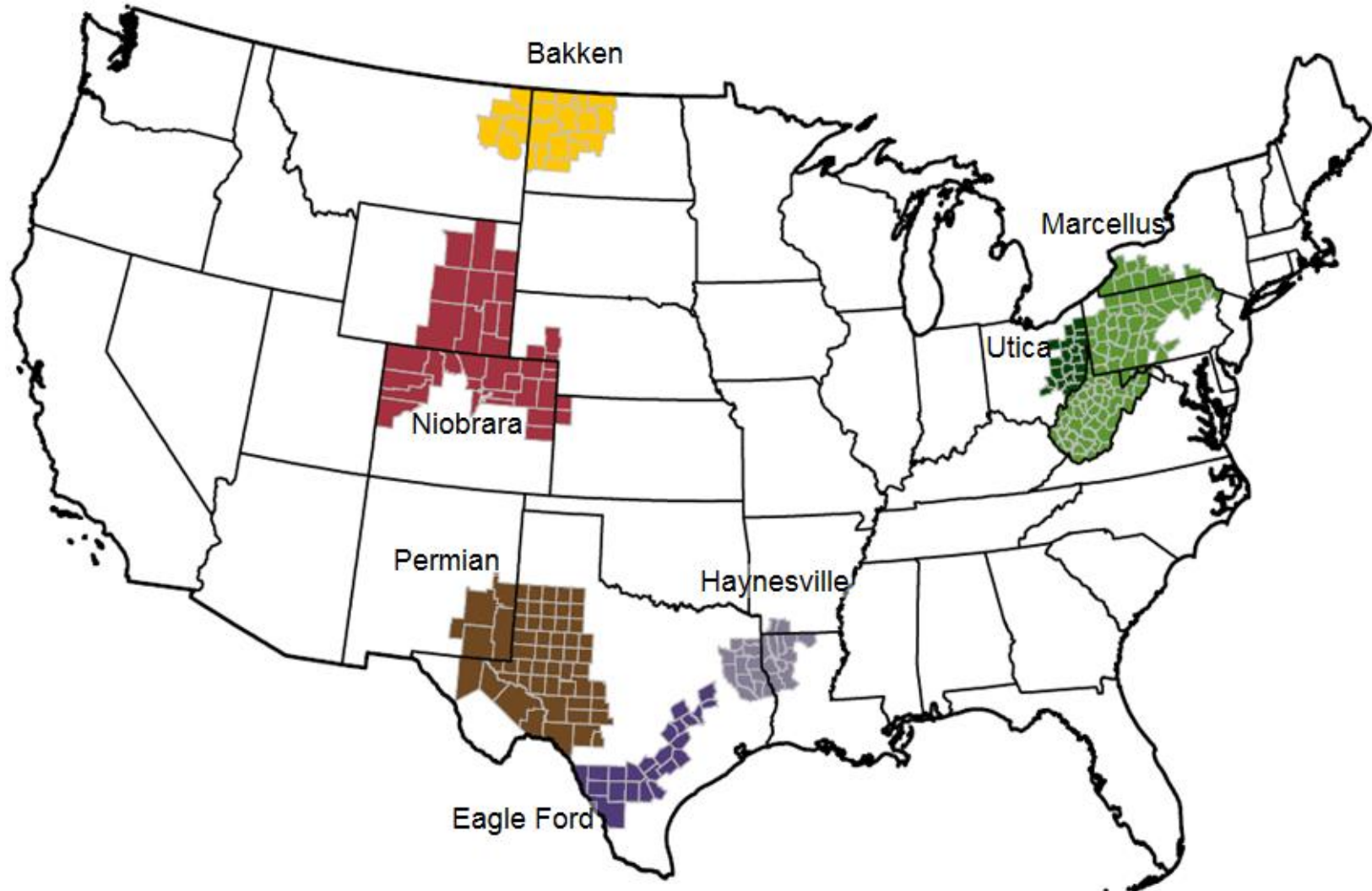
Total U.S. Commercial Oil Stocks



Total OECD Excluding US Commercial Oil Stocks



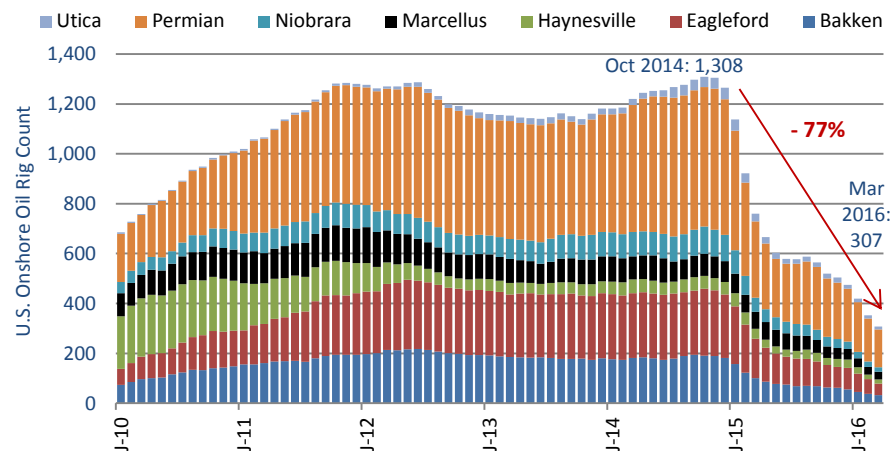
These seven shale regions onshore the US account for ~92% of domestic oil production growth and all natural gas production growth during 2011 to 2014.



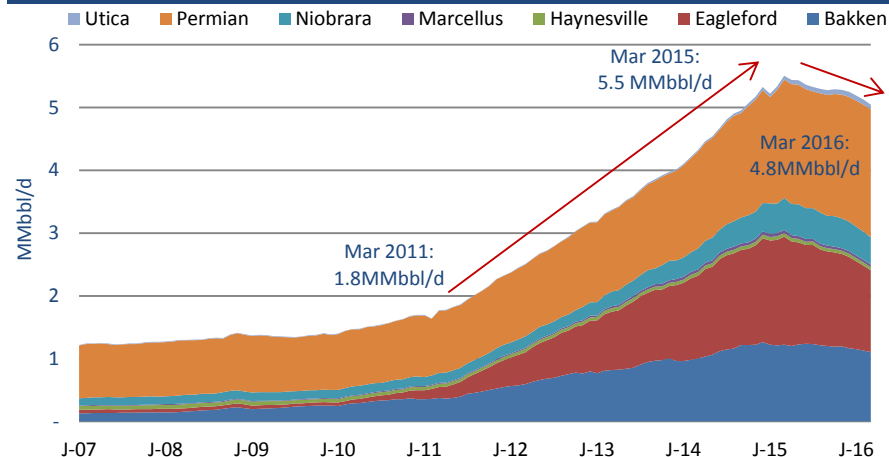
U.S. Rig Count Continues to Fall; Shale Production Shows Steepening Decline MoM

The anticipated negative impact of the current downturn on US oil production outlook is taking shape. The U.S. onshore oil rig count has fallen almost 80% from the high of Oct 14. Over 50 U.S. producers have entered bankruptcy since early 2015. Bi-annual lending reviews by banks in April are likely to leave companies without sufficient credit to finance new drilling and therefore support falling production due to the fast natural decline of shale wells.

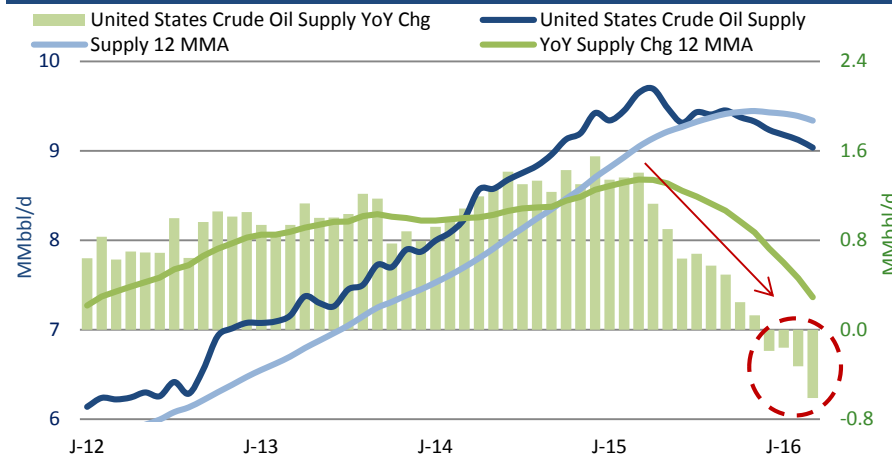
U.S. Onshore Active Oil Rigs



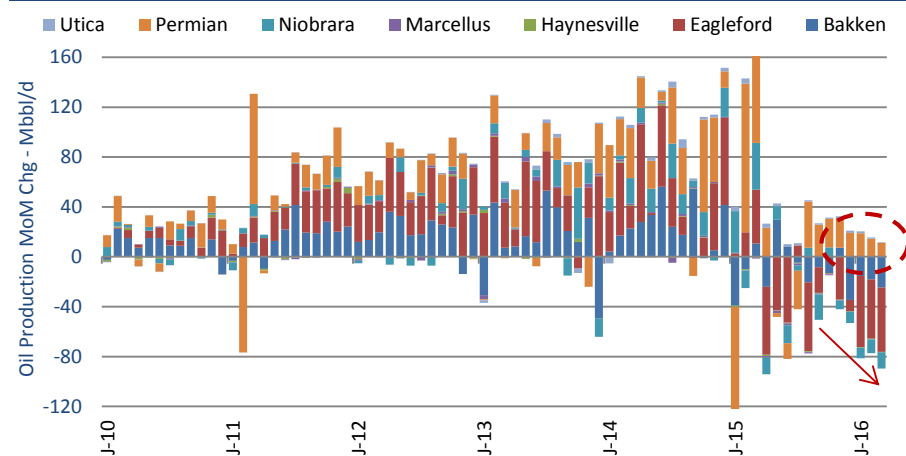
U.S. Onshore Oil Production by Region



US Crude Oil Supply



US Shale Production MoM Change by Shale Region

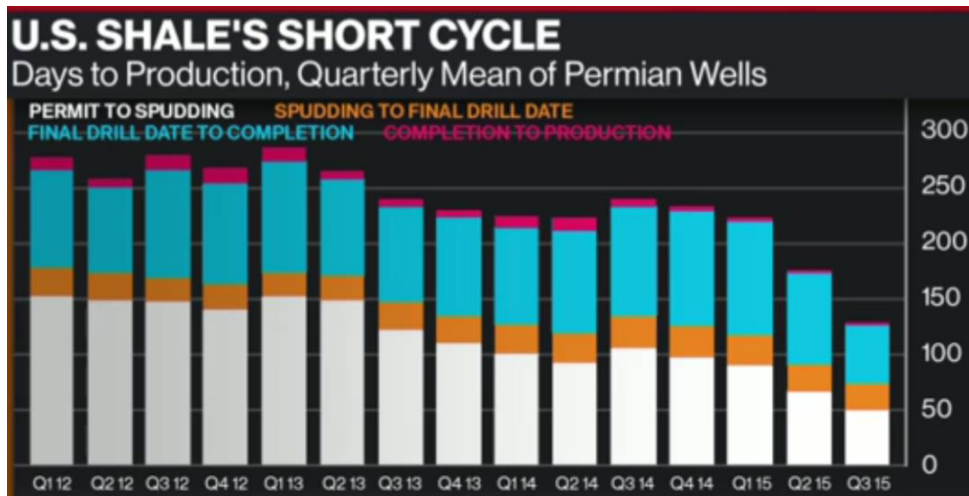


Chevron see capital allocation towards shorter-cycle base and shale and tight assets as it brings more of its major capital projects to completion. First among these opportunities is the Permian where Chevron hold a large resource base with largely (~85%) no or low royalty.

