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The Oil Manual | Global

Three Observations on the Oil Price Sell-Off

Oil market fundamentals have weakened in recent weeks, justifying much - but not all - of the recent oil price correction. Expectations about an OPEC production cut are building but the likelihood should not be overstated and it may not have the desired effect.

#1 Oil market fundamentals have weakened in recent weeks: Oil markets have been undersupplied during most of 2017 and 1H18. So when Iranian sanctions were reintroduced, with the US government vocal about its aim to reduce Iranian crude and condensate exports to zero, this created expectations of an exceptionally tight oil market during 4Q18.

By mid October however, several trends emerged that were no longer consistent with a strong market outlook. Refining margins were squeezed severely, time spreads weakened and inventories stopped drawing - we highlighted this in [Passing Clouds over the Oil Market](#) (19 Oct). Since then, production data from major producers has come in far stronger than expected. The US, Saudi Arabia, Russia and the UAE all reached record levels of production in recent months, all at the same time. On top, the US government ended up giving more waivers to importers of Iranian oil than expected.

In early October, the consensus view was still that already-low inventories would draw further in 2019. Several OPEC oil ministers have recently raised the possibility of OPEC production cuts to prevent stocks from building. Over the period of just a few weeks, the outlook for the oil market in 2019 has deteriorated materially.

#2 This justifies most - but not all - of the recent oil price correction: Inventories correlate poorly with spot prices but have a stronger relationship with time spreads (i.e. the slope of the forward curve). Over the last few weeks, the Brent futures curve has moved from backwardation into a contango structure, with the spread between the 1st vs 12th month contract now in negative territory. This reflects the weakening of the physical supply/demand balance discussed above.

After some adjustments (for interest rates, the strength of the USD and volatility), time spreads and spot prices are correlated (see [Regime Change in the Oil Market](#) for discussion). [Exhibit 1](#) shows the relationship between the adjusted 1-12 month time spreads and Brent spot prices over much of the last decade. The trajectory since the 3 Oct when Brent reached \$86/bbl is also shown in this exhibit.

This analysis shows that much of the correction has been orderly. At current time spreads, the Brent spot prices would historically have been in the range....*continued overleaf*

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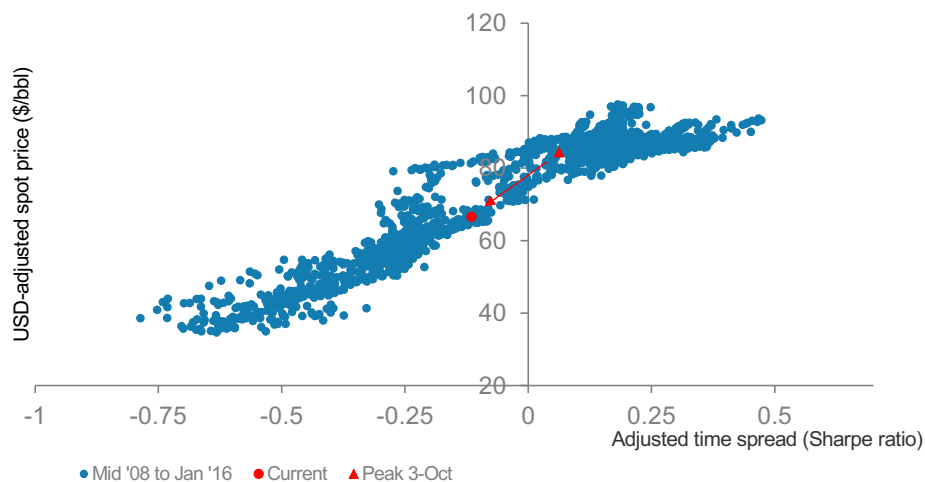
of \$64-81/bbl, with an average of \$70/bbl. This suggests that approximately three-quarters of the \$20/bbl move down from the peak has been consistent with the weakening in time spreads which tend to reflect fundamentals.

The last \$4-5/bbl of this correction however, is harder to rationalise. As oil futures moved lower on Tuesday, options-implied volatility spiked strongly. It is likely that this will have caused a positive feedback loop in systematic derivatives trading strategies where selling begets more selling, ultimately creating the sharp correction seen on Tuesday. That move no longer reflects fundamentals, in our view.

It may be premature to call a bottom, but the same forces that drove the last \$5 lower can also work on the way up. With Iranian barrels only coming off the market from November and global refiners coming out of maintenance, our base case is that oil price find firmer footing towards year-end. Our Brent forecast for year-end currently stands at \$77.50/bbl which we are leaving unchanged for now.

Exhibit 1: Time spreads and spot prices have deteriorated in tandem, maintaining their historic relationship. This reflect that the majority of the correction in Brent prices from the peak has been orderly and consistent with weakening fundamentals.

Brent crude oil: time spread vs flat price (\$/bbl)



Source: Bloomberg, Morgan Stanley Research

#3 A production cut by OPEC may not be the right decision: The sharp correction in oil prices has also raised expectations about OPEC announcing a production cut at their upcoming meeting on 6 Dec. Earlier today, OPEC's president, U.A.E. energy minister Suhail Al Mazrouei, said "We have cut in the past to reach market balance, and if we need to cut production to keep the market balanced, we will." Yet, an OPEC cut is not a foregone conclusion. We see two issues:

First, there is an imbalance in the oil market that is not addressed by an OPEC cut. At the moment, there is a glut of light-sweet crude, whilst medium and heavier are in much shorter supply and actually trading strongly. The main oil price benchmarks - Brent and

WTI - are both light-sweet crudes and reflect this glut. OPEC production cuts are usually implemented by removing medium and heavier barrels from the market but that does not address the oversupply of light-sweet. Therefore, OPEC cuts may have a more muted effect on the benchmarks that are widely tracked.

Second, OPEC cuts have historically been most successful when they address a temporary imbalance or accelerate a rebalancing that is already taking place. The experience of the 1980s has taught that OPEC tends to struggle with structural oversupply. The reason for this is straightforward: OPEC cuts are inherently temporary – all they can do is shift production from one period to another. When faced with excess supply of a structural nature, production cuts can support oil prices for a while, but this stores up problems for the future. At some point, the price signal needs to do its work to rebalance the oil market.

This is why OPEC did not cut at the meeting in Nov 2014, as it was faced with supply that was structurally growing too strongly. Yet, this was also the reason why they did cut in 2016. By that time, upstream capex was already cut in half, rigs counts were down sharply and US production was in decline. Under those circumstances, the OPEC cut simply accelerated a rebalancing that was already taking place.

At the moment, the supply situation arguably looks more like late 2014 than late 2016, with shale production meeting the majority of global oil demand growth once again. Still, OPEC may decide to cut nonetheless. That would probably put a floor under prices for a while but it's unclear what that achieves in the medium term.

The curious case of the 1986 comparison

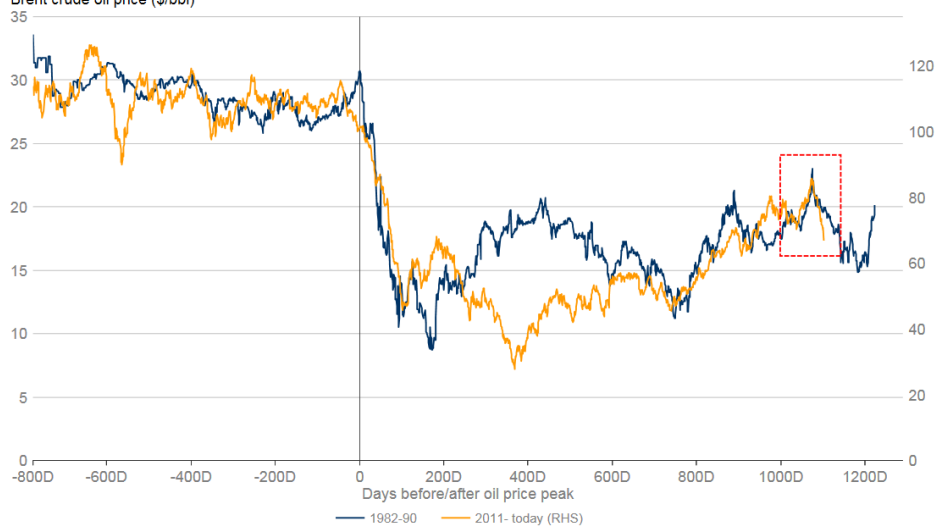
In recent years, we have often highlighted the similarities between the oil price collapse of 2014/15 with the one that occurred in 1985/86. The chart below shows that the speed and magnitude of the decline was similar in both periods. This comparison broke down in late 2015/early 2016 when Brent prices went lower than the 1980s trajectory suggested.

Both time series reconnected again in early 2017 and have followed a remarkably similar path since then. Even the recent surge to \$86/bbl occurred a similar ~1,100 days after the collapse in both occasions. There is little that can actually be derived from this, although it holds one lesson: it is not our base case but we should keep an open mind about the possibility of a sell-off to \$60.

Exhibit 2: 2011-today compared to 1982-90

How the last few years compares to mid-1980s...

Brent crude oil price (\$/bbl)



Source: Thomson Reuters Datastream, Morgan Stanley Research

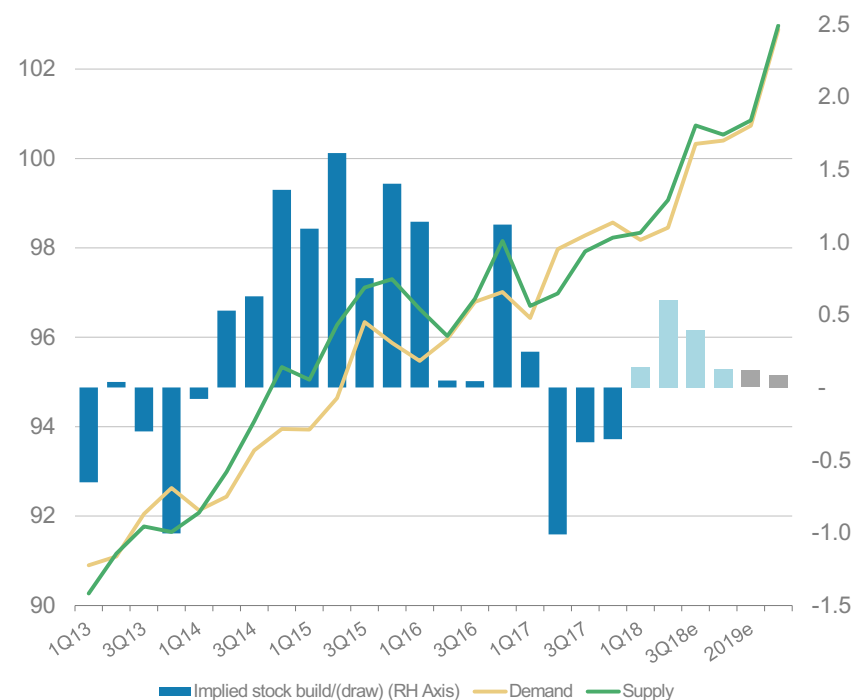
Source: Refinitiv, Morgan Stanley Research

Exhibit 3: Global Balance Summary (mmb/d)

	2017						2018						YoY Change		YoY Change		
	2016	1Q17	2Q17	3Q17	4Q17	2017	1Q18	2Q18	3Q18	4Q18	2018	2019	2020	2017	2018	2019	2020
Demand	96.3	96.4	98.0	98.3	98.6	97.8	98.2	98.5	100.3	100.4	99.3	100.7	102.9	1.5	1.5	1.4	2.1
OECD	46.9	46.9	47.0	47.6	48.0	47.4	47.8	47.1	48.1	48.4	47.8	48.1	48.9	0.4	0.5	0.3	0.8
US 50	19.7	19.5	20.1	20.0	20.2	20.0	20.2	20.3	20.7	20.4	20.4	20.7	21.0	0.3	0.5	0.2	0.4
Euro 5	8.1	8.2	8.3	8.4	8.2	8.3	8.2	8.2	8.2	8.3	8.2	8.2	8.4	0.1	-0.1	0.0	0.2
Non-OECD	49.4	49.6	51.0	50.7	50.5	50.4	50.4	51.4	52.3	52.0	51.5	52.7	54.0	1.1	1.1	1.1	1.4
China	12.0	12.4	12.9	12.3	12.7	12.6	12.7	13.0	13.5	13.5	13.2	13.7	14.3	0.6	0.6	0.5	0.6
India	4.4	4.5	4.7	4.4	4.7	4.6	4.8	4.9	4.5	4.9	4.8	4.9	5.1	0.1	0.2	0.1	0.1
Non-OPEC Supply	57.1	57.5	57.5	58.0	58.7	57.9	59.1	60.0	61.2	61.2	60.4	62.1	63.8	0.8	2.4	1.8	1.7
US	12.5	12.7	13.0	13.2	14.1	13.3	14.4	15.1	16.0	16.2	15.4	16.8	18.2	0.8	2.1	1.4	1.4
Canada	4.5	4.9	4.5	4.9	5.0	4.8	5.2	5.0	5.1	5.2	5.1	5.2	5.1	0.3	0.3	0.1	0.0
Russia	11.3	11.5	11.3	11.3	11.3	11.4	11.3	11.4	11.6	11.8	11.6	11.9	12.0	0.0	0.2	0.3	0.1
OPEC NGLs/Condensates	6.8	6.9	6.9	6.9	6.8	6.9	6.9	6.9	7.0	6.9	6.9	6.9	6.9	0.1	0.1	-0.1	0.0
Call on OPEC Crude	32.4	32.1	33.6	33.3	33.0	33.0	32.2	31.5	32.2	32.3	32.1	31.7	32.1	0.6	-0.9	-0.3	0.4
OPEC Crude	33.0	32.3	32.6	33.0	32.6	32.6	32.3	32.1	32.6	32.5	32.4	31.8	32.2	-0.4	-0.2	-0.5	0.4
Implied stock build/(draw)	0.6	0.2	-1.0	-0.4	-0.4	-0.4	0.1	0.6	0.4	0.1	0.3	0.1	0.1	-1.0	0.7	-0.2	0.0

Source: EIA, IEA, Rystad, Morgan Stanley Research estimates (2018-20)

Exhibit 4: Global Balance (mmb/d)



Source: EIA, IEA, Rystad, Morgan Stanley Research estimates (e)

Oil Price Forecasts

Exhibit 5: Bull, base, and bear case estimates for Brent and WTI at end of period

(\$/bbl)	WTI		
	Bear case	Base case	Bull case
4Q18	58.5	68.5	78.5
1Q19	58.5	68.5	78.5
2Q19	58.5	68.5	78.5
3Q19	58.5	68.5	78.5
4Q19	61.0	71.0	81.0
1Q20	67.0	77.0	87.0
2Q20	67.0	77.0	87.0
3Q20	67.0	77.0	87.0
4Q20	67.0	77.0	87.0
LT	54.0	64.0	74.0

(\$/bbl)	Brent		
	Bear case	Base case	Bull case
4Q18	67.5	77.5	87.5
1Q19	67.5	77.5	87.5
2Q19	67.5	77.5	87.5
3Q19	67.5	77.5	87.5
4Q19	70.0	80.0	90.0
1Q20	75.0	85.0	95.0
2Q20	75.0	85.0	95.0
3Q20	75.0	85.0	95.0
4Q20	75.0	85.0	95.0
LT	60.0	70.0	80.0