Development costs continue to be driven lower through both reduction of well costs and through higher anticipated recoveries.

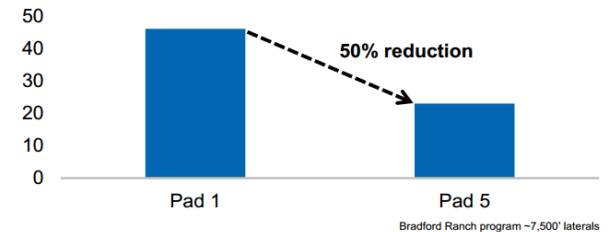
Chevron estimate around 1,300 operated well locations that offer a 10% rate of return at \$40 WTI or less (only 30% of its operated acreage assessed so as at March 2016).

Time between permit allocation and first production for U.S. shale wells has fallen markedly, leading to what is being referred to as a “fracklog” of wells ready to quickly take advantage of any price rally, which could act to cap price rises. Bloomberg Analysts estimate 4,000 wells have been drilled and are awaiting fracking to begin production.

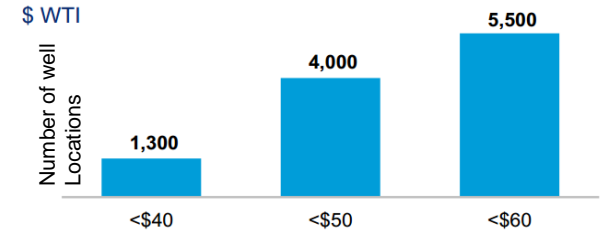


Source: Chevron, Bloomberg, IHS, Goldman Sachs

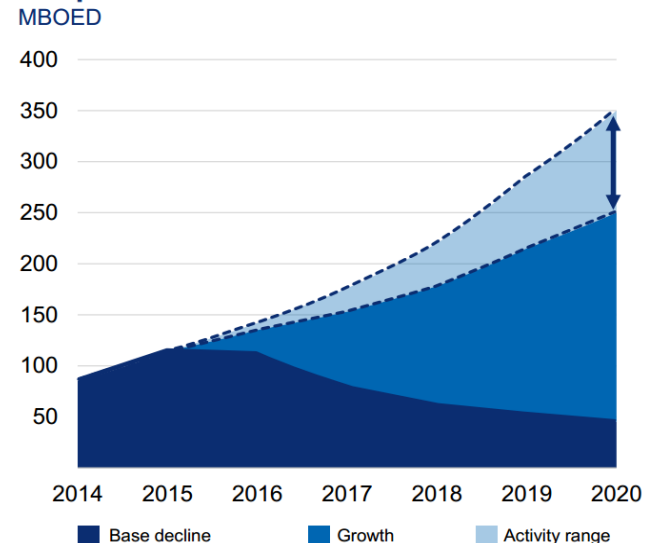
Drilling days per well



Breakevens

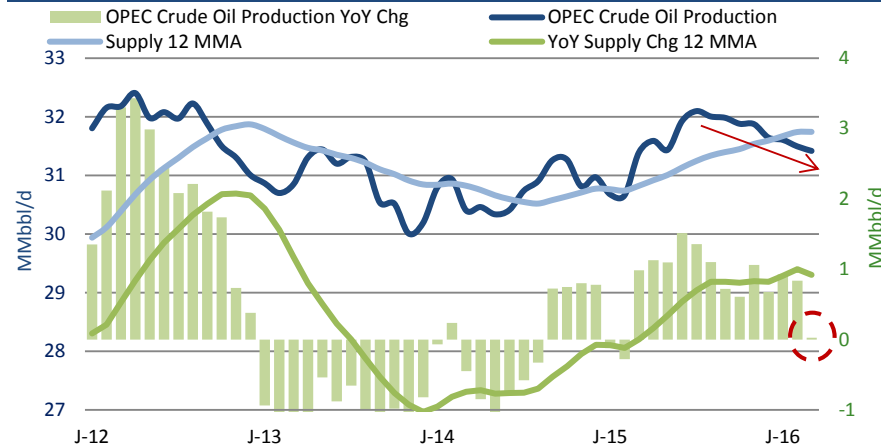


Net production – Midland & Delaware Basins

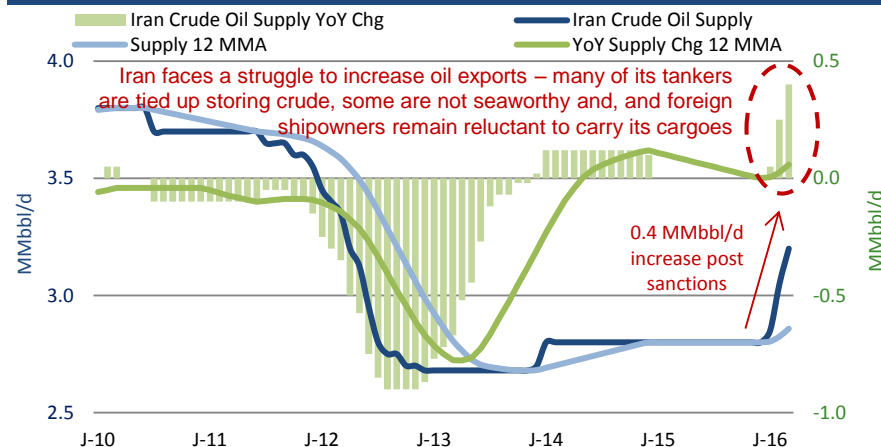


OPEC supply has fallen in recent months due to outages in Iraq, Nigeria and the UAE. This decline could be temporary as fixing of facilities in these countries could return ~600,000 bbl/d of supply to the oil markets. Iran exported its first oil cargo to Europe in 4 years and aims to further raise exports to pre-sanction levels, although it may be misleading to expect such increases in the near-term due to the time and capital required to drill new oil fields, and problems with access to markets.

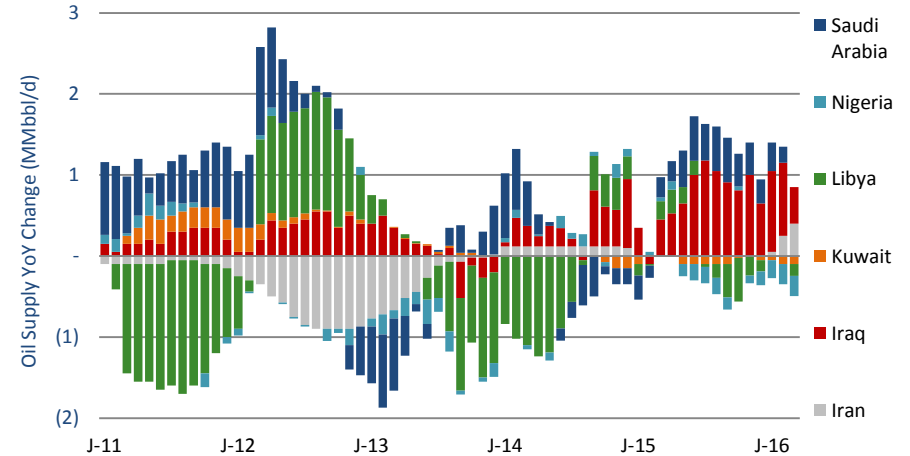
OPEC Crude Oil Production and YoY Change



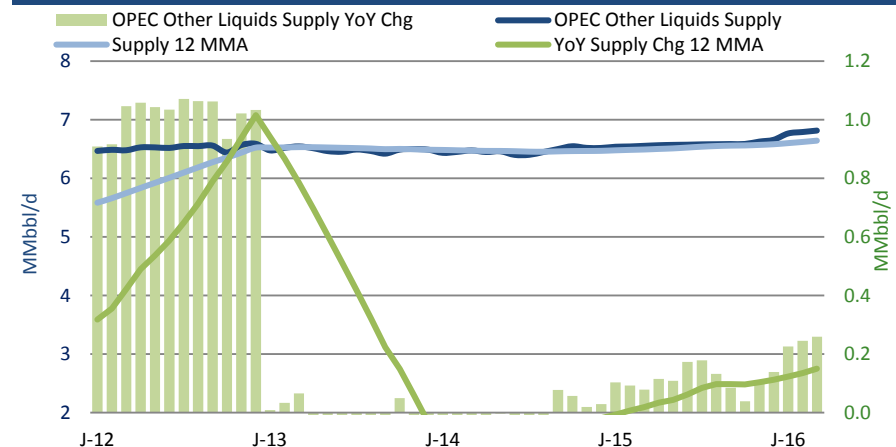
Iran Crude Oil Supply and YoY Change



OPEC Oil Supply YoY Change (Select OPEC Members)



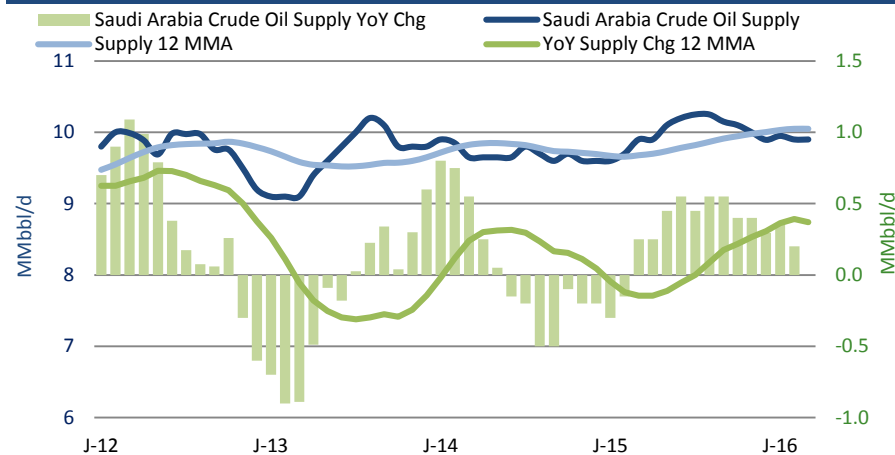
OPEC Other Liquids Production and YoY Change



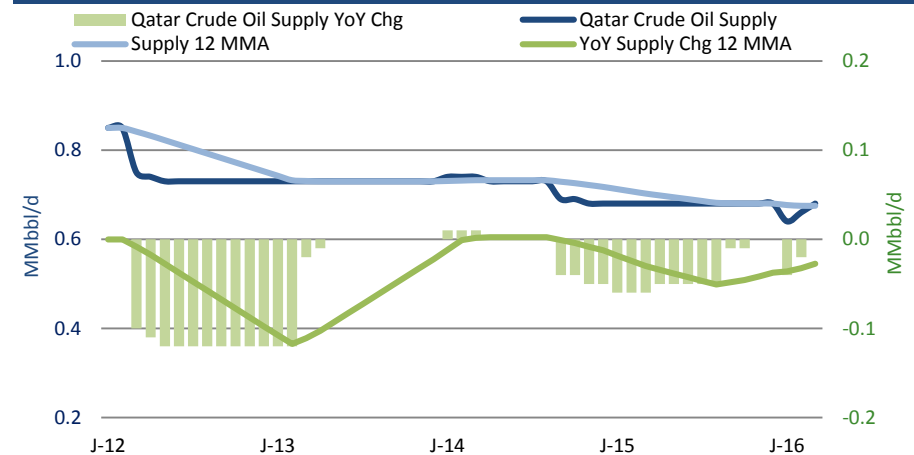
OPEC Gulf States Crude Oil Production: Saudis Keep Output at Record Levels

Saudi Arabia continues output at near record levels to defend their market share, recent statements from officials suggests no change to this strategy in the immediate future. Gulf states such as Saudi Arabia, Kuwait, Qatar and the United Arab Emirates all have relatively high ratings from debt rating agencies and can dip further into reserves or borrow internationally to continue production in a low-price climate.