Source: Morgan Stanley Research estimates

Exhibit 6: Price forecast chart for Brent

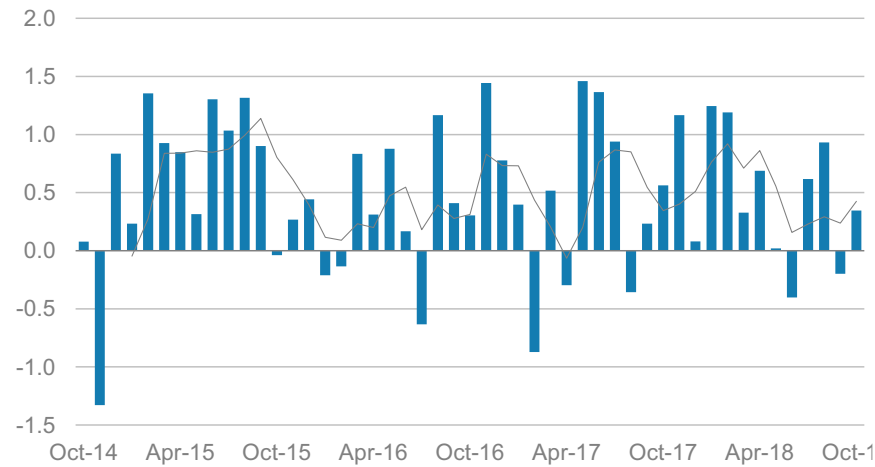
Brent price target (\$/bbl)



Source: Morgan Stanley Research estimates

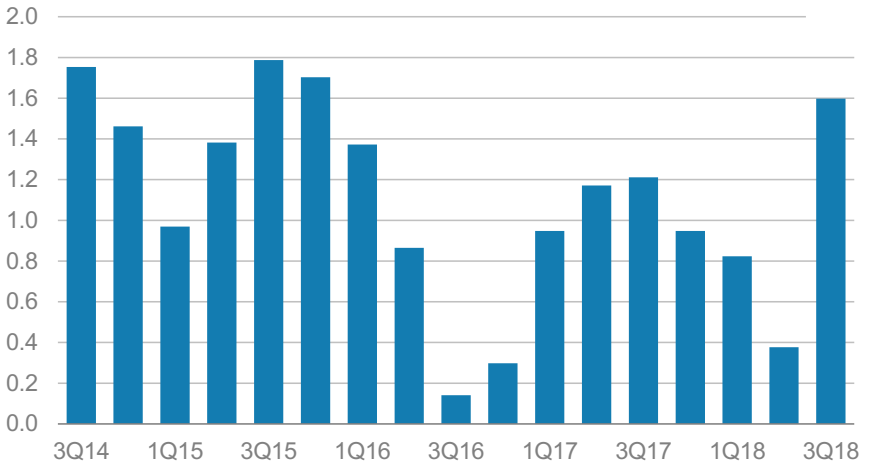
Supply – Demand Overview

Exhibit 7: OECD Demand Growth (annual, mmb/d)



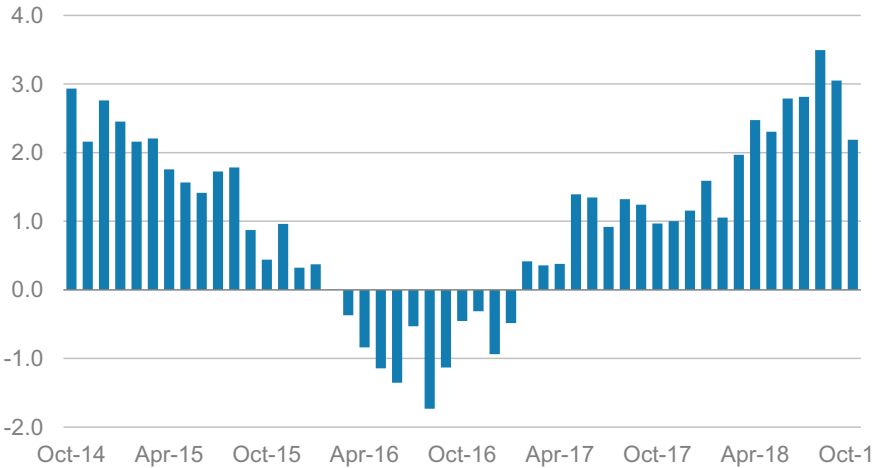
Source: IEA

Exhibit 8: Non-OECD Demand Growth (annual, mmb/d)



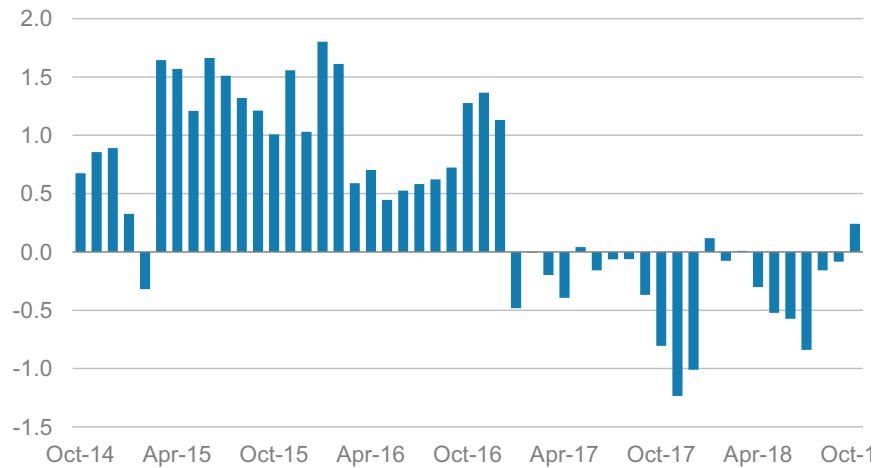
Source: IEA

Exhibit 9: Non-OPEC Supply Growth (annual, mmb/d)



Source: IEA

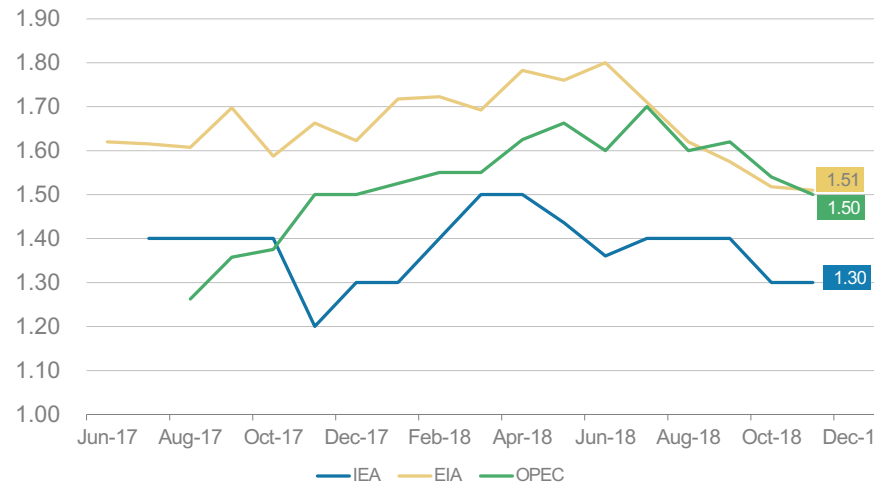
Exhibit 10: OPEC Supply Growth (annual, mmb/d)



Source: IEA

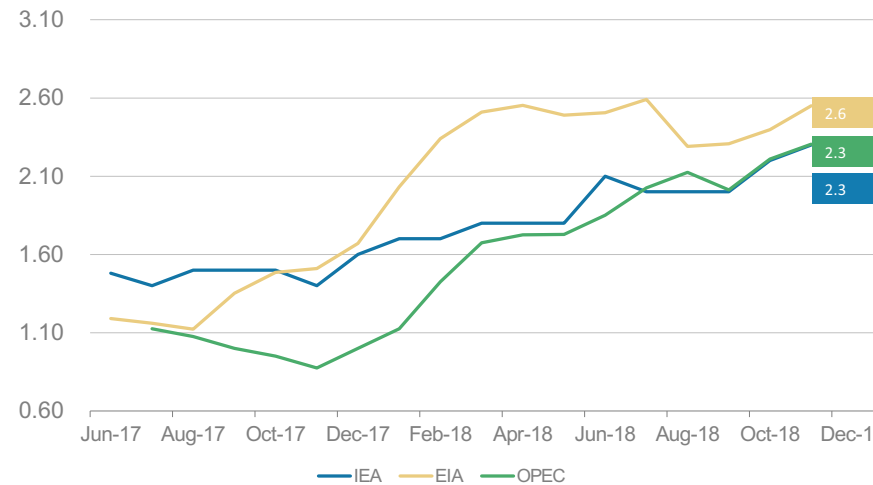
Key Agency Revisions (2018)

Exhibit 11: Oil Demand Growth 2017-18 (mmb/d)



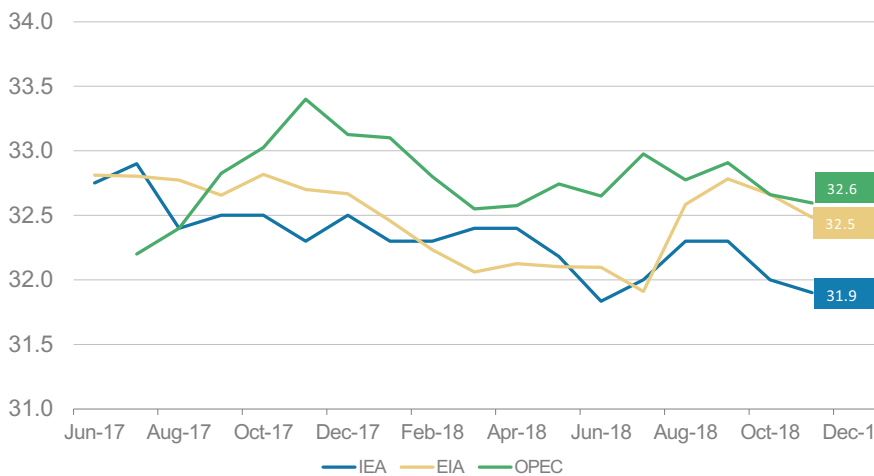
Source: EIA, IEA, OPEC

Exhibit 12: Non-OPEC Supply Growth 2017-18 (mmb/d)



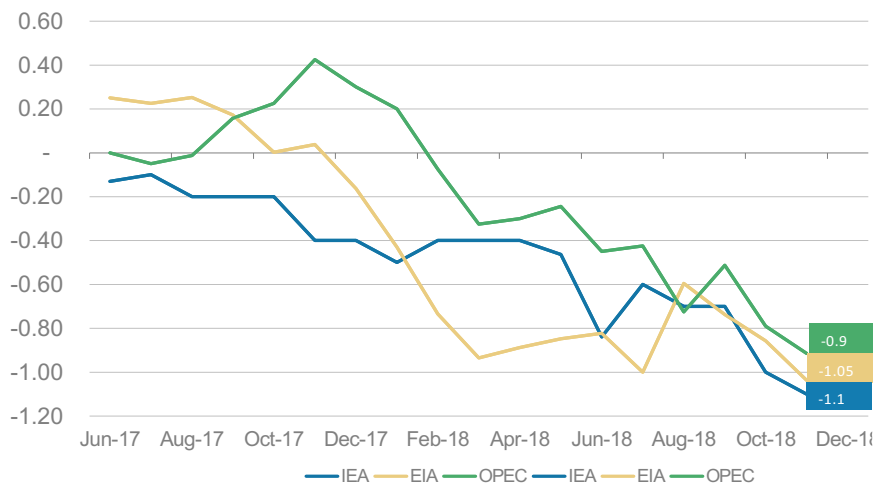
Source: EIA, IEA, OPEC

Exhibit 13: Call on OPEC 2018 (mmb/d)



Source: EIA, IEA, OPEC

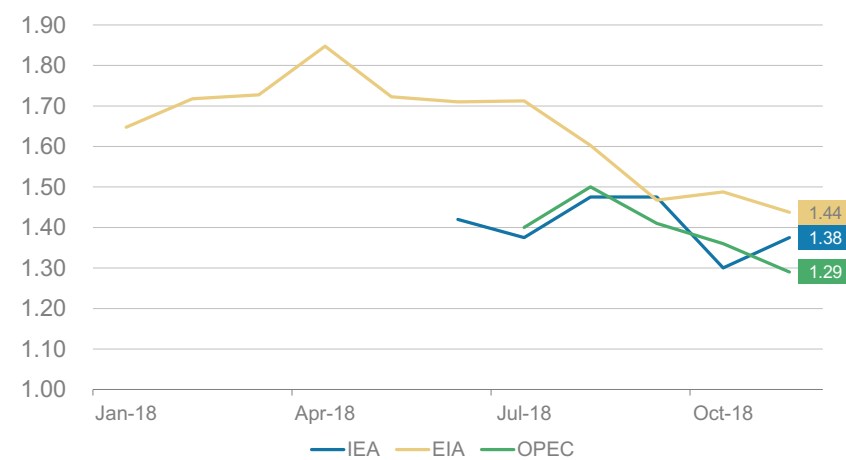
Exhibit 14: Change in the Call on OPEC 2017-18 (mmb/d)



Source: EIA, IEA, OPEC

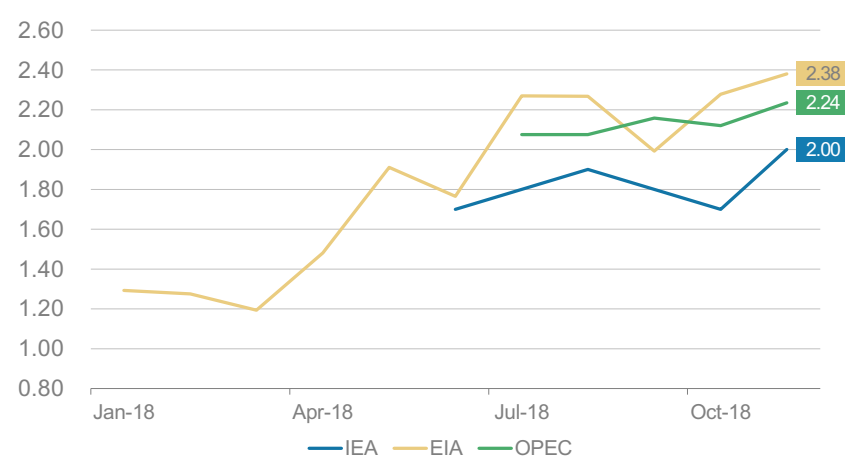
Key Agency Revisions (2019)

Exhibit 15: Oil Demand Growth 2018-19 (mmb/d)



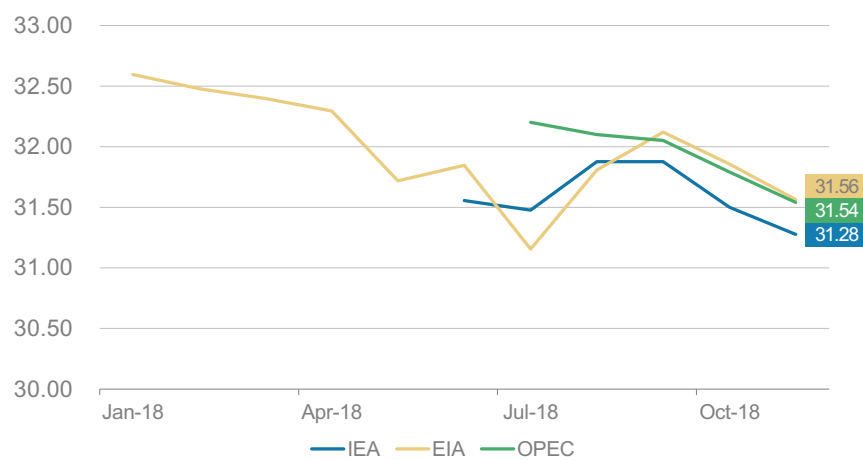
Source: EIA, IEA, OPEC

Exhibit 16: Non-OPEC Supply Growth 2018-19 (mmb/d)



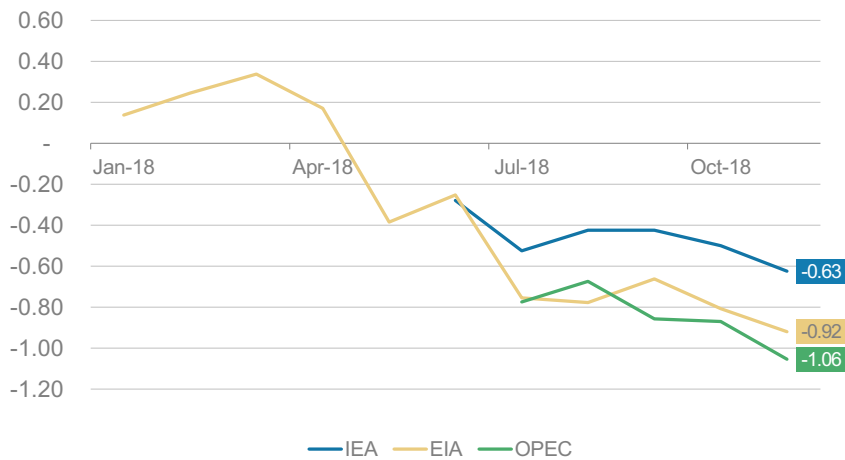
Source: EIA, IEA, OPEC

Exhibit 17: Call on OPEC 2019 (mmb/d)



Source: EIA, IEA, OPEC

Exhibit 18: Change in the Call on OPEC 2018-19 (mmb/d)



Source: EIA, IEA, OPEC

Prices & Differentials

Exhibit 19: Crude Prices (\$/bbl)



Source: Bloomberg

Exhibit 21: Brent vs. WTI (\$/bbl)



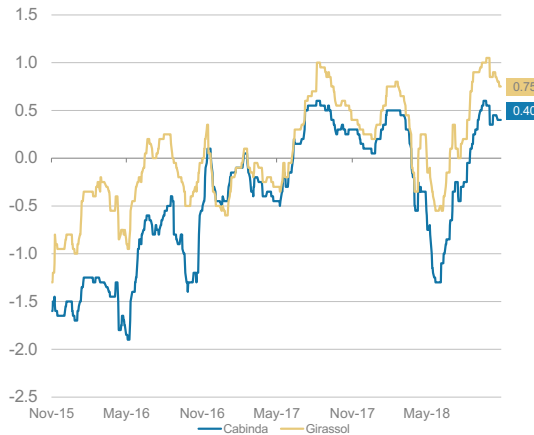
Source: Bloomberg

Exhibit 23: Brent vs. Dubai (\$/bbl)



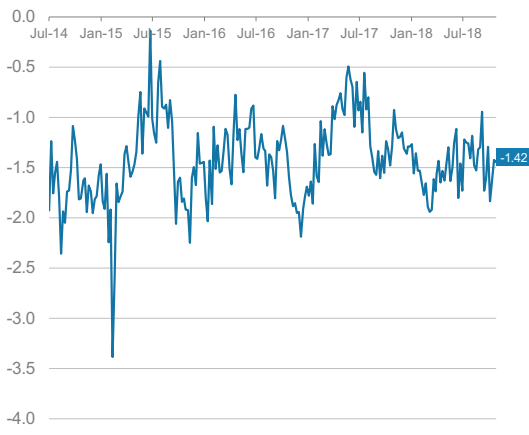
Source: Bloomberg

Exhibit 20: Angola vs. Brent (\$/bbl)



Source: Platts, Bloomberg

Exhibit 22: Sweet vs. Sour: Discount per 1% of Sulphur Content (\$/bbl)



Source: Platts, Bloomberg

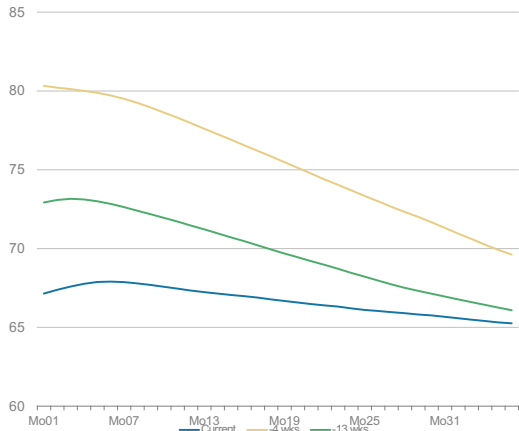
Exhibit 24: Heavy - Light: Premium per Degree of API Gravity (\$/bbl)



Source: Platts, Bloomberg

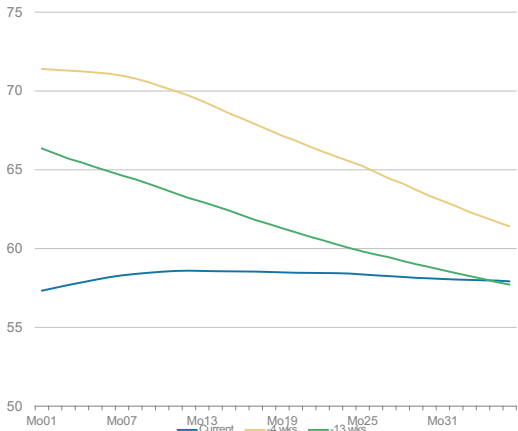
Crude Oil Forward Curves and Time Spreads

Exhibit 25: Brent Forward Curve (\$/bbl)



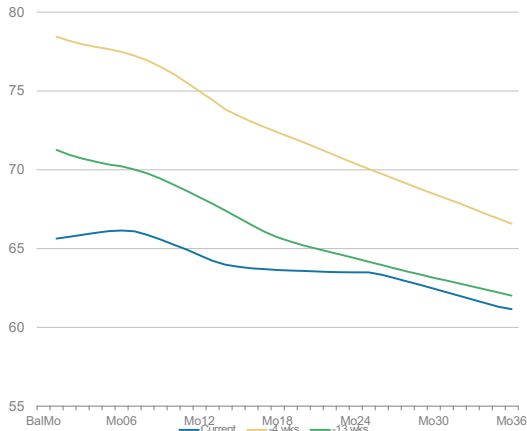
Source: Bloomberg

Exhibit 27: WTI Forward Curve (\$/bbl)



Source: Bloomberg

Exhibit 29: Dubai Forward Curve (\$/bbl)



Source: Bloomberg

Exhibit 26: Brent Time Spreads (\$/bbl)



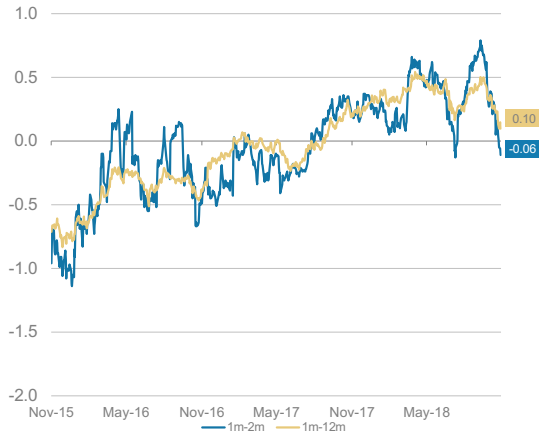
Source: Bloomberg

Exhibit 28: WTI Time Spreads (\$/bbl)



Source: Bloomberg

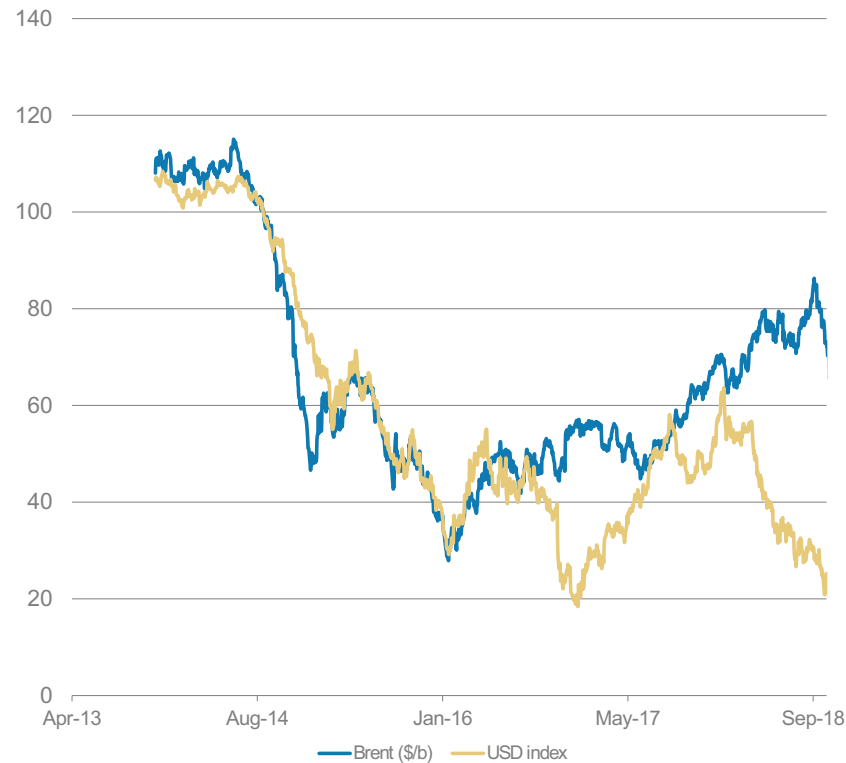
Exhibit 30: Dubai Time Spreads (\$/bbl)



Source: Bloomberg

Oil vs. Other Things

Exhibit 31: Brent Crude vs. Inverse TWD



Source: Reuters

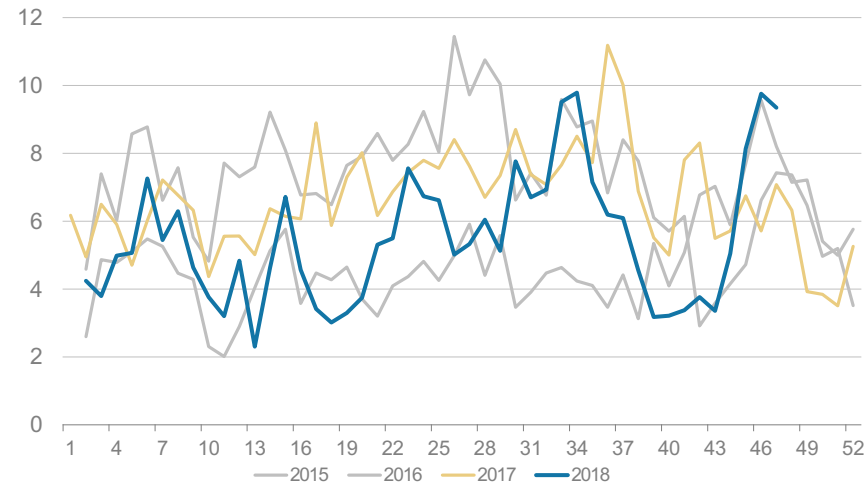
Exhibit 32: Brent Crude vs. Inflation vs. Base Metals



Source: Bloomberg

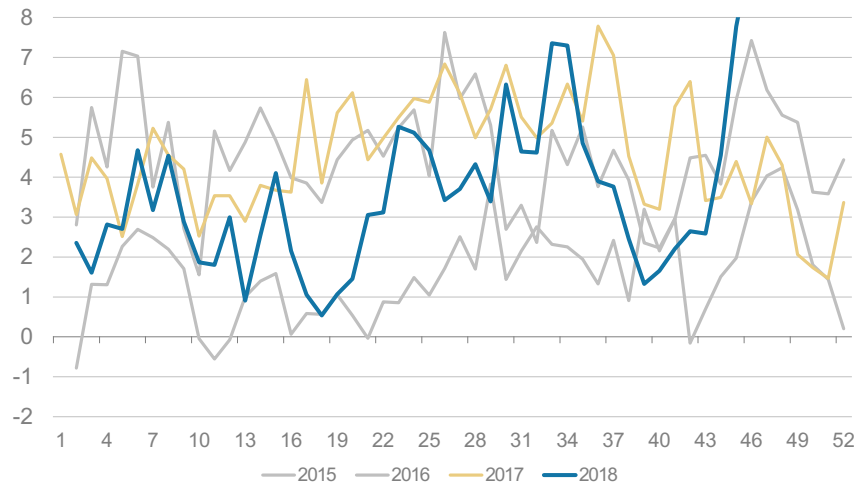
Refining Margins

Exhibit 33: Rotterdam – Brent Cracking (\$/bbl)



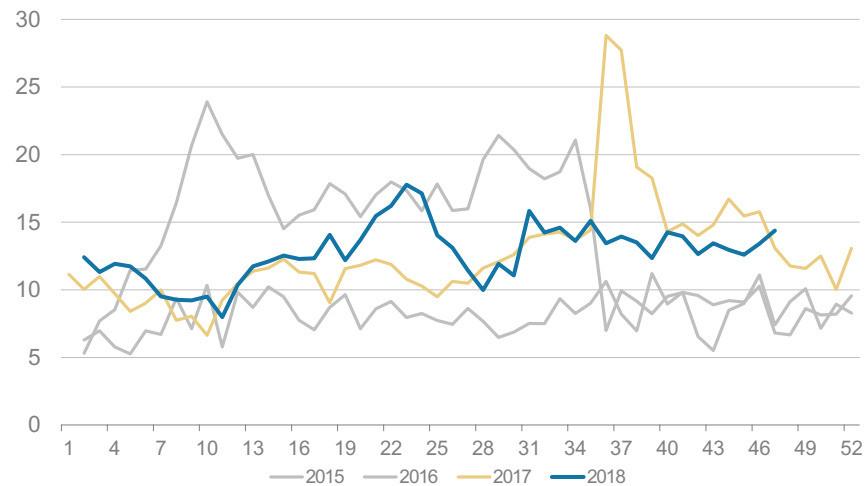
Source: Thomson Reuters

Exhibit 34: Rotterdam – Brent Hydroskimming (\$/bbl)