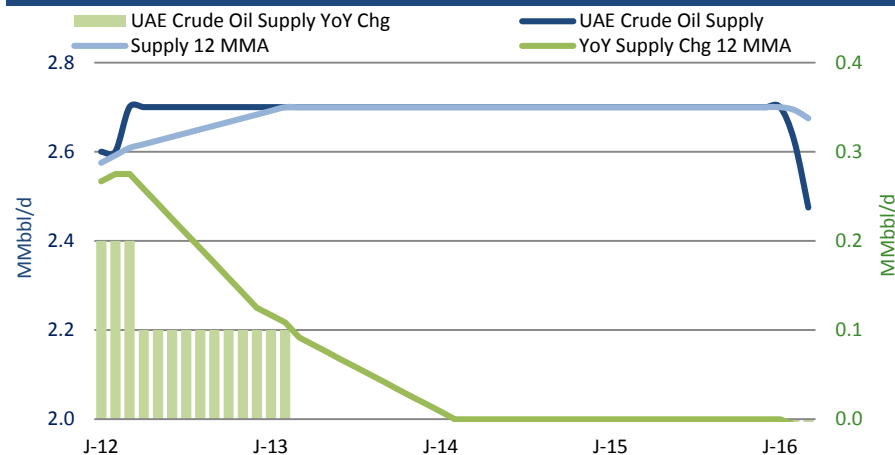
Saudi Arabia Crude Oil Supply and YoY Change



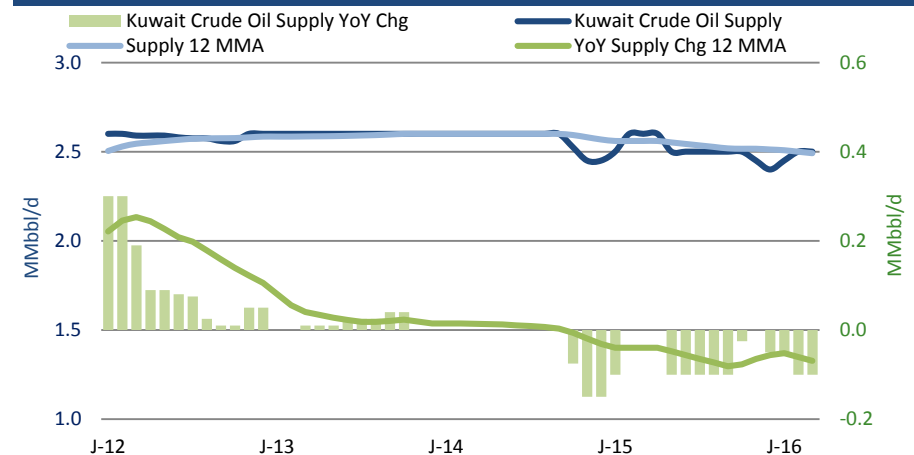
Qatar Crude Oil Supply and YoY Change



UAE Crude Oil Supply and YoY Change

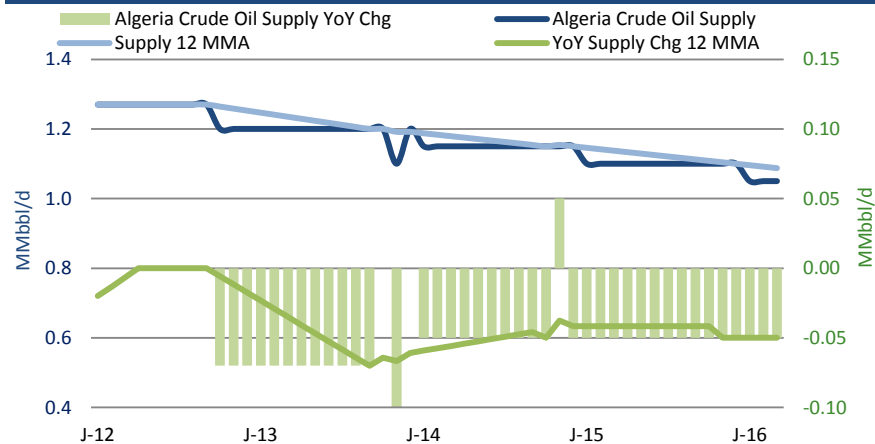


Kuwait Crude Oil Supply and YoY Change

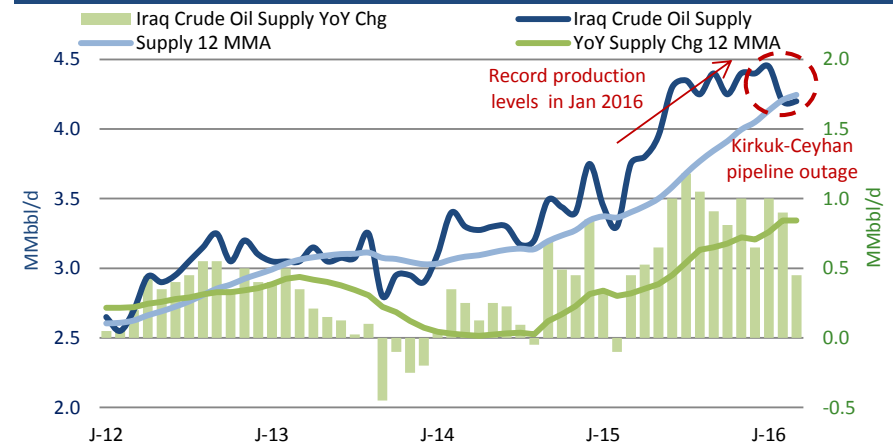


Instability persists in Algeria, Iraq, Libya, Nigeria and Venezuela causing volatility in supply. Nigeria and Iraq are experiencing pipeline outages due to sabotage and political disputes. Iraq continues to up production to record levels, seeking to maximise market share. Political division in Libya continues to suppress exports. Venezuela is approaching economic and possibly political collapse with service companies pulling out of projects due to defaulted payments. Algeria's energy earnings fell 50% in 2015 leading to cuts in social spending which could provoke social unrest.

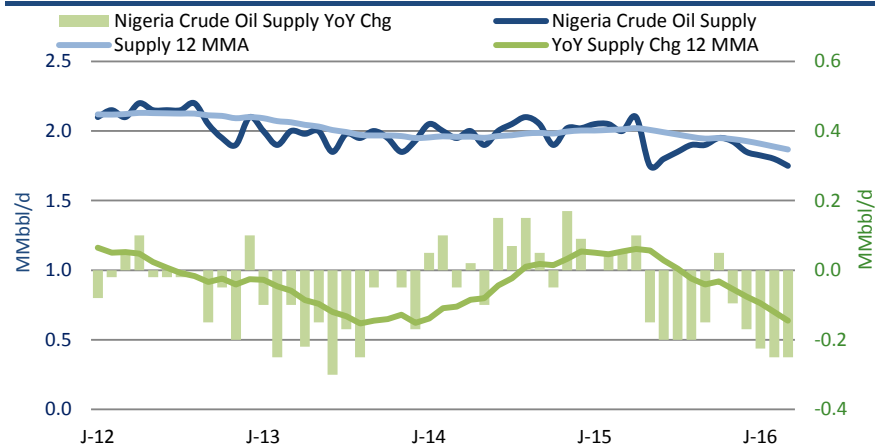
Algeria Crude Oil Supply and YoY Change



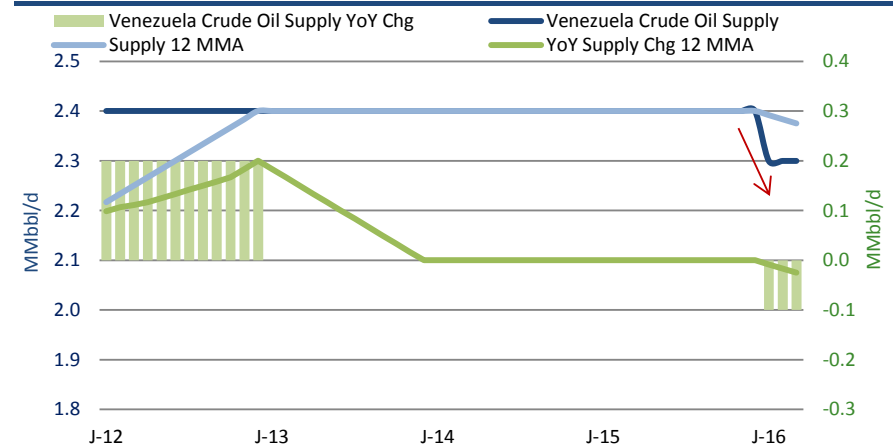
Iraq Crude Oil Supply and YoY Change



Nigeria Crude Oil Supply and YoY Change

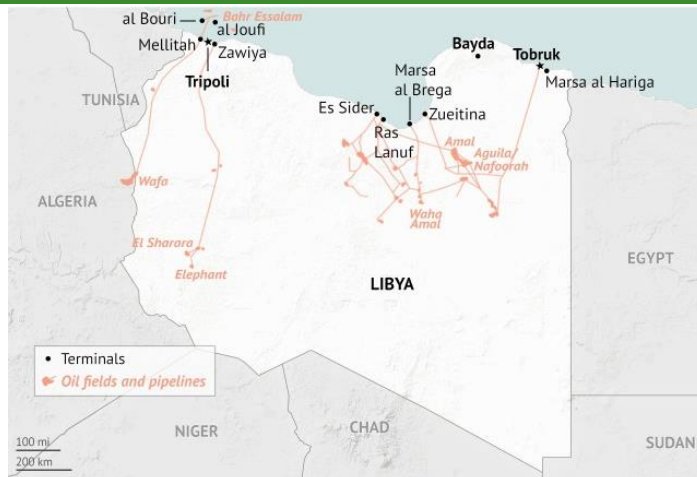
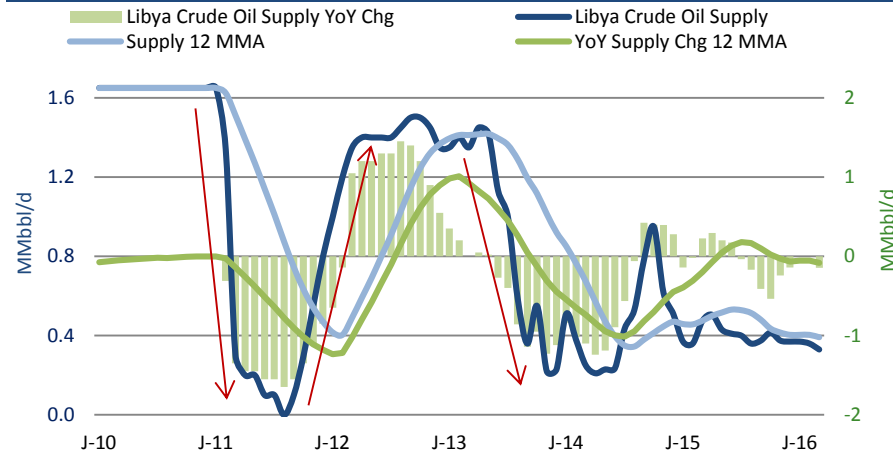