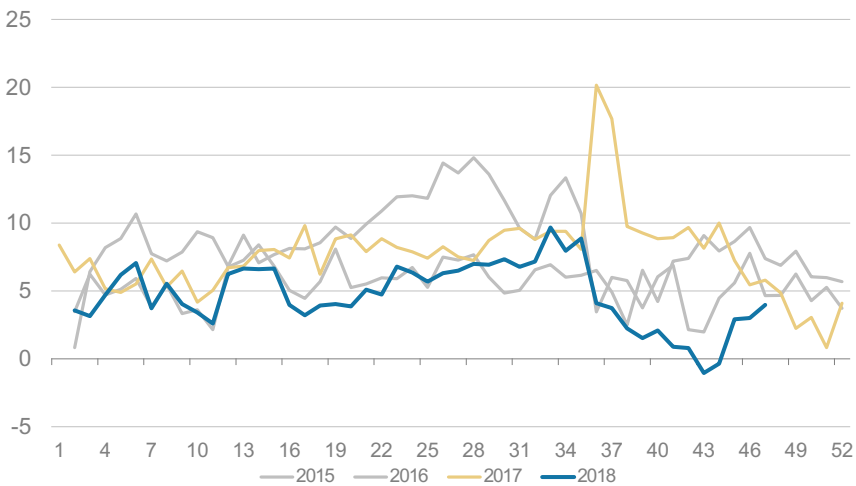
Source: Thomson Reuters

Exhibit 35: USGC – WTI Cracking (\$/bbl)



Source: Thomson Reuters

Exhibit 36: USGC – Brent Cracking (\$/bbl)



Source: Thomson Reuters

Exhibit 37: Med – Urals Cracking (\$/bbl)

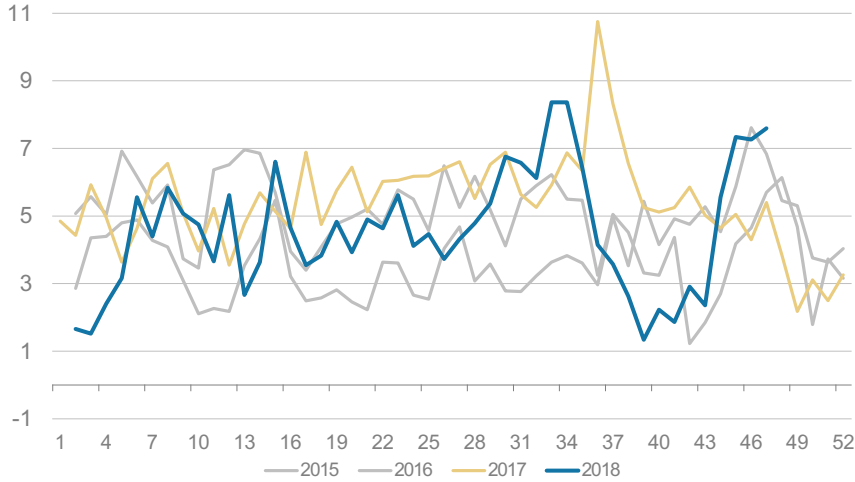


Exhibit 38: Med – Urals Hydroskimming (\$/bbl)



Exhibit 39: Singapore – Dubai Cracking (\$/bbl)

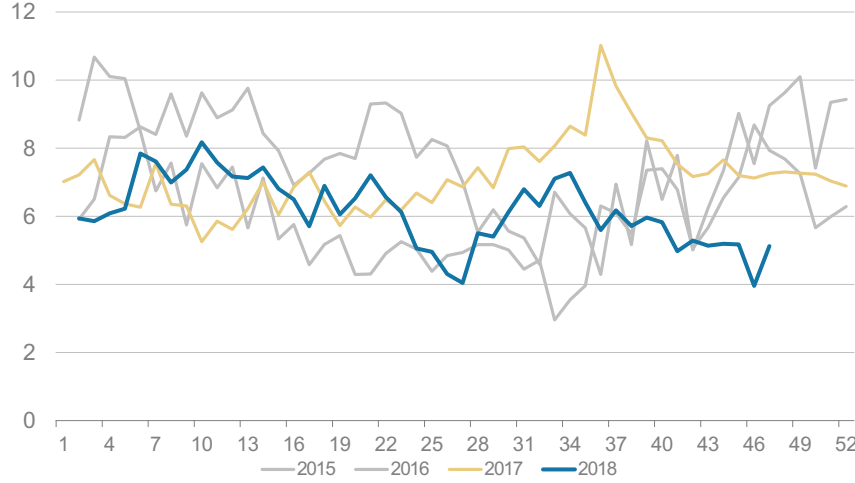
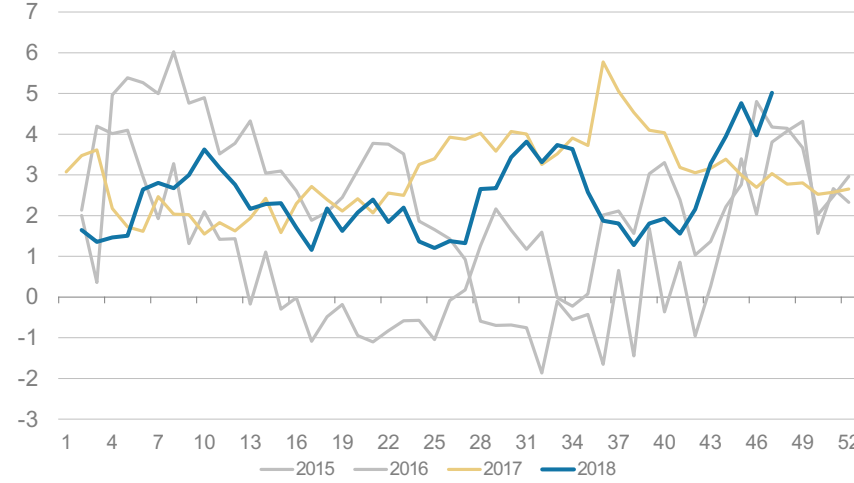
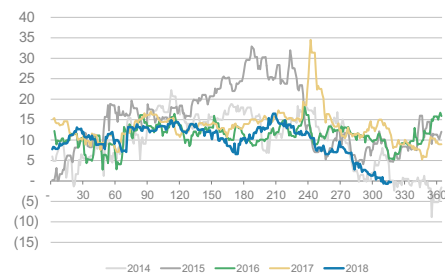


Exhibit 40: Singapore – Dubai Hydroskimming (\$/bbl)



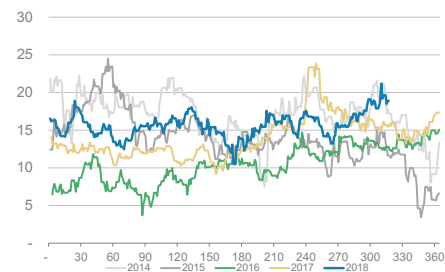
Product Cracks

Exhibit 41: Gasoline US vs. WTI (\$/bbl)



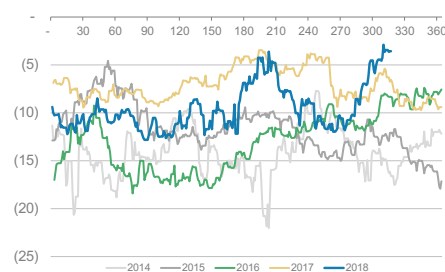
Source: Platts, Bloomberg

Exhibit 42: Diesel US vs. WTI (\$/bbl)



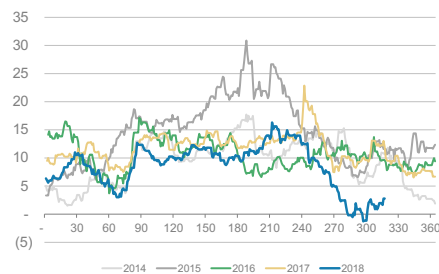
Source: Platts, Bloomberg

Exhibit 43: US Fuel Oil Crack (\$/bbl)



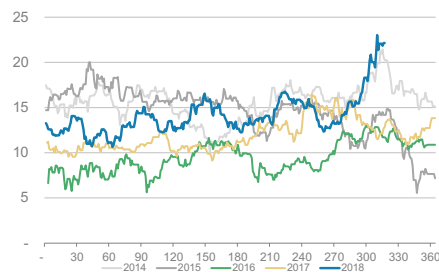
Source: Platts, Bloomberg

Exhibit 44: Gasoline NWE vs. Brent (\$/bbl)



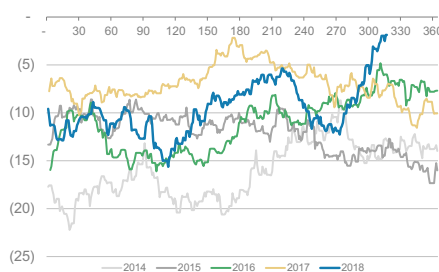
Source: Platts, Bloomberg

Exhibit 45: Diesel NWE vs. Brent (\$/bbl)



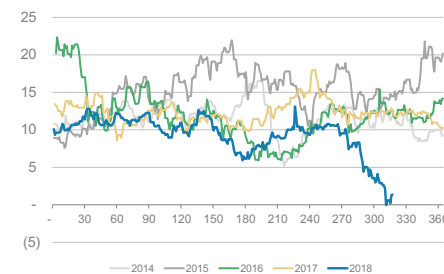
Source: Platts, Bloomberg

Exhibit 46: Fuel Oil NWE vs. Brent (\$/bbl)



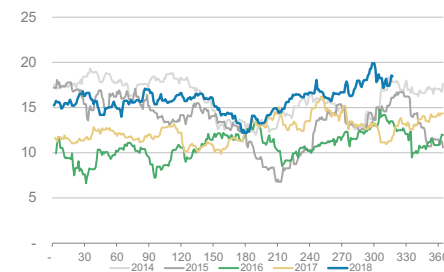
Source: Platts, Bloomberg

Exhibit 47: Gasoline Singapore vs. Brent (\$/bbl)



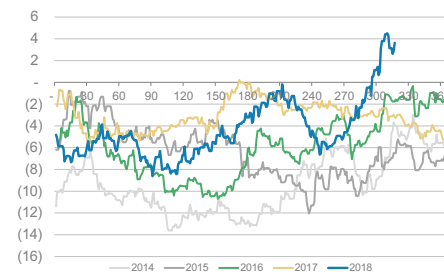
Source: Platts, Bloomberg

Exhibit 48: Gasoil Singapore vs. Brent (\$/bbl)



Source: Platts, Bloomberg

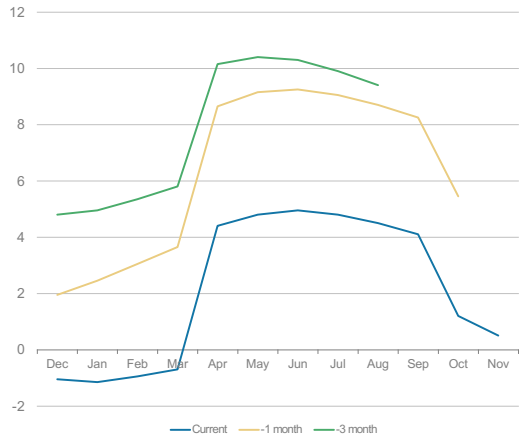
Exhibit 49: Fuel Oil Singapore vs. Brent (\$/bbl)



Source: Platts, Bloomberg

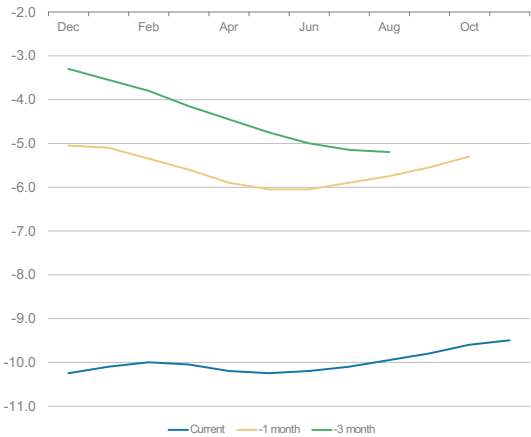
European Product Crack Forward Curves

Exhibit 50: Gasoline Crack NWE Forward Curve (\$/bbl)



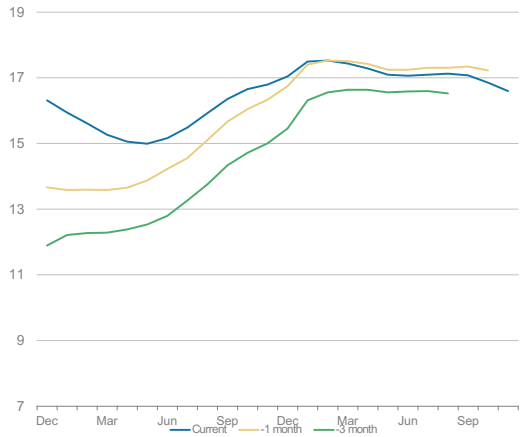
Source: Bloomberg

Exhibit 52: Naphtha Crack NWE Forward Curve (\$/bbl)



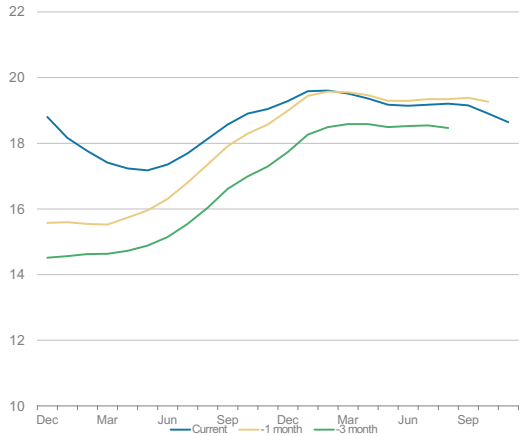
Source: Bloomberg

Exhibit 54: Gasoil 0.1% Crack NWE Forward Curve (\$/bbl)



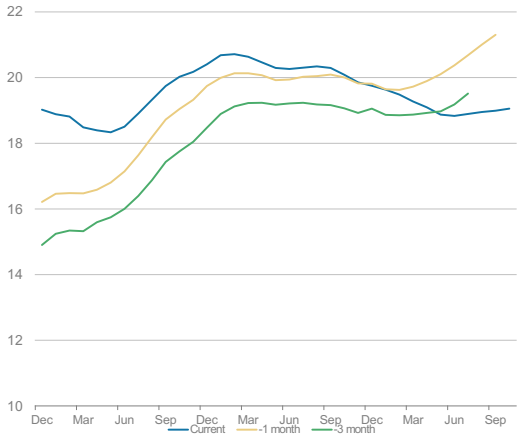
Source: Bloomberg

Exhibit 51: ULSD 10ppm Crack Forward Curve (\$/bbl)



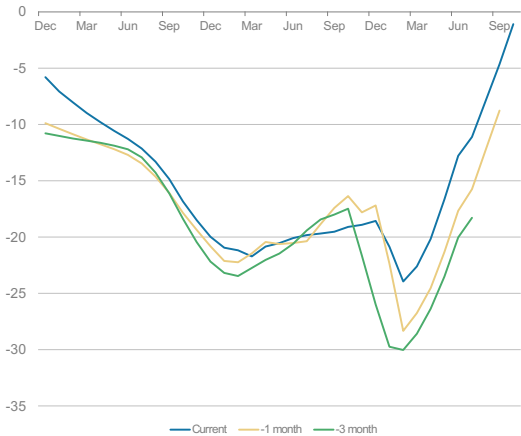
Source: Bloomberg

Exhibit 53: Jet Kero Crack NWE Forward Curve (\$/bbl)



Source: Bloomberg

Exhibit 55: Fuel Oil 3.5% Crack Forward Curve (\$/bbl)