Venezuela Crude Oil Supply and YoY Change



2014's renewed civil war in Libya collapsed the country's oil production from a brief recovery post-revolution. Recent announcement of cooperation between Libya's NOC and the UN-backed unity government over the coordination of future oil sales is promising for a near-term return to ~1 MMbbl/d, although raises concern for curbing global oversupply. The Petroleum Facilities Guard is prepared to re-open ports for oil exports by the unity government, but the rival eastern government with its parallel NOC continues to fight over rights to sell oil independently.

Libya Crude Oil Supply and YoY Change

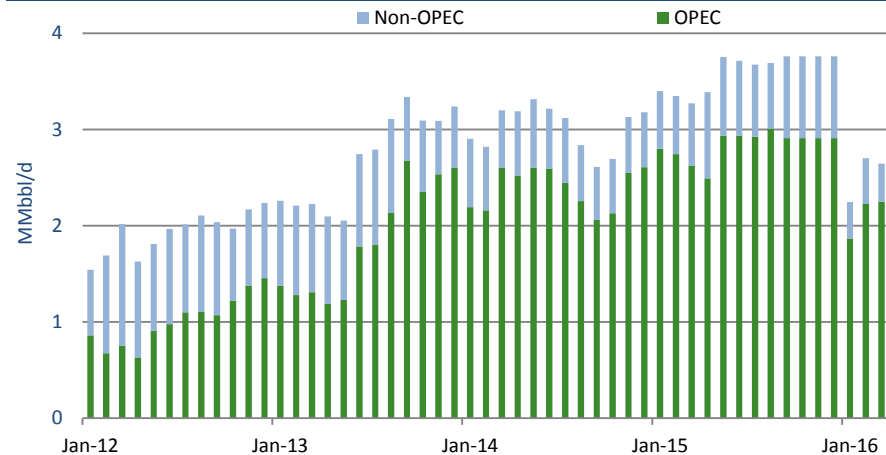


LIBYA'S KEY UPSTREAM OPERATORS

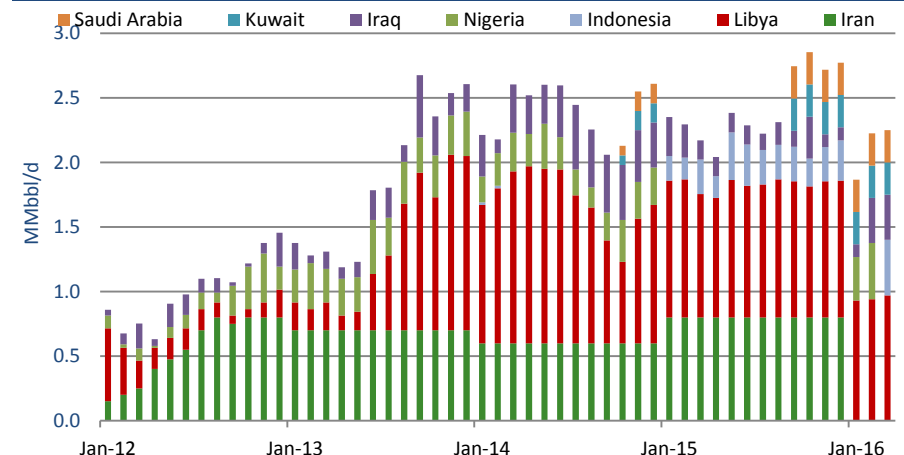
Name	Type	Estimated production	Estimated pre-war capacity	Main terminal(s)
Arabian Gulf Oil Company (Agoco)	Subsidiary	250,000 bpd	420,000 bpd	Marsa al Hariga, Ras Lanuf
Akakus Oil Operations	Joint venture with Repsol	0 bpd	370,000 bpd	Zawiya
Harouge Oil Operations	Joint venture with Petro-Canada	0 bpd	100,000 bpd	Ras Lanuf
Mabruk Oil Operations	Joint venture with Total	45,000 bpd	70,000 bpd	al Joufi, Es Sider
Mellitah Oil and Gas	Joint venture with Eni	45,000 bpd	300,000 bpd	al Bouri, Zueitina, Mellitah
Sirte Oil Co.	Subsidiary	50,000 bpd	60,000 bpd	Marsa al Brega
Waha Oil Co.	Subsidiary	0 bpd	350,000 bpd	Es Sider
Wintershall	Joint venture with Wintershall	0 bpd	90,000 bpd	Ras Lanuf
Zueitina Oil	Subsidiary	0 bpd	100,000 bpd	Zueitina

The level of unplanned crude oil production outages, how quickly it occurs, and the uncertainty of restoring the output have considerable influence on oil prices. Unplanned supply disruptions could still affect crude oil prices and OPEC surplus crude oil production capacity is at low levels (as a % of demand). However, the threshold that the market can bear has risen in light of robust global production and strong increases in inventory levels.

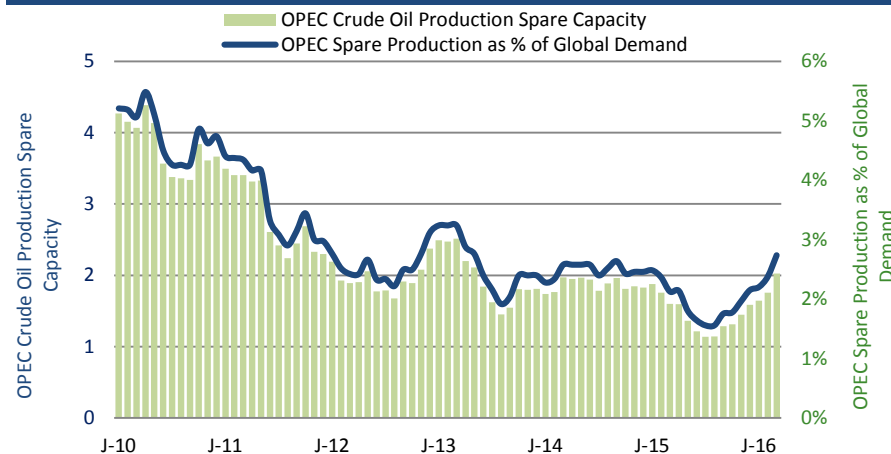
Unplanned Crude Oil Production Outages



Unplanned OPEC Crude Oil Production Outages

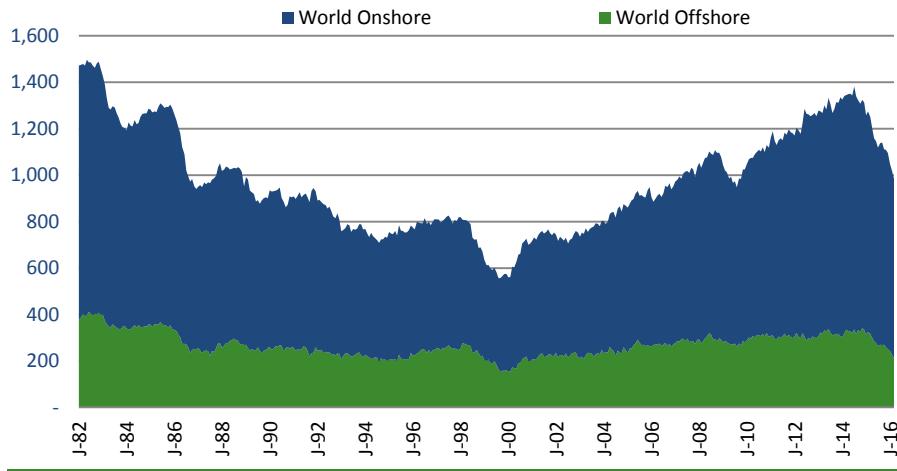


OPEC Crude Oil Production Spare Capacity

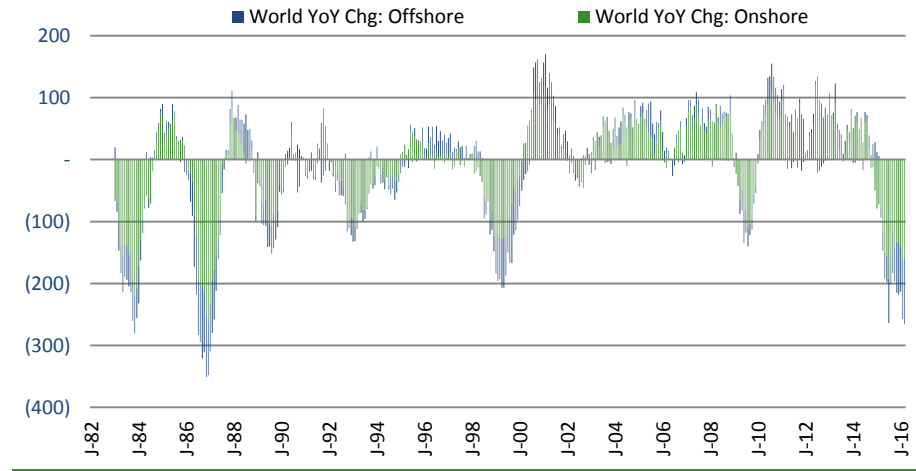


- OPEC spare capacity is the volume of production that can be brought on within 30 days and sustained for at least 90 days.
- OPEC spare capacity provides an indicator of the world oil market's ability to respond to supply shocks
- From 2003 through 2008, OPEC's total spare capacity remained near or below 2 MMbbl/d, which provided very little cushion for fluctuations in supply in a context of rapidly rising demand.

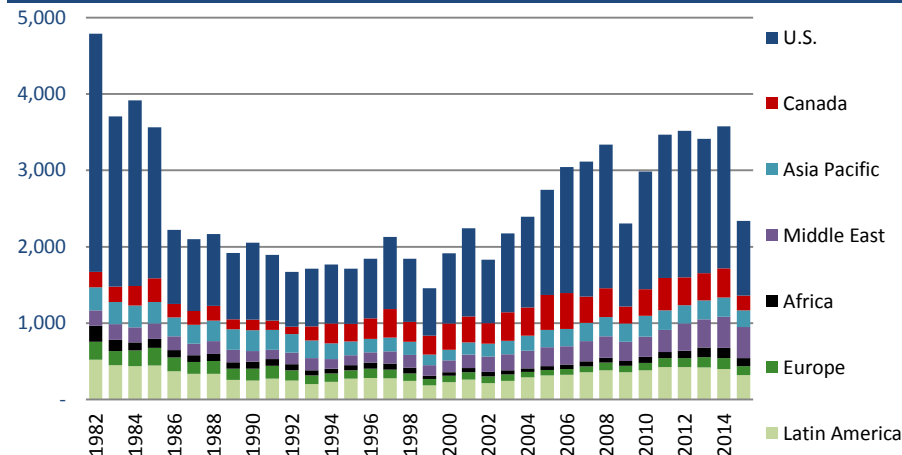
Global Rig Count: Onshore Vs. Offshore Excluding North America (1982 - 2016 YTD)



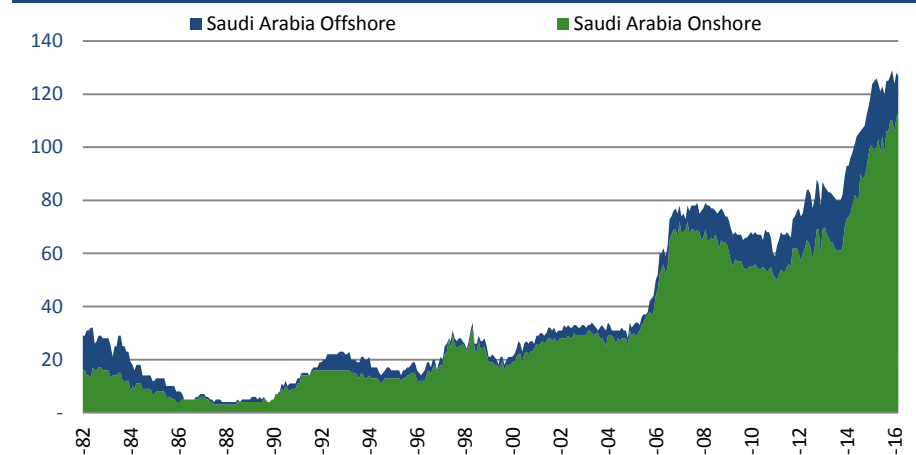
Global Rig Count YoY Chg: Onshore Vs. Offshore (1982 - 2016 YTD)



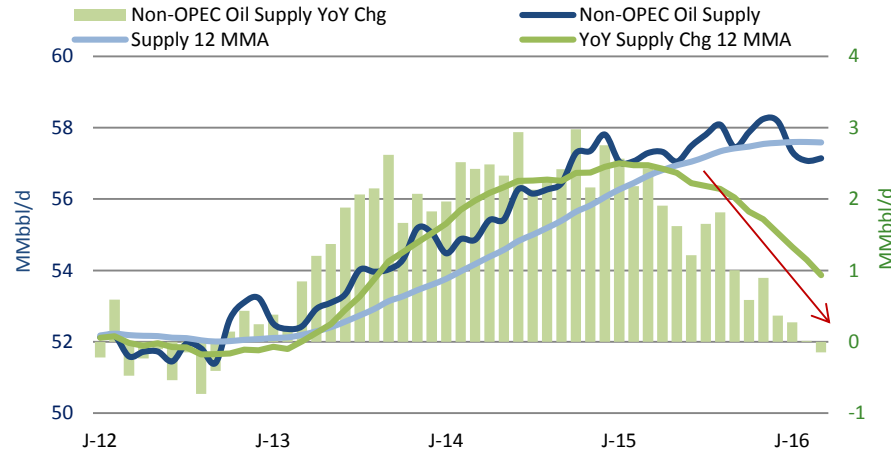
Global Rig Count by Region (1982 - 2015)



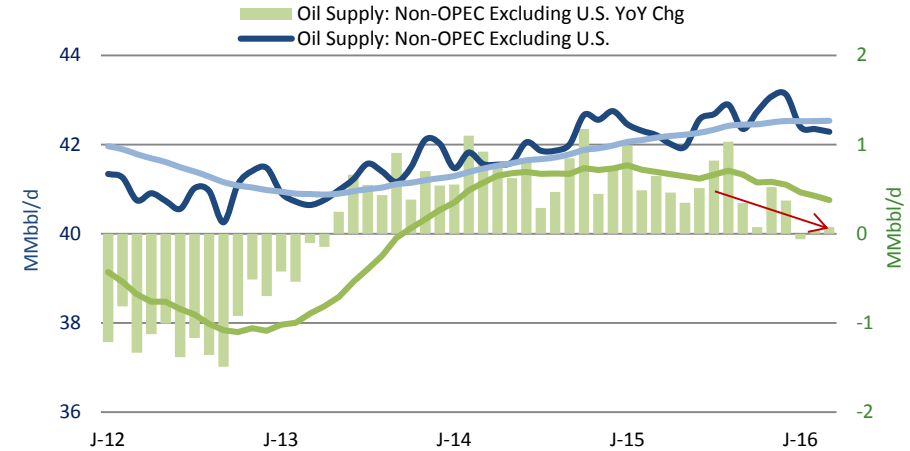
Saudi Arabia Rig Count: Onshore Vs. Offshore (Monthly 1982 - 2016 YTD)



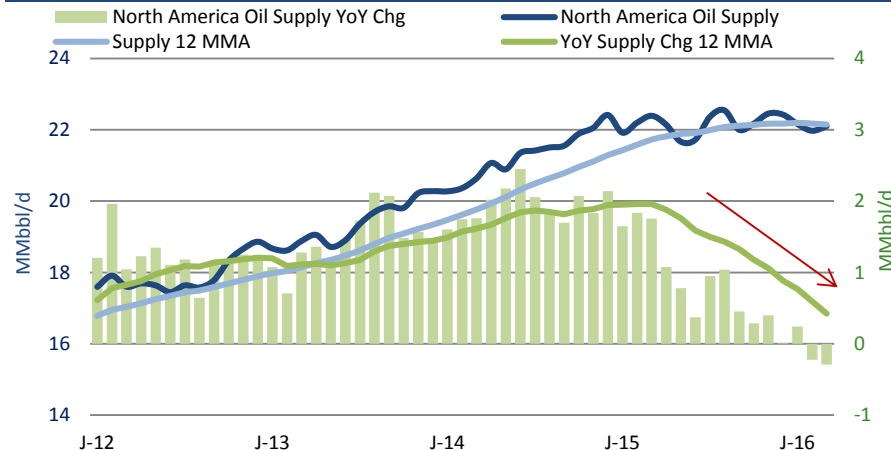
Non-OPEC Crude Oil and Liquid Fuels Supply



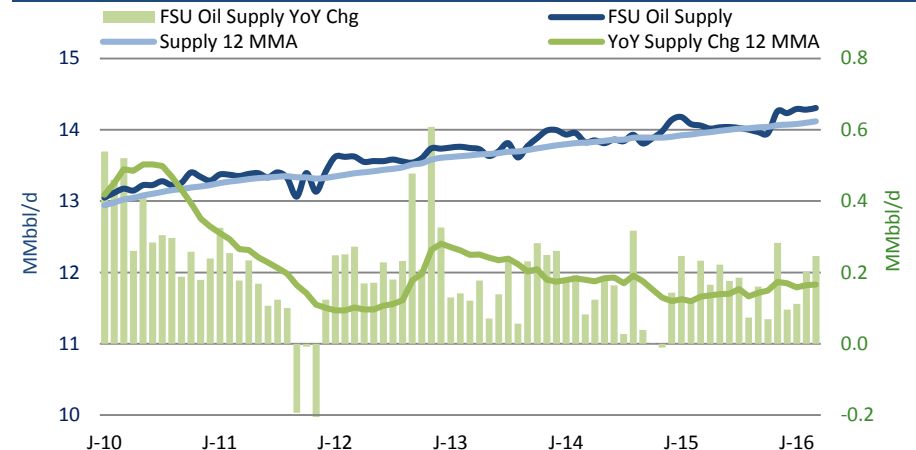
Non-OPEC Crude Oil and Liquid Fuels Supply Excluding US



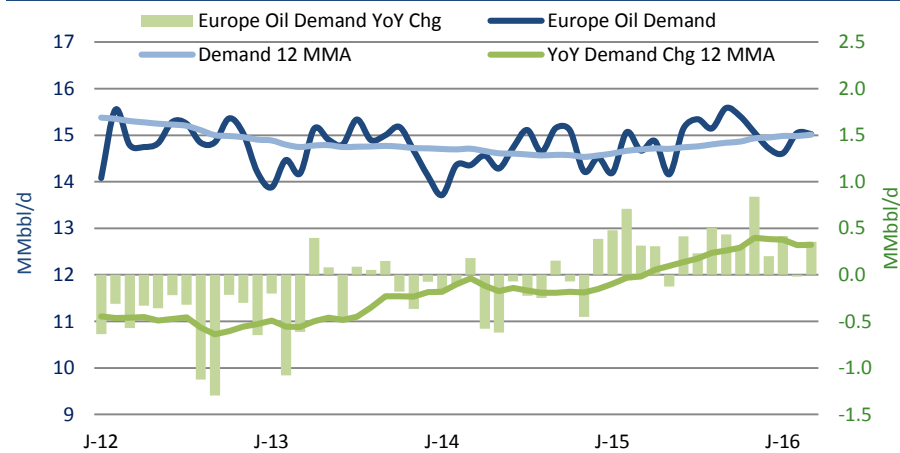
North America Crude Oil and Liquid Fuels Supply