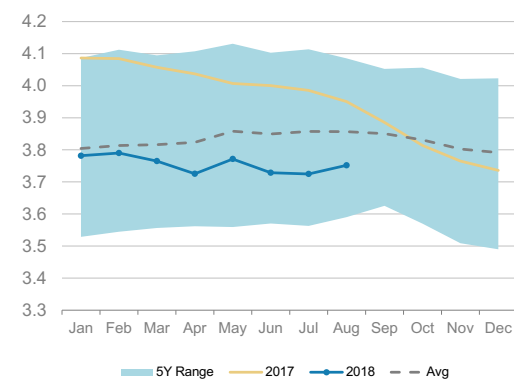


Source: Bloomberg

Global Stocks – Monthly

Exhibit 56: Total Liquid Stocks (bln bbls)

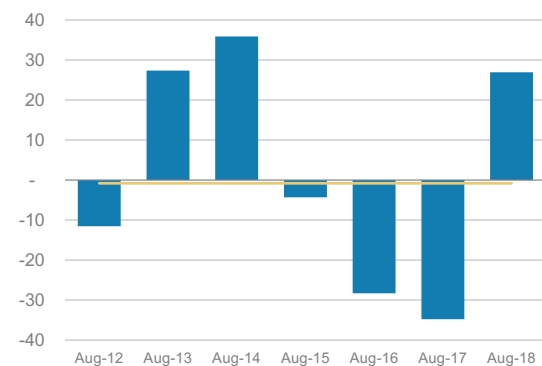
Total Liquid Stocks (bln bbls)



Source: IEA, JODI, Xinhua

Exhibit 57: Historical Global Liquids Stock Change (Latest Month)

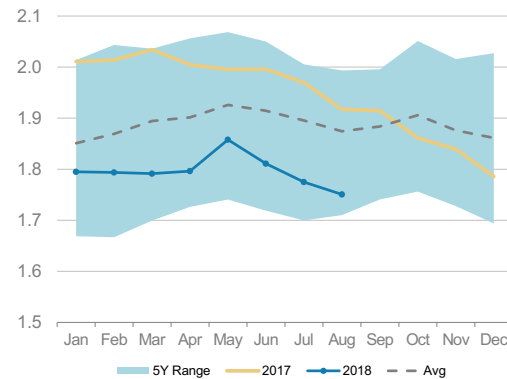
MoM Change in Global Liquids Stocks in August of Each Year (mln bbls)



Source: IEA, JODI, Xinhua

Exhibit 58: Total Crude Stocks (bln bbls)

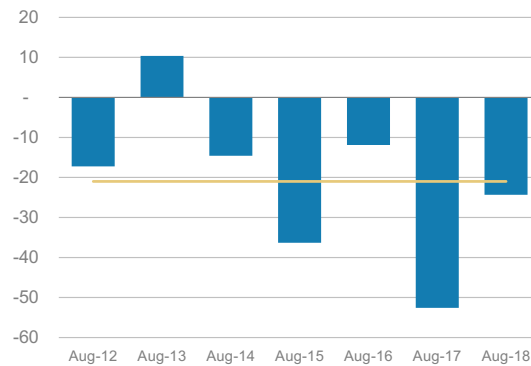
Total Crude Stocks (bln bbls)



Source: IEA, JODI, Xinhua

Exhibit 59: Historical Global Crude Stock Change (Latest Month)

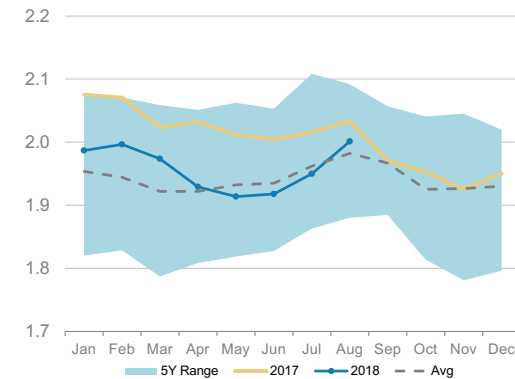
MoM Change in Global Crude Stocks in August of Each Year (mln bbls)



Source: IEA, JODI, Xinhua

Exhibit 60: Total Product Stocks (bln bbls)

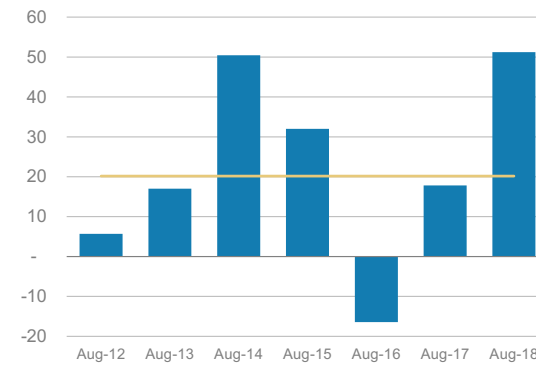
Total Product Stocks



Source: IEA, JODI, Xinhua

Exhibit 61: Historic Global Products Stock Change (Latest Month)

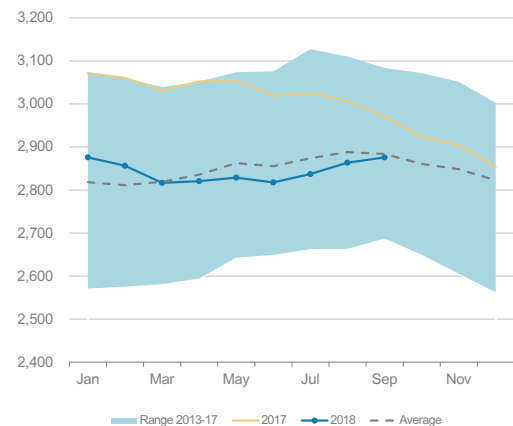
MoM Change in Global Product Stocks in August of Each Year (mln bbls)



Source: IEA, JODI, Xinhua

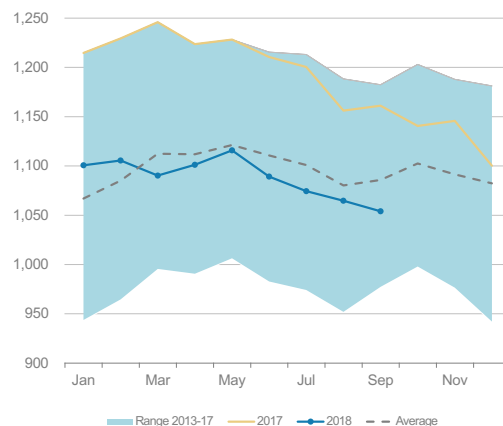
OECD Stocks – Monthly

Exhibit 62: OECD Total Liquid Stocks (bln bbls)



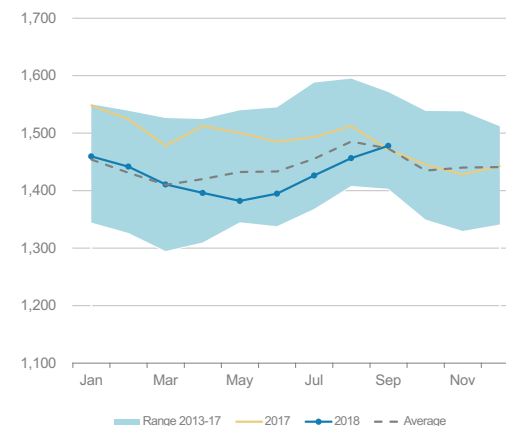
Source: IEA

Exhibit 64: OECD Total Crude Stocks (bln bbls)



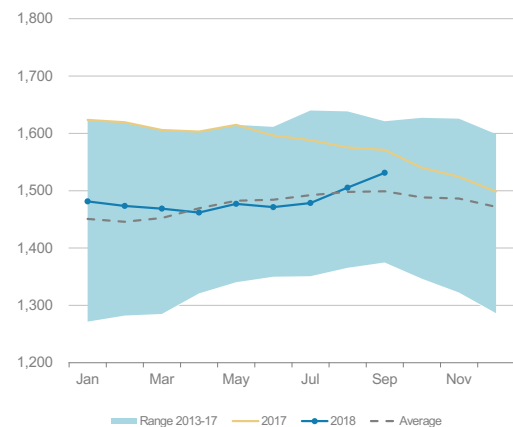
Source: IEA

Exhibit 66: OECD Total Product Stocks (bln bbls)



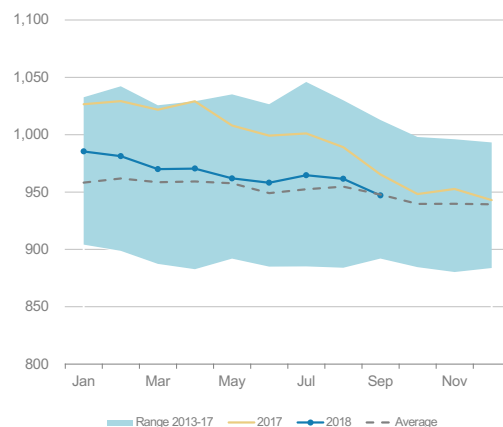
Source: IEA

Exhibit 63: OECD Americas Total Liquid Stocks (bln bbls)



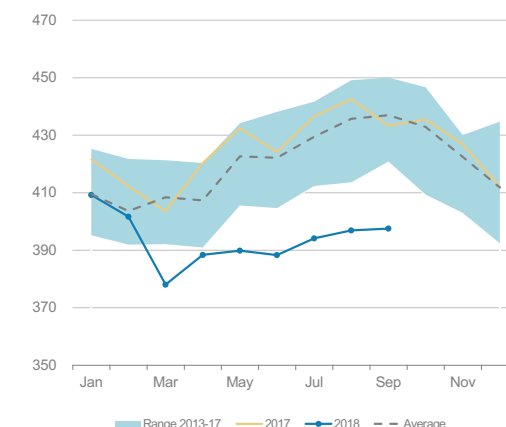
Source: IEA

Exhibit 65: OECD Europe Total Liquid Stocks (bln bbls)



Source: IEA

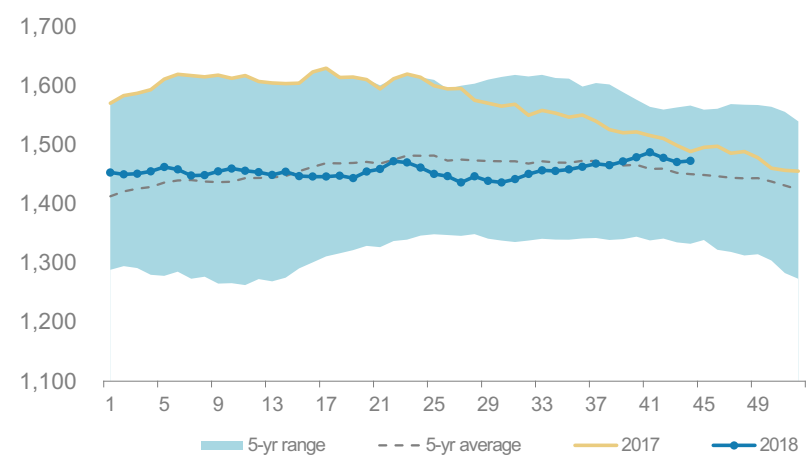
Exhibit 67: OECD Asia Oceania Total Liquid Stocks (bln bbls)



Source: IEA

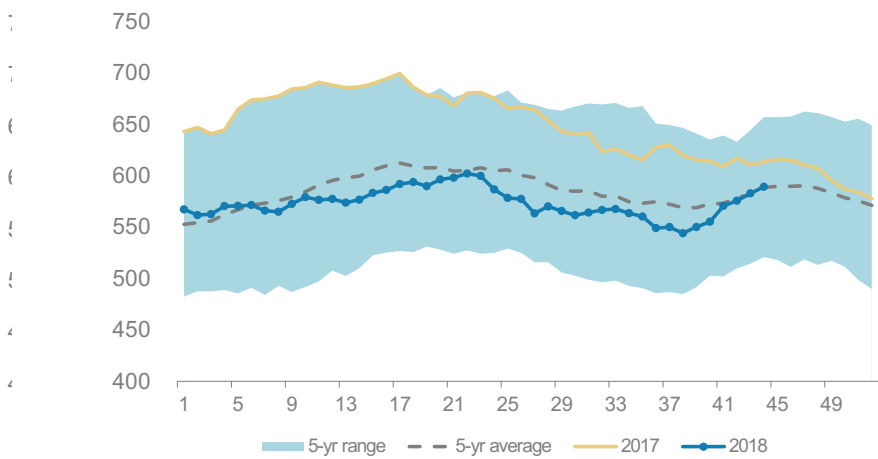
Global Stocks – Weekly

Exhibit 68: Total Oil (US, Japan, ARA, Singapore)



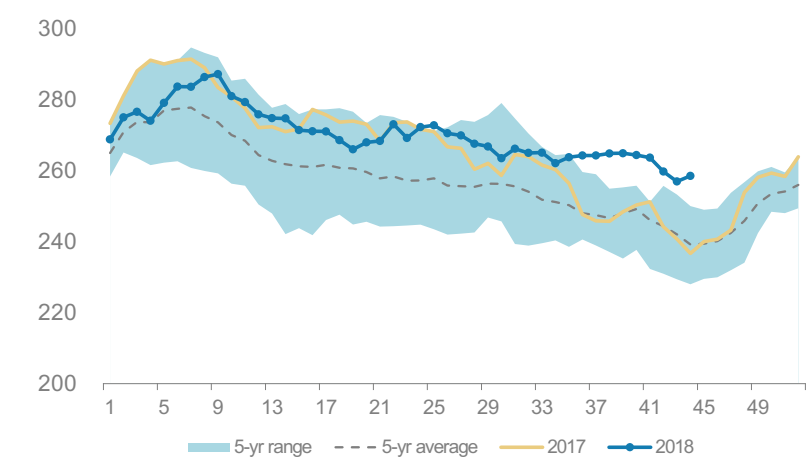
Source: EIA, PAJ, Genscape

Exhibit 69: Crude (US, Japan, ARA)



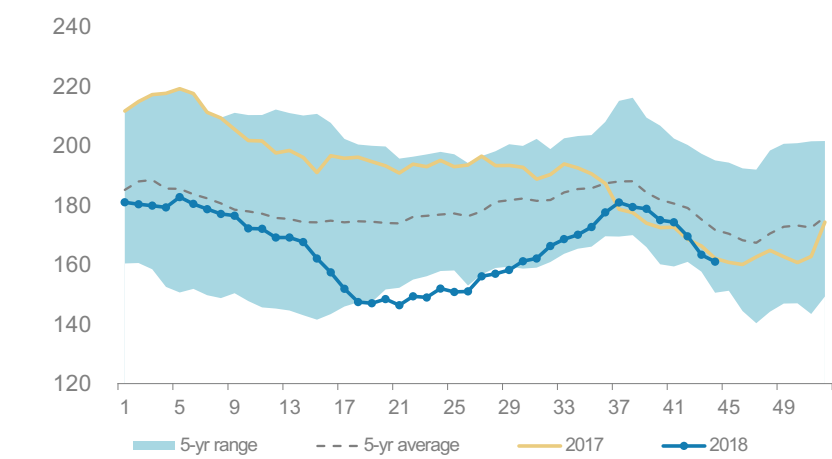
Source: EIA, PAJ, PKJ, IE

Exhibit 70: Gasoline (US, Japan, ARA, Singapore)