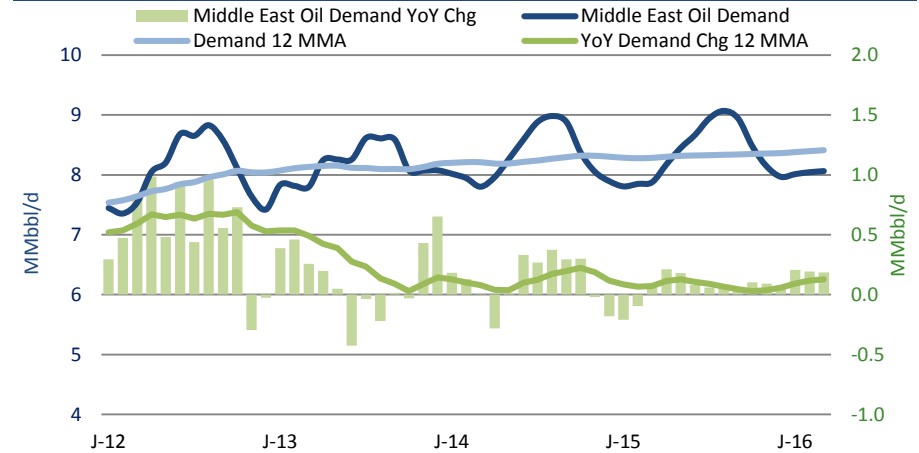
FSU Crude Oil & Liquid Fuels Supply



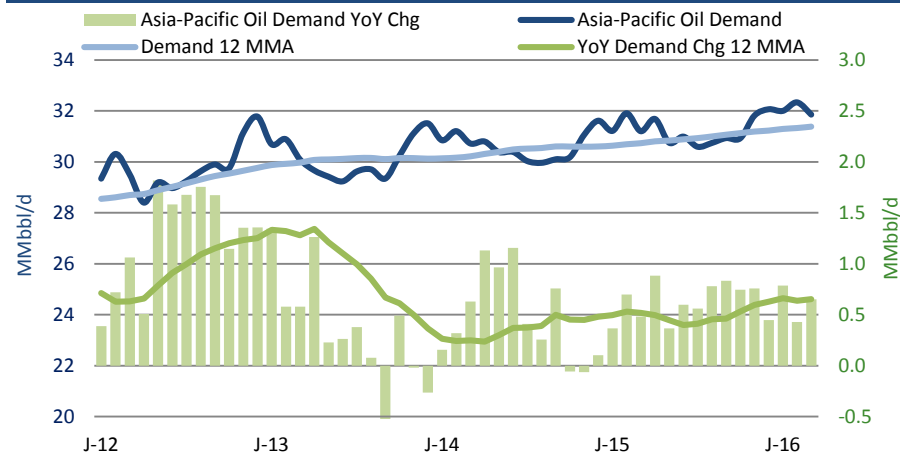
Europe Oil Demand YoY Change



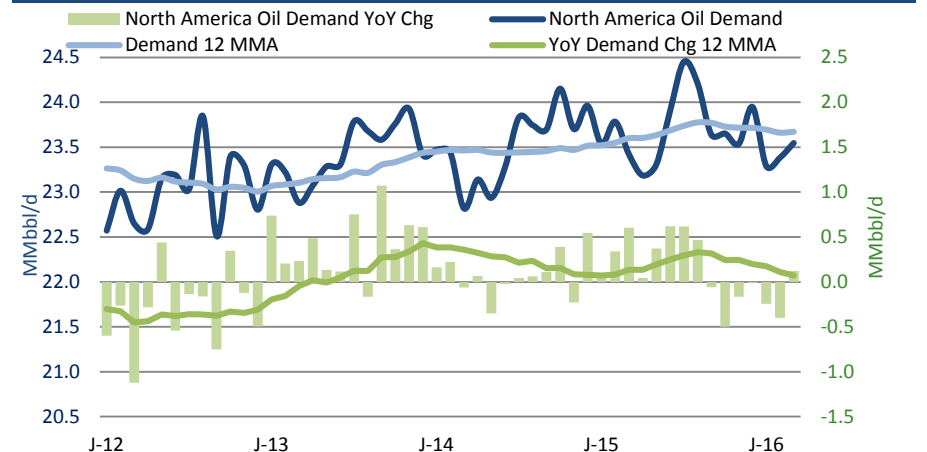
Middle East Oil Demand YoY Change



Asia-Pacific Oil Demand YoY Change

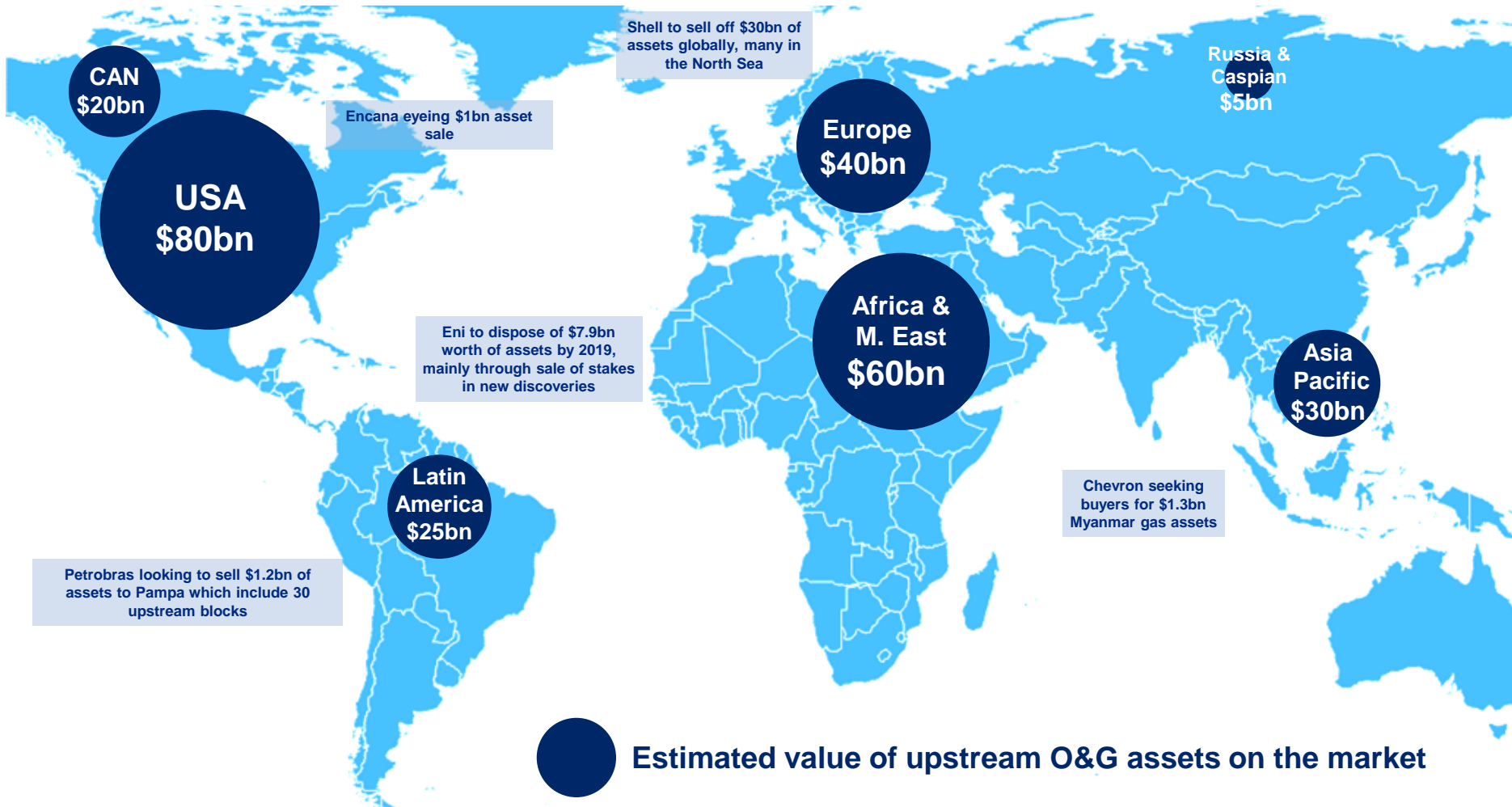


North America Oil Demand YoY Change



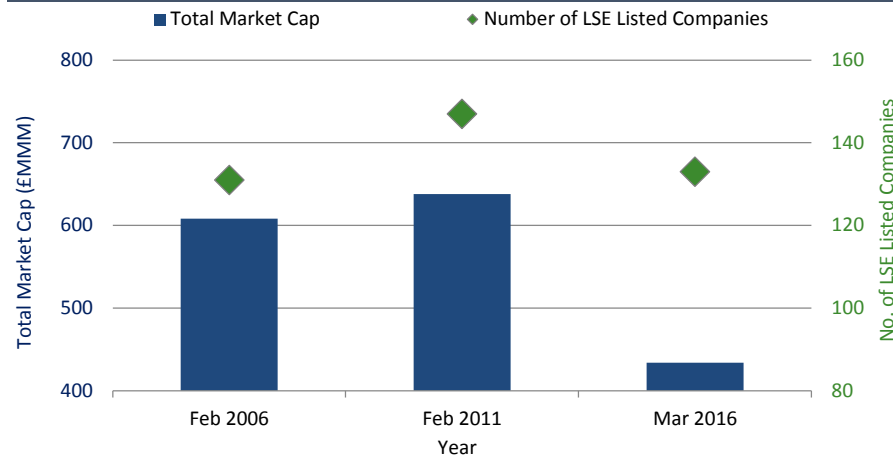
Summary of Sector Activity

Upstream O&G M&A activity dropped significantly in 2015 from 2014, and in Q1 2016 was the lowest since the start of the price downturn. The sudden oil price crash combined with high volatility has created a gap between seller and buyer expectations leaving many assets on the market. Wood Mackenzie's predict M&A activity to increase in 2016 regardless of oil price; with sustained low prices, smaller players will be forced into asset sales and if prices rise, buyers will jump to beat competitors.

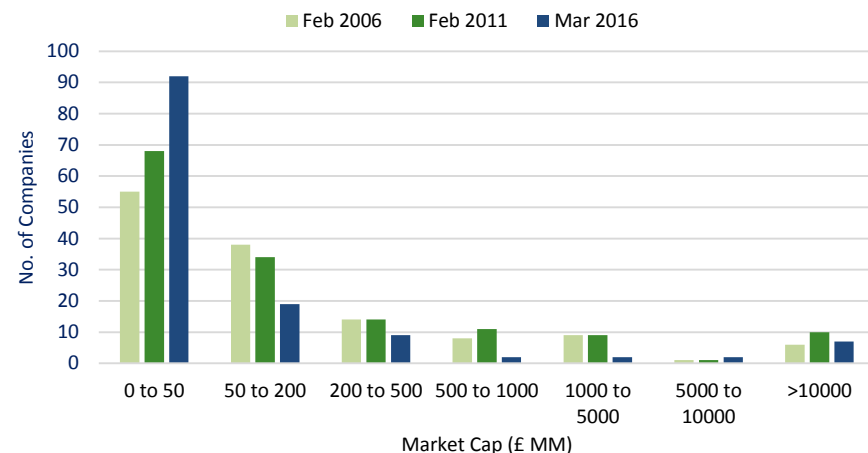


Oil sector equity valuations have experienced a significant drop in the current downturn but market value of integrated oil and gas has held up better and less volatile vs. oil price due to their financial strength. Analysis of LSE listed companies shows the significant drop in the sector market value that has occurred. Despite falling costs, Deloitte estimates that a third of oil producers are at risk of bankruptcy in 2016.