Source: EIA, PAJ, PKJ, IE

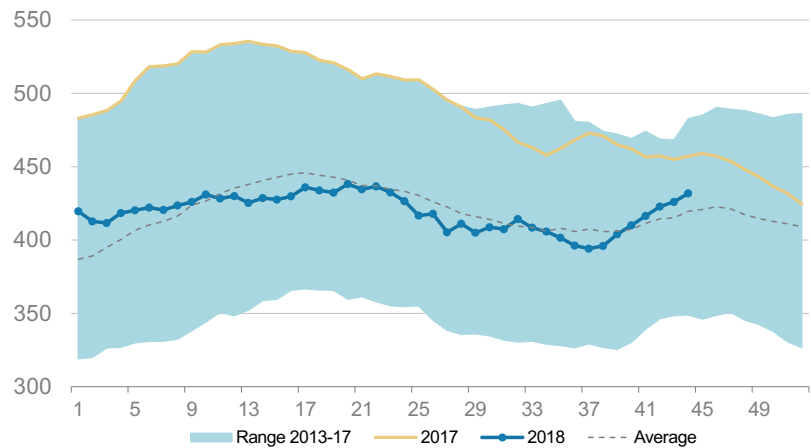
Exhibit 71: Distillates (US, Japan, ARA, Singapore)



Source: EIA, PAJ, PKJ, IE

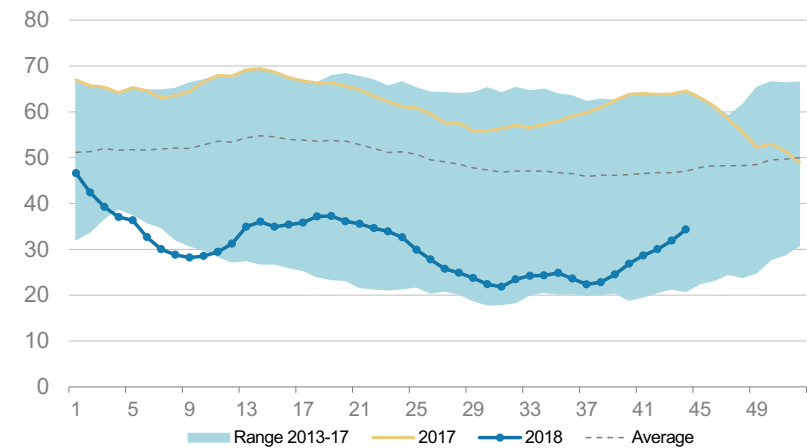
US Stocks – Weekly

Exhibit 72: US Crude – Total (mmb)



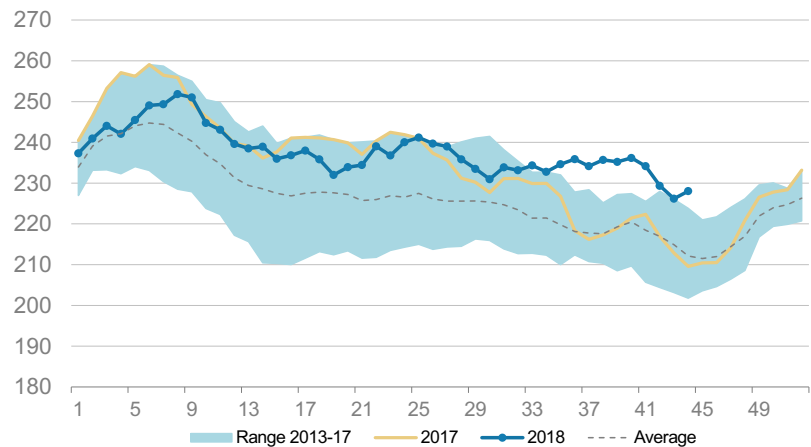
Source: EIA, Reuters

Exhibit 73: US Crude – Cushing (mmb)



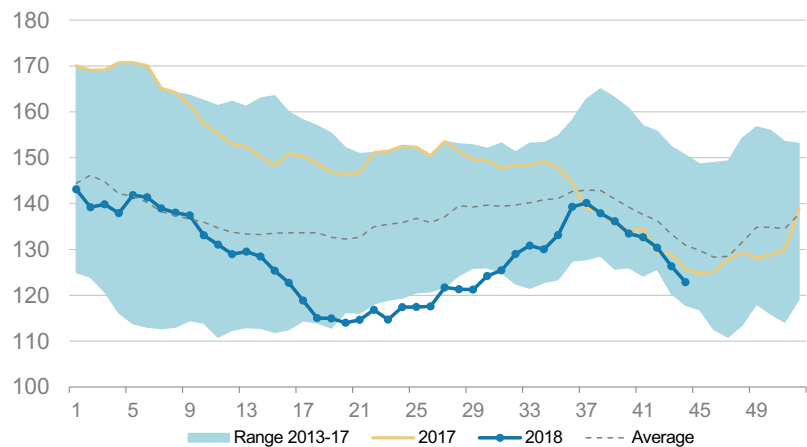
Source: EIA, Reuters

Exhibit 74: US Gasoline (mmb)



Source: EIA, Reuters

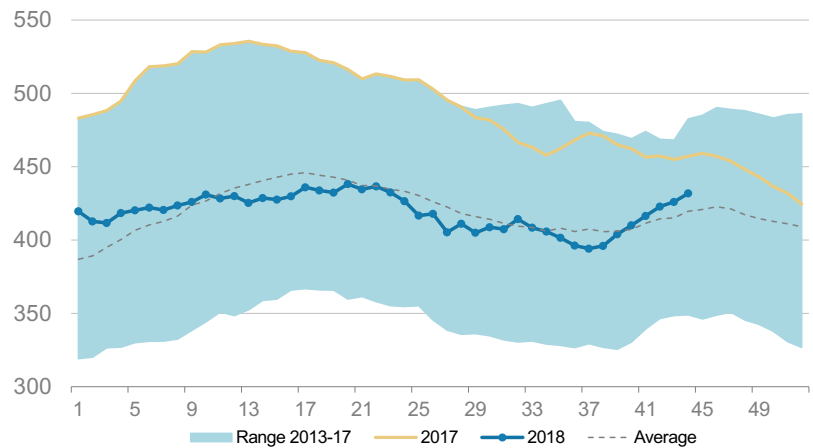
Exhibit 75: US Distillate (mmb)



Source: EIA, Reuters

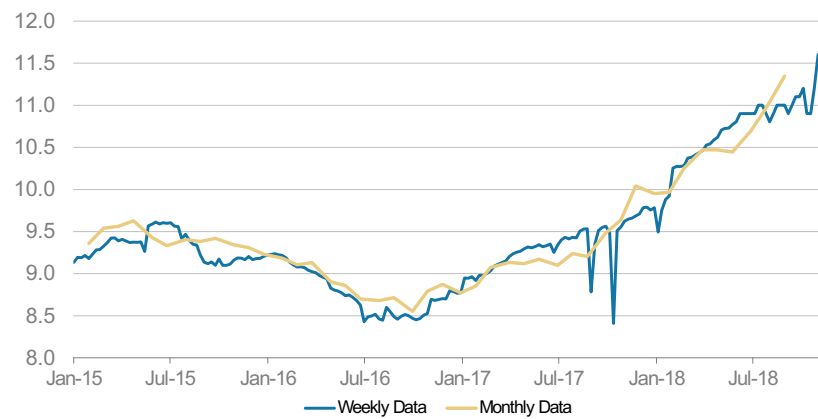
EIA – Crude Oil

Exhibit 76: Crude Oil Stocks (mmb)



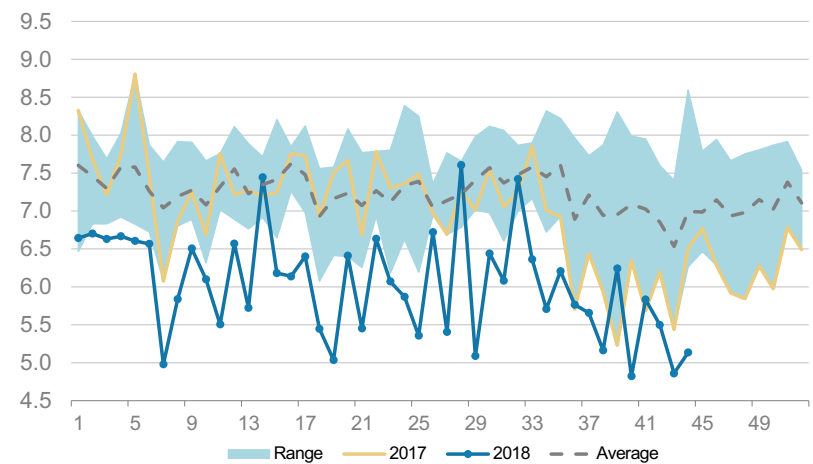
Source: EIA, Reuters

Exhibit 77: Crude Oil Production (mmb/d)



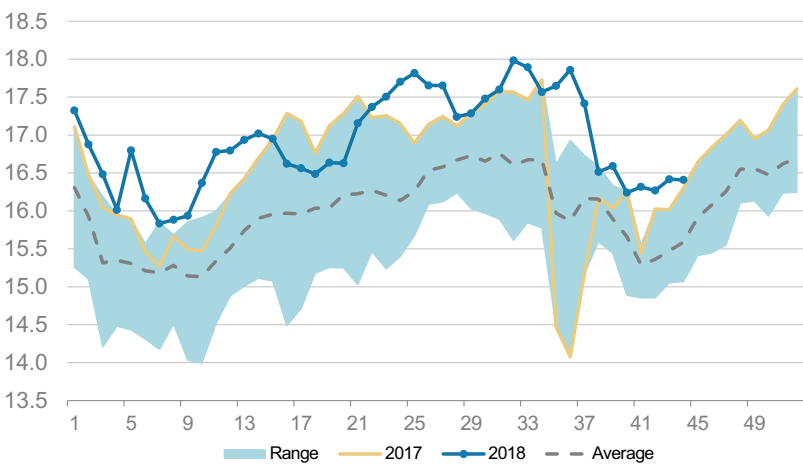
Source: EIA, Reuters

Exhibit 78: Net Crude Imports (mmb/d)



Source: EIA, Reuters

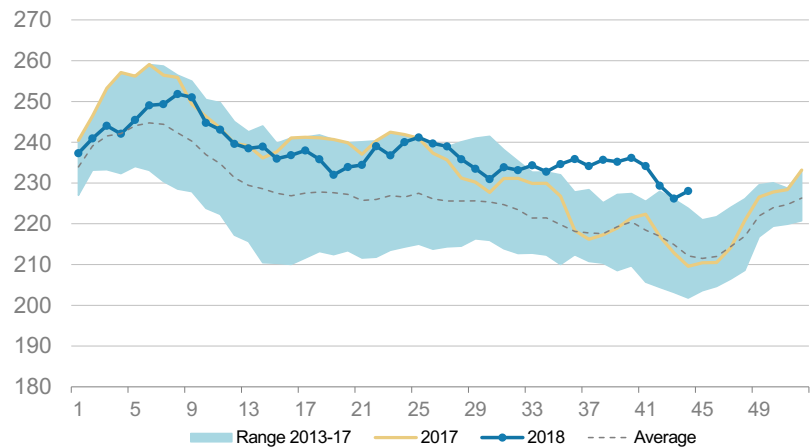
Exhibit 79: Crude Runs (mmb/d)



Source: EIA, Reuters

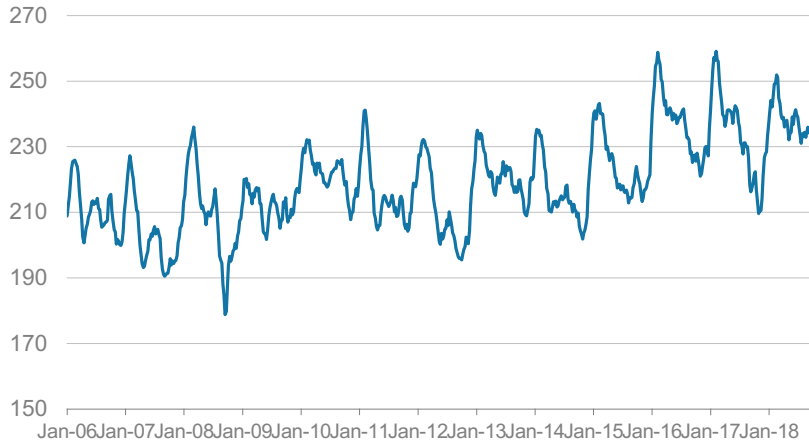
EIA – Gasoline

Exhibit 80: Gasoline Stocks (mmb)



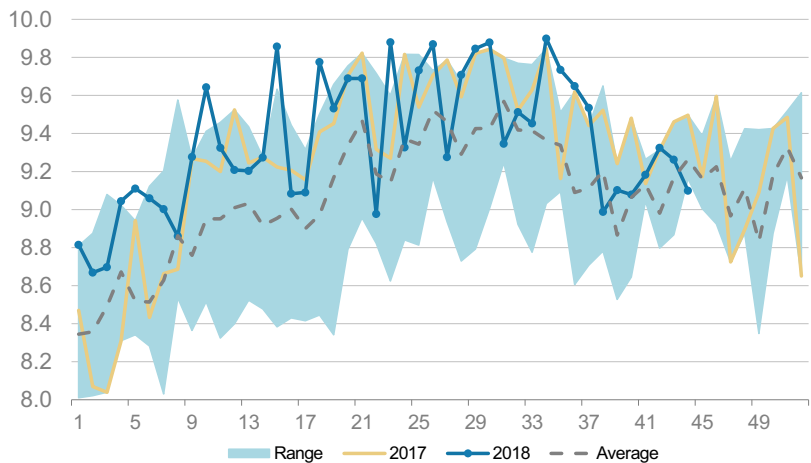
Source: EIA, Reuters

Exhibit 81: Long-term Gasoline Stocks (mmb)



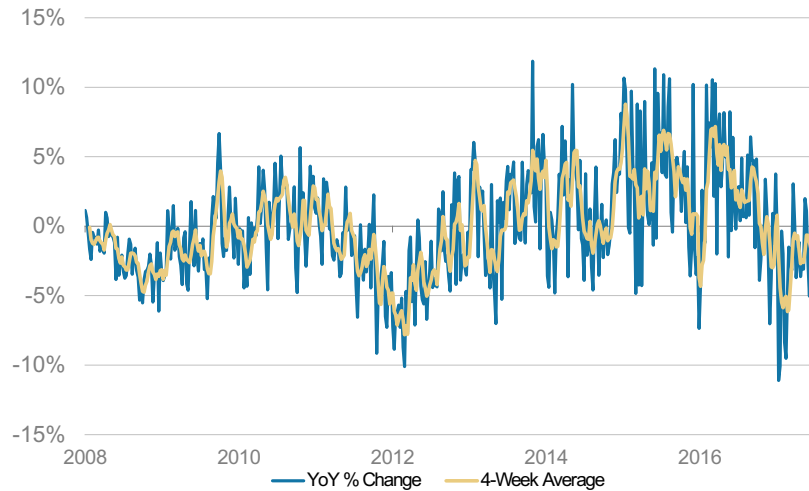
Source: EIA, Reuters

Exhibit 82: Gasoline Product Supplied (mmb/d)



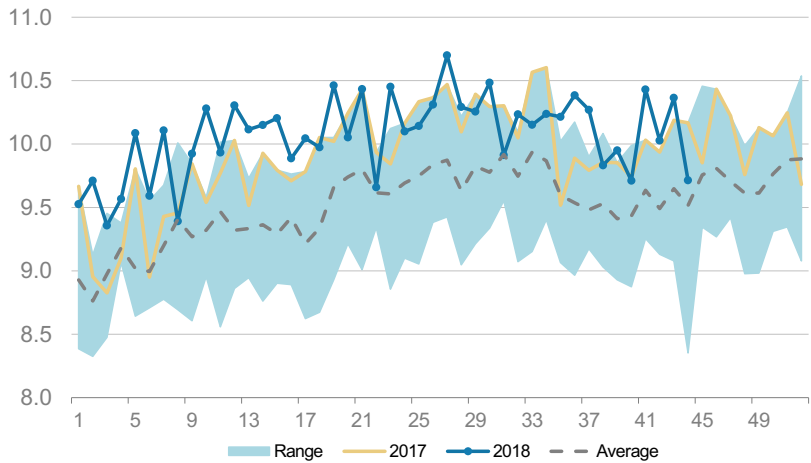
Source: EIA, Reuters

Exhibit 83: Gasoline Product Supplied (% YoY)



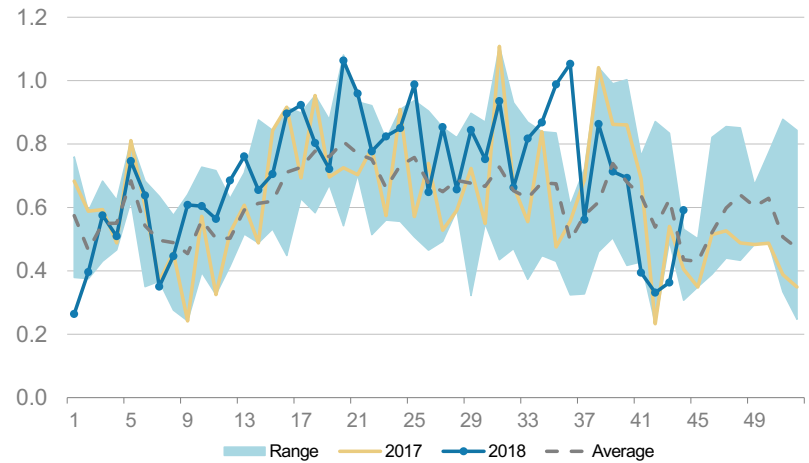
Source: EIA, Bloomberg

Exhibit 84: Gasoline Production (mmb/d)



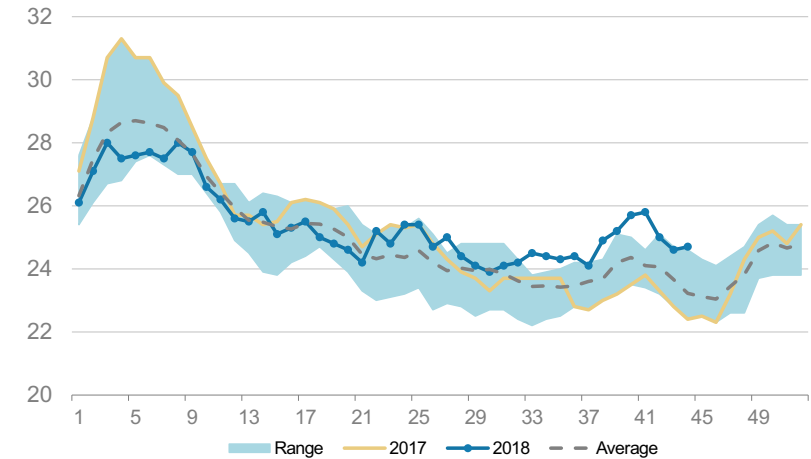
Source: EIA, Reuters

Exhibit 85: Gasoline Imports (mmb/d)



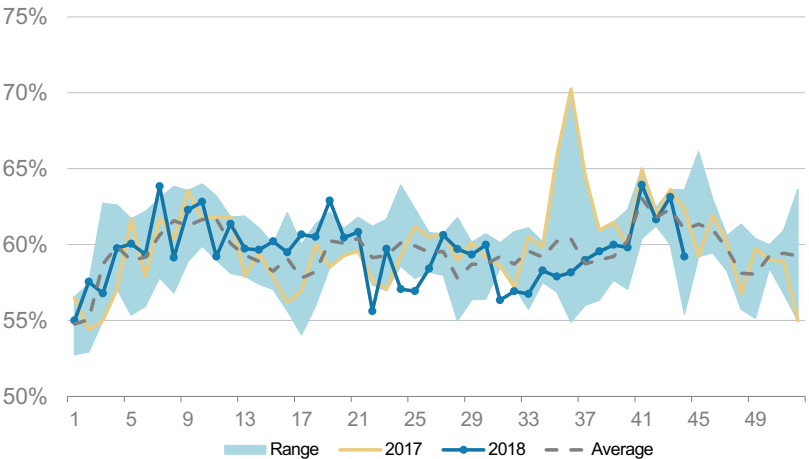
Source: EIA, Reuters

Exhibit 86: Gasoline Stocks Days of Supply (4 wk avg)



Source: EIA, Bloomberg

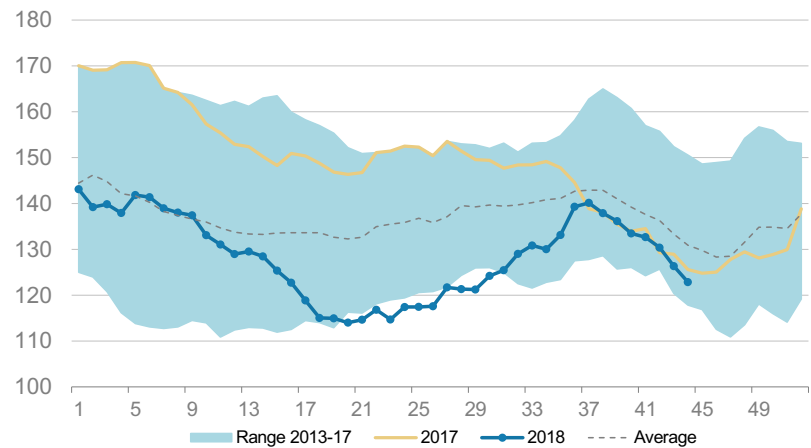
Exhibit 87: Gasoline Yield (%)



Source: EIA, Reuters

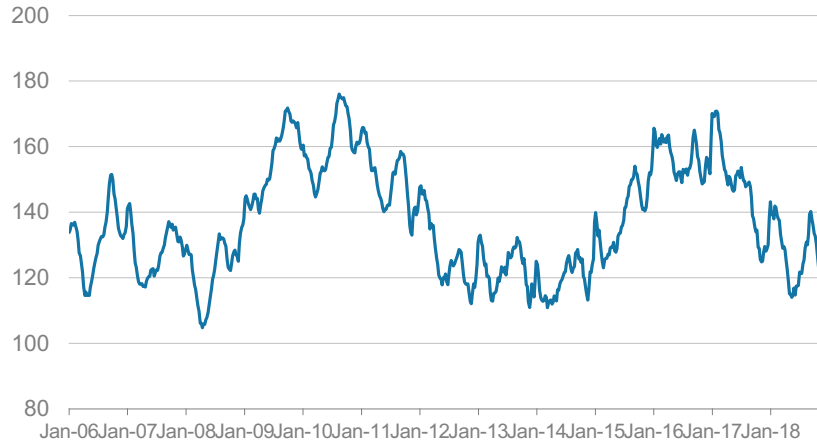
EIA – Distillate

Exhibit 88: Distillate Stocks (mmb)



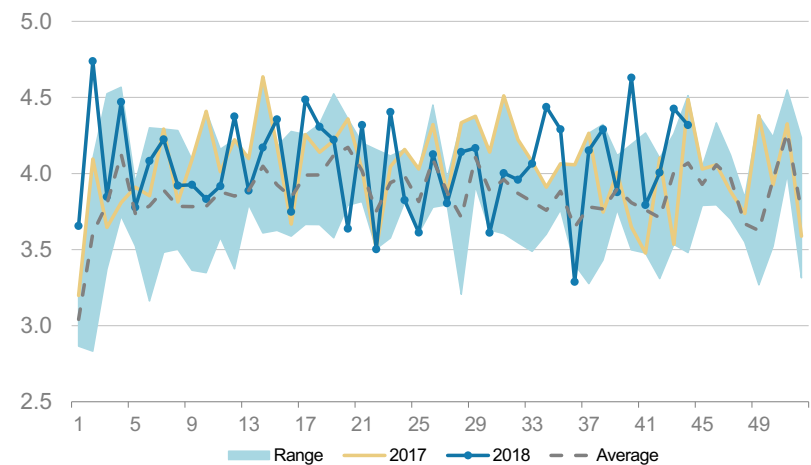
Source: EIA, Reuters

Exhibit 89: Long-term Distillate Stocks (mmb)



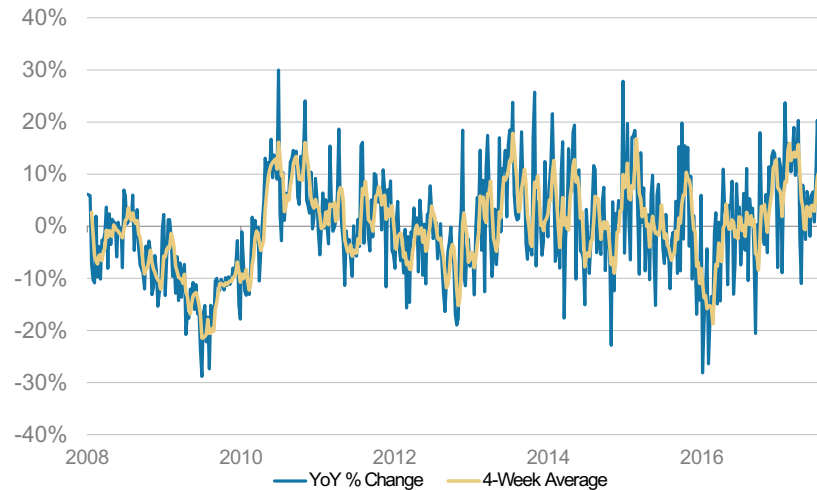
Source: EIA, Reuters

Exhibit 90: Distillate Product Supplied (mmb/d)



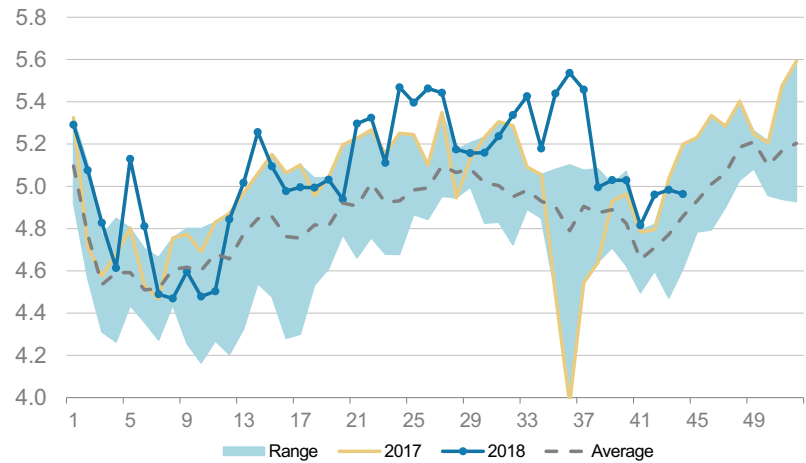
Source: EIA, Reuters

Exhibit 91: Distillate Product Supplied (% YoY)



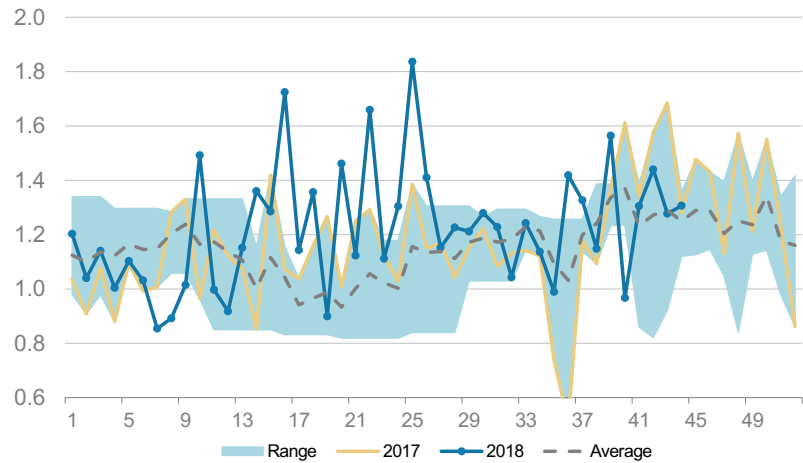
Source: EIA, Bloomberg

Exhibit 92: Distillate Production (mmb/d)



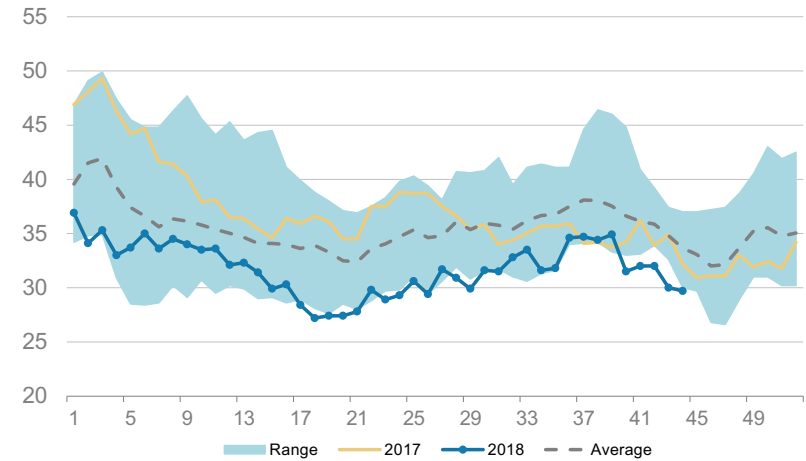
Source: EIA, Reuters

Exhibit 93: Distillate Exports (mmb/d)



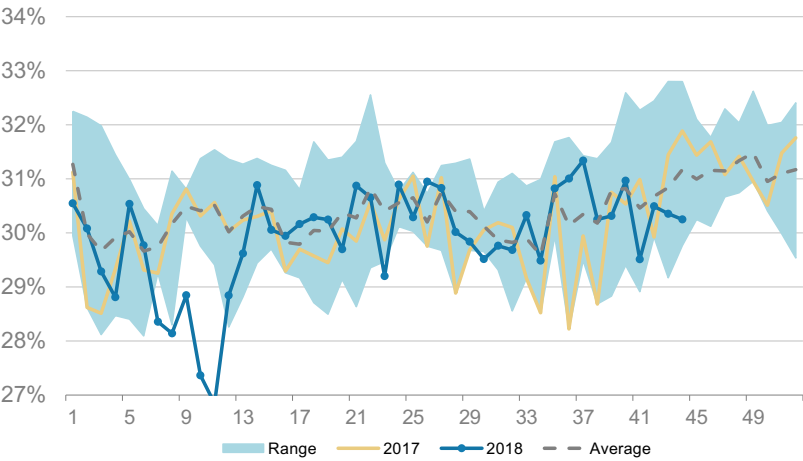
Source: EIA, Reuters

Exhibit 94: Distillate Stocks Days of Supply (4 wk avg)