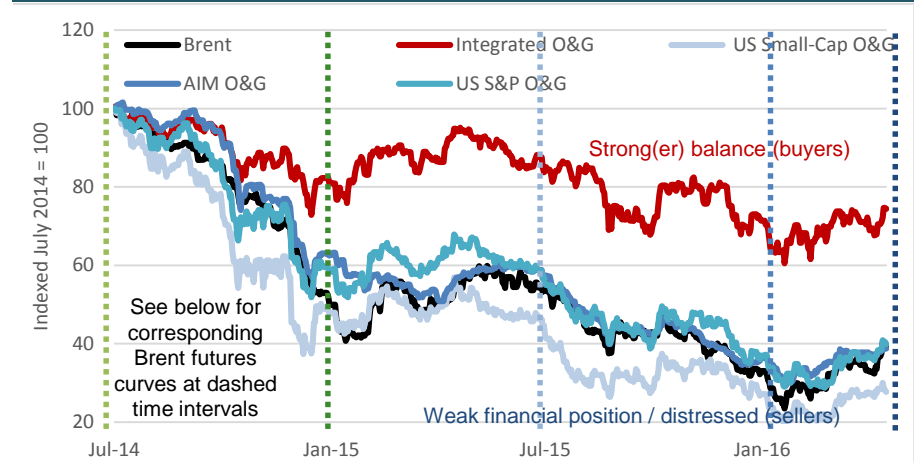
LSE Listed Oil and Gas Producers and Total Market Cap



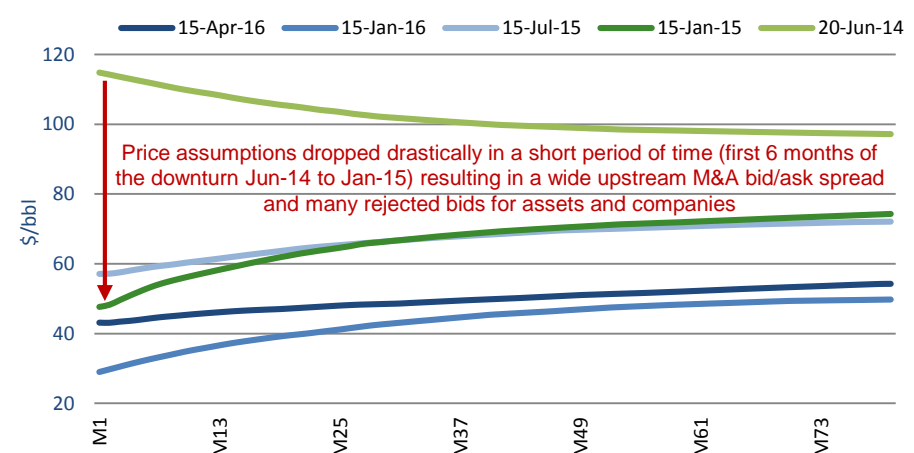
LSE Listed Oil and Gas Producers: Market Cap Distribution by Year



Brent Vs O&G Indices (Market Valuation of O&G Equities)

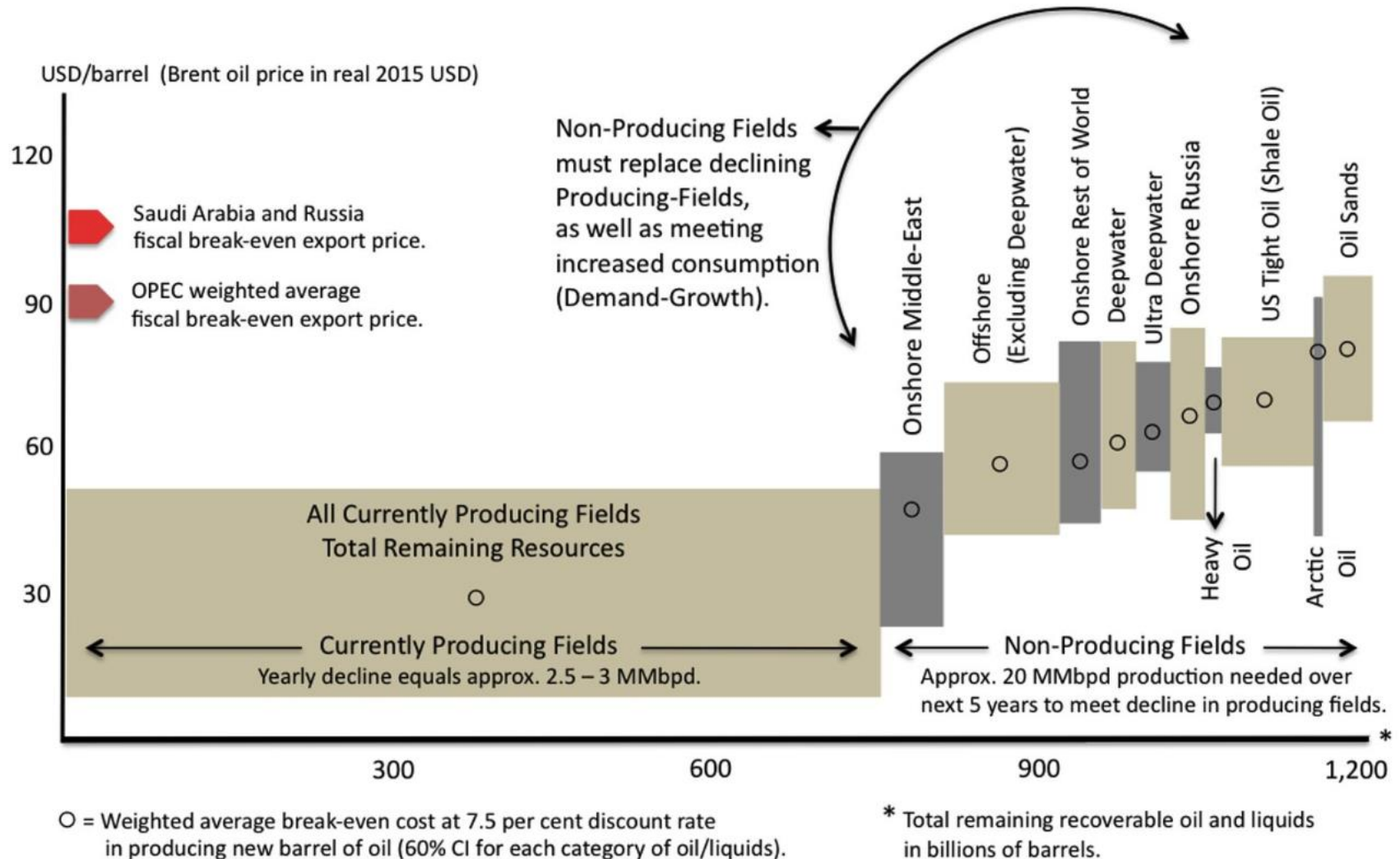


Brent Futures Curve: Jun-14 (peak), Jan-15, Jul-15, Jan-16 and current Apr-16



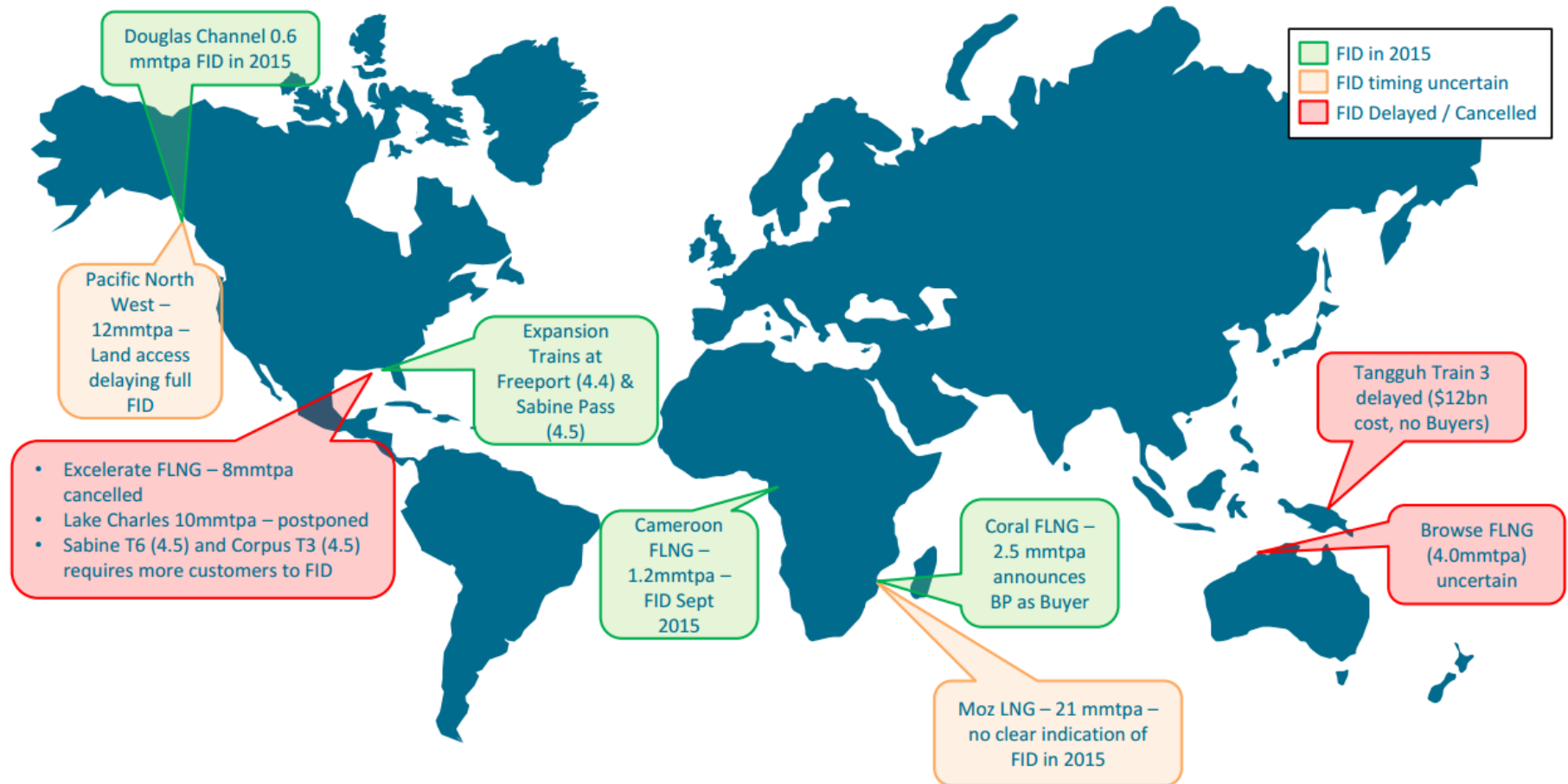
Future exploration to take place in areas where development makes economic sense.

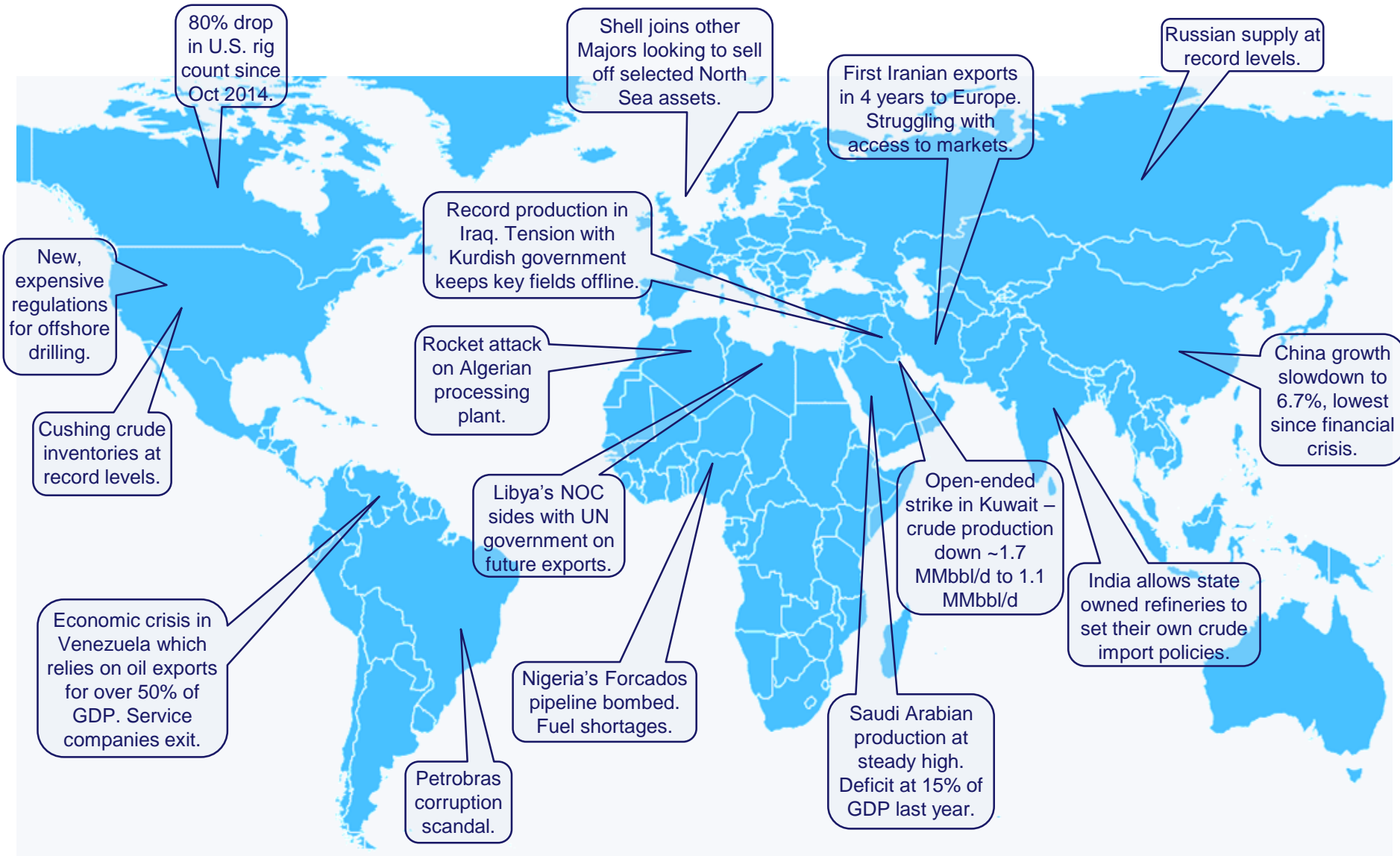
(Break-even is Brent crude oil price at which NPV equals zero at read discount rate of 7.50%)



In response to the decline in global oil and LNG prices, larger project planning originally to take FID in 2015 are delayed, struggling to find buyers or reengineering to smaller scale.

Expected reduction in Asian growth, price uncertainty and market sentiment of oversupply add to the woes for LNG projects.





\$	All dollar amounts are in U.S. dollars unless otherwise indicated.		
bbl	barrels	OPEC	Organisation of the Petroleum Exporting Countries. Its mandate is to "coordinate and unify the petroleum policies" of its members and to "ensure the stabilization of oil markets in order to secure an efficient, economic and regular supply of petroleum to consumers, a steady income to producers, and a fair return on capital for those investing in the petroleum industry. It's current members are Algeria, Angola, Ecuador, Iran, Iraq, Kuwait, Libya, Nigeria, Qatar, Saudi Arabia, the UAE, and Venezuela.
bbl/d	barrels per day	p	pence (GBp)
Brent	A blended crude stream produced in the North Sea region which serves as a reference or "marker" for pricing a number of other crude streams.	Real	Economic value that has been adjusted from a nominal value to remove the effects of general price level changes over time and is thus measured in terms of the general price level in some reference year (the base year e.g. 2013).
btu	British thermal unit	Spot Price	The price for a one-time open market transaction for immediate delivery of a specific quantity of product at a specific location where the commodity is purchased "on the spot" at current market rates.
chg	Change.	stb	stock tank barrels.
EIA	U.S. Energy Information Agency	WTI	West Texas Intermediate – a crude stream produced in Texas and southern Oklahoma which serves as a reference or "marker" for pricing a number of other crude streams and which is traded in the U.S. domestic spot market at Cushing, Oklahoma.
ERCE	ERC Equipoise Ltd.	YoY	Year-on-year (e.g. YoY Chg = year-on-year percentage change).
FSU	Former Soviet Union and includes Armenia, Azerbaijan, Belarus, Estonia, Georgia, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Moldova, Russia, Tajikistan, Turkmenistan, Ukraine and Uzbekistan.	YTD	Year-to-date.
IEA	International Energy Agency		
M	Month (e.g. 1M Ago = one month ago).		
MMbbl	million stock tank barrels.		
MMbbl/d	Million stock tank barrels per day.		
MMA	Month Moving average (12MMA = twelve month moving average).		
MMbtu	Million british thermal units		
MoM	Month-on-month (e.g. MoM Chg = month-on-month change).		
Nominal	Economic value expressed in historical nominal monetary terms, also known as "money-of-the-day".		
Therm	a unit of heat equal to 100,000 British thermal units and approximately the energy equivalent of burning 100 cubic feet of natural gas.		
OECD	The Organisation for Economic Co-operation and Development - an international economic organisation of 34 countries and		

About ERC Equipoise

Offshore and
onshore
projects in over
50 countries
worldwide



High standards in a cost-effective environment

ERC Equipoise (ERCE) is a privately owned Reservoir Evaluation company, specialising in all areas of upstream analysis. We offer a variety of services from independent reserve audits, to expert witness testimonials, to technical reservoir consulting including geophysical and geological modelling and reservoir simulation.

ERCE offers a wide range of advisory and technical services for clients, all focused on Reservoir Evaluation.

Our experience in selecting the appropriate tools for the project, and our ability to draw upon our associated professionals and companies ensures that ERCE provides high standard work in a cost-effective environment.

Our Reservoir Evaluation Services can be broken down into eight main categories:

Headquartered in London, ERCE provides consulting services for an international client base, analysing assets spanning the globe. Our team is made up of Professional Engineers, Petrophysicists, Geophysicists, Geologists, Economists and associated experts with experience in operations, consulting, academia and investment banking.

- **Exploration and Appraisal**
- **Field Simulation, Development and Management**
- **Reserves and Resources Auditing**
- **Valuation and Equity**
- **Depth Modelling and Uncertainty**
- **Quantitative Geophysics**
- **Data Services**
- **Expert Witness**

www.ercequipoise.com

Stronger together

ERCE was created in 2010, when ERC Energy Resource Consultants Ltd (ERC) and Equipoise Solutions Ltd (Equipoise) merged.

ERC and Equipoise had a long history of technical cooperation and partnership. Their association dates to the re-launch of ERC in 2003, and even further back to the 1980s when David Wilson and Simon McDonald of the original ERC worked with Don Scott of Scott Pickford Group on the privatisations of BritOil, Enterprise Oil and British Gas.

After years of working together, the Directors of ERC and Equipoise felt that an integrated model would strengthen the technical team and offer opportunities to build upon the combined company's strengths.

A brief history of the two companies prior to their merger in 2010 is shown below.

ERC Energy Resource Consultants Ltd

1977	1977-1994	1994	2003	2003-2010
ERC co-founded by David Wilson.	ERC becomes the UK's premier independent reservoir evaluation company and a leader in the development of UK reserves reporting regulations.	ERC acquired by PGS and the brand name retired.	ERC relaunched by David Wilson and Simon McDonald.	ERC provides reservoir evaluation consulting services to the international petroleum industry.

2010
ERC Equipoise formed; resulting in a completely integrated international sub-surface consultancy.

Equipoise Solutions Ltd

1998-2010
Don Scott, Mark Holliday and Charles Wood form Equipoise Solutions Ltd, and are leaders in the transition from mainframe to desktop G&G projects. In partnership with SMT, Equipoise brings Kingdom to the UK and Libya. The firm is a leader in Unithesis and Equity disputes.



Global expertise...

UNITED KINGDOM

Since our Director's work on the privatisation of the UK oil and gas industry, ERCE gas has been involved in all aspects of the UK Energy Sector. Our recent projects include conventional onshore and offshore evaluations, RBL studies, shale gas studies and CO₂ sequestration modelling.

EUROPE

In addition to conventional projects we have had experience in many unusual projects including: Polish tight gas, fractured volcanic reservoirs in Croatia, representation in the International Court in the Hague and Arctic Exploration.

MIDDLE EAST

Our management team has managed assets in the Middle East throughout the past 35 years. Since 2005, we have been at the forefront of providing technical and commercial evaluation in the Northern Iraqi region of Kurdistan.

FAR EAST

Our principals have worked extensively in Asia for major operators. We are currently engaged in detailed subsurface support studies, audits for year end reporting and M&A studies. Highlights include involvement in the Cairn Rajasthan discoveries, India licence rounds, Soco TGT field development planning, and cross-border utilisation advisory services.

NORTH AFRICA

A key challenge in this region is fractured reservoirs. We have completed static models, simulation models, field development plans and M&A studies for such reservoirs across Algeria, Tunisia and Libya. Beyond the more conventional reservoir studies, we have also undertaken deep-water exploration projects and studies involving the application of advanced technologies.

WEST AFRICA

We are one of the few firms who have been continuously involved in the full lifecycle of asset evaluation, development and commercialisation throughout the whole length of the West African Passive Margin. Of particular note is our role as Tullow Auditors since 2003.

EAST AFRICA

From the early days of exploration in Sudan through to the most recent Rift Valley oil and Mozambique/Tanzania gas discoveries, we have provided considered advisory and technical support - recognising the unique challenges regarding appraisal, development and commercialisation in the region.

Offshore
and onshore
projects in over
50 countries
worldwide

Our partners

Reservoir Evaluation is a complex task, requiring specialists experienced in a variety of topics including Reservoir Engineering, Geophysics, Geology, Petrophysics, Facilities Design and Costing together with Economics.

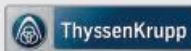
Over the years, ERC Equipoise has developed strong relationships with a number of expert companies and independent consultants in the petroleum industry. These companies and individuals are seconded onto our teams during project execution, working seamlessly to ensure that our clients have access to the specialist knowledge required to properly evaluate their assets.



We combine our regional subsurface knowledge of Europe, Africa and the Near and Far East with GLJ's experience in the North and South American Unconventional fields.



We work closely with this established earth science consultancy characterising the fractured reservoir and incorporating their analysis into ERCE models.



Providing conceptual and, where required, front end engineering project input to ERCE projects in the areas of field development planning and facilities and field cost assessment.

Associate Consultants

ERCE has long standing relationships with numerous independent consultants, many of whom are prominent in their field of expertise, in the areas of Reservoir Engineering, Petrophysics, Geoscience, Economics and Facilities Engineering.

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