Source: EIA, Reuters

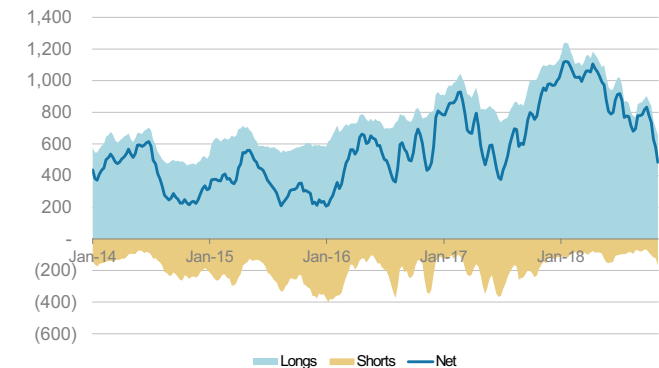
Exhibit 95: Distillate Yield (%)



Source: EIA, Reuters

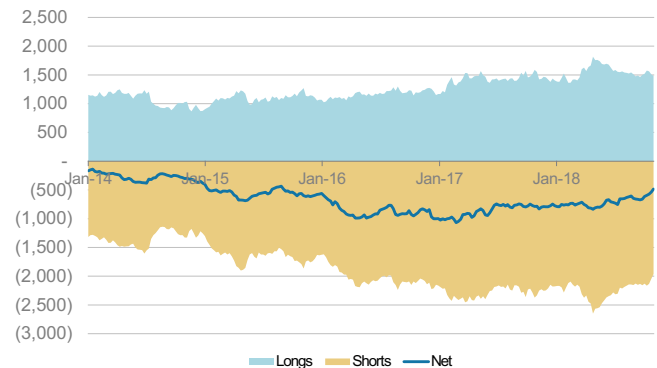
Positioning

Exhibit 96: Managed Money Crude Positioning ('000 lots)



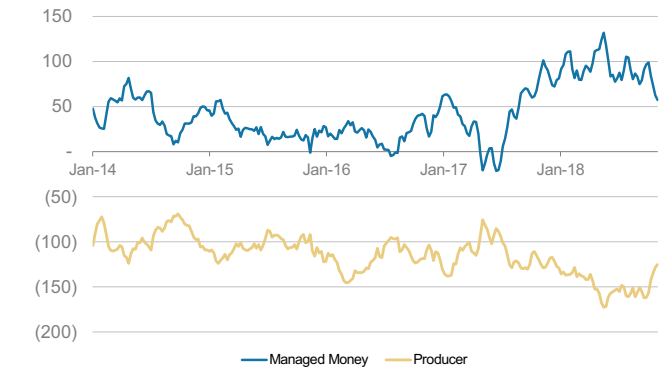
Source: ICE, CFTC, Reuters

Exhibit 97: Producer/Merchant Crude Positioning ('000 lots)



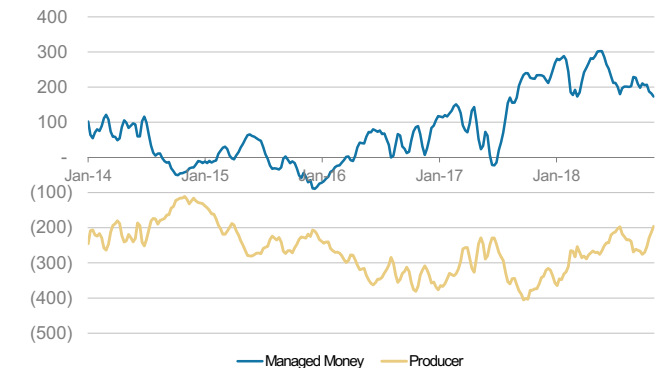
Source: ICE, NYMEX, CFTC, Reuters

Exhibit 98: Net Long Positioning – Gasoline ('000 lots)



Source: NYMEX, CFTC, Reuters

Exhibit 99: Net Long Positioning – Distillate ('000 lots)



Source: ICE, CFTC, Reuters

Supply/Demand Balance

Exhibit 100: Global Demand and Non-OPEC Supply (mb/d)

	2015	1Q16	2Q16	3Q16	4Q16	2016	1Q17	2Q17	3Q17	4Q17	2017	1Q18	2Q18	3Q18	4Q18	2018	2019	2020	2015-16	2016-17	2017-18	2018-19	2019-20
Demand																							
OECD	46.5	46.9	46.1	47.3	47.4	46.9	46.9	47.0	47.6	48.0	47.4	47.8	47.1	48.1	48.4	47.8	48.1	48.9	0.4	0.4	0.5	0.3	0.8
US50	19.5	19.5	19.5	19.9	19.8	19.7	19.5	20.1	20.0	20.2	20.0	20.2	20.3	20.7	20.4	20.4	20.7	21.0	0.2	0.3	0.5	0.2	0.4
Europe 5	8.1	8.0	8.1	8.3	8.2	8.1	8.2	8.3	8.4	8.2	8.3	8.2	8.2	8.2	8.3	8.2	8.2	8.4	0.0	0.1	-0.1	0.0	0.2
Japan	4.1	4.5	3.7	3.8	4.1	4.0	4.3	3.6	3.6	4.1	3.9	4.3	3.4	3.5	4.0	3.8	3.7	3.7	-0.1	-0.1	-0.1	-0.1	0.0
Canada	2.4	2.4	2.4	2.6	2.5	2.5	2.4	2.4	2.5	2.5	2.4	2.3	2.3	2.5	2.5	2.4	2.4	2.4	0.1	0.0	0.0	0.0	0.0
Mexico	2.0	2.1	2.0	2.0	2.1	2.1	2.0	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0	-0.1	0.0	0.0	0.0
Other	10.3	10.3	10.4	10.8	10.8	10.6	10.5	10.6	11.0	11.1	10.8	10.8	10.8	11.1	11.2	11.0	11.1	11.3	0.3	0.2	0.2	0.1	0.3
Non-OECD	48.7	48.6	49.8	49.5	49.6	49.4	49.6	51.0	50.7	50.5	50.4	50.4	51.4	52.3	52.0	51.5	52.7	54.0	0.7	1.1	1.1	1.1	1.4
China	11.6	11.7	12.3	11.8	12.2	12.0	12.4	12.9	12.3	12.7	12.6	12.7	13.0	13.5	13.5	13.2	13.7	14.3	0.4	0.6	0.6	0.5	0.6
India	4.2	4.5	4.5	4.3	4.4	4.4	4.5	4.7	4.4	4.7	4.6	4.8	4.9	4.5	4.9	4.8	4.9	5.1	0.2	0.1	0.2	0.1	0.1
Russia	3.4	3.3	3.2	3.5	3.4	3.3	3.1	3.3	3.5	3.3	3.3	3.3	3.4	3.7	3.5	3.5	3.5	3.5	-0.1	0.0	0.2	0.0	0.0
Brazil	3.2	2.9	3.0	3.0	3.0	3.0	2.9	3.0	3.1	3.0	3.0	2.9	2.9	3.1	3.1	3.0	3.1	3.2	-0.2	0.0	0.0	0.1	0.1
Middle East	6.7	6.3	6.7	7.0	6.5	6.6	6.4	6.8	7.0	6.4	6.7	6.3	6.6	6.8	6.4	6.5	6.6	6.7	-0.1	0.1	-0.2	0.1	0.1
Other	19.6	19.9	20.2	19.9	20.2	20.0	20.2	20.4	20.4	20.4	20.3	20.3	20.6	20.7	20.7	20.6	20.9	21.3	0.4	0.3	0.2	0.3	0.4
Total demand	95.2	95.5	96.0	96.8	97.0	96.3	96.4	98.0	98.3	98.6	97.8	98.2	98.5	100.3	100.4	99.3	100.7	102.9	1.1	1.5	1.5	1.4	2.1
Supply																							
Non-OPEC Crude + Condensate	46.6	46.3	44.7	45.1	46.2	45.6	46.2	45.5	45.7	46.5	46.0	47.1	47.1	47.9	48.5	47.6	49.1	50.6	-1.0	0.4	1.7	1.5	1.4
United States	9.4	9.1	8.8	8.6	8.8	8.8	9.0	9.1	9.3	9.9	9.4	10.2	10.5	11.3	11.6	10.9	12.1	13.1	-0.6	0.5	1.6	1.2	1.1
- Shale production	5.8	5.5	5.3	5.2	5.3	5.3	5.4	5.6	5.8	6.5	5.8	6.7	7.2	7.7	7.9	7.4	8.4	9.6	-0.5	0.5	1.5	1.1	1.2
- Alaska	0.5	0.5	0.5	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.5	0.5	0.5	0.4	0.0	0.0	0.0	0.0	0.0
- Other Lower 48	3.2	3.1	3.0	2.9	3.0	3.0	3.1	3.0	3.0	2.9	3.0	3.0	2.9	3.2	3.2	3.1	3.2	3.1	-0.1	0.0	0.1	0.1	-0.1
Canada	3.7	3.8	3.1	3.8	4.0	3.7	4.1	3.7	4.0	4.1	4.0	4.2	4.1	4.3	4.2	4.2	4.3	4.4	0.0	0.3	0.2	0.1	0.0
Mexico	2.3	2.2	2.2	2.1	2.1	2.2	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.7	1.6	-0.1	-0.2	-0.1	-0.1	-0.1
UK	0.9	1.0	1.0	0.9	0.9	0.9	1.0	0.9	0.9	0.9	0.9	1.0	0.9	0.9	1.0	0.9	1.0	1.1	0.0	0.0	0.0	0.1	0.0
Norway	1.6	1.7	1.6	1.6	1.8	1.6	1.7	1.7	1.6	1.6	1.6	1.6	1.5	1.5	1.4	1.5	1.4	1.6	0.0	0.0	-0.1	-0.1	0.2
Russia	10.7	10.9	10.8	10.9	11.2	11.0	11.1	11.0	10.9	10.9	11.0	11.0	11.0	11.3	11.4	11.2	11.5	11.6	0.2	0.0	0.2	0.3	0.1
China	4.2	4.1	4.0	3.8	3.8	3.9	3.8	3.8	3.7	3.7	3.8	3.7	3.7	3.7	3.7	3.7	3.6	3.5	-0.3	-0.1	-0.1	-0.1	-0.1
Kazakhstan	1.7	1.7	1.6	1.5	1.8	1.6	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.8	1.9	1.9	1.8	1.8	0.0	0.2	0.1	0.0	0.0
Azerbaijan	0.8	0.9	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.0	0.0	0.0	0.0	0.0
Brazil	2.4	2.3	2.4	2.6	2.7	2.5	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.5	2.6	2.6	2.9	3.3	0.1	0.1	0.0	0.3	0.4
Colombia	1.0	0.9	0.9	0.8	0.8	0.9	0.8	0.9	0.9	0.9	0.9	0.8	0.9	0.9	0.9	0.9	0.8	0.8	-0.1	0.0	0.0	0.0	-0.1
Indonesia	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.8	0.7	0.7	0.1	0.0	0.0	0.0	0.0
Other	7.1	6.9	6.6	6.7	6.7	6.8	6.6	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.4	6.5	6.4	6.4	-0.3	-0.2	-0.1	-0.1	-0.1

Source: IEA, Morgan Stanley Research estimates

Supply/Demand Balance (cont'd)

Exhibit 101: OPEC supply (mb/d)

	2015	1Q16	2Q16	3Q16	4Q16	2016	1Q17	2Q17	3Q17	4Q17	2017	1Q18	2Q18	3Q18	4Q18	2018	2019	2020	2015-16	2016-17	2017-18	2018-19	2019-20
Supply (cont'd)																							
NGLs	6.1	6.4	6.5	6.3	6.5	6.4	6.6	6.6	6.7	7.0	6.7	7.1	7.2	7.4	7.4	7.3	7.5	7.7	0.3	0.3	0.5	0.2	0.2
Unconventionals*	0.5	0.5	0.5	0.5	0.4	0.5	0.5	0.5	0.5	0.4	0.5	0.5	0.6	0.6	0.5	0.6	0.5	0.5	-0.1	0.0	0.1	-0.1	0.0
Biofuels	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	0.0	0.0	0.0	0.0	0.0
Processing gains	2.3	2.0	2.5	2.7	2.3	2.4	2.0	2.5	2.9	2.5	2.5	2.1	2.7	3.0	2.5	2.6	2.7	2.7	0.1	0.1	0.1	0.1	0.1
Total non-OPEC supply	57.8	57.4	56.4	56.9	57.7	57.1	57.5	57.5	58.0	58.7	57.9	59.1	60.0	61.2	61.2	60.4	62.2	63.8	-0.7	0.8	2.4	1.8	1.7
OPEC NGLs	6.5	6.7	6.8	6.8	6.8	6.8	6.9	6.9	6.9	6.8	6.9	6.9	6.9	7.0	6.9	6.9	6.9	6.9	0.2	0.1	0.1	-0.1	0.0
Call on OPEC crude + Δstock	30.8	31.4	32.7	33.1	32.5	32.4	32.1	33.6	33.3	33.0	33.0	32.2	31.5	32.2	32.3	32.1	31.7	32.1	1.6	0.6	-0.9	-0.4	0.4
OPEC																							
Saudi Arabia	10.1	10.2	10.3	10.6	10.6	10.4	9.9	10.0	10.0	10.0	10.0	10.0	10.1	10.4	10.5	10.3	10.4	10.4	0.3	-0.5	0.3	0.2	0.0
Iran	2.8	3.1	3.6	3.7	3.8	3.6	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.6	3.0	3.6	2.4	2.6	0.7	0.3	-0.2	-1.2	0.2
Iraq	4.0	4.3	4.3	4.4	4.6	4.4	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.6	4.7	4.6	4.8	5.0	0.4	0.1	0.1	0.2	0.2
UAE	2.9	2.9	3.0	3.1	3.2	3.0	3.0	2.9	2.9	2.9	2.9	2.8	2.9	3.0	3.2	3.0	3.2	3.3	0.1	-0.1	0.0	0.3	0.0
Kuwait	2.8	2.9	2.9	2.9	2.9	2.9	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.8	2.8	2.7	2.8	2.8	0.1	-0.2	0.0	0.1	0.0
Neutral Zone	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	-0.1	0.0	0.0	0.1	0.1
Qatar	0.7	0.7	0.7	0.6	0.6	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.0	0.0	0.0	0.0	0.0
Angola	1.8	1.8	1.7	1.7	1.6	1.7	1.6	1.6	1.7	1.6	1.6	1.6	1.5	1.5	1.5	1.5	1.5	1.4	-0.1	-0.1	-0.1	-0.1	-0.1
Nigeria	1.8	1.7	1.5	1.3	1.5	1.5	1.4	1.5	1.6	1.6	1.5	1.7	1.5	1.6	1.7	1.6	1.7	1.8	-0.3	0.1	0.1	0.1	0.0
Libya	0.4	0.4	0.3	0.3	0.6	0.4	0.7	0.7	0.9	1.0	0.8	1.0	0.9	0.9	1.1	1.0	1.1	1.1	0.0	0.4	0.2	0.1	0.0
Algeria	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.0	1.0	1.0	1.0	1.1	1.1	1.0	1.0	1.0	0.0	-0.1	0.0	0.0	-0.1
Ecuador	0.5	0.5	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.0	0.0	0.0	0.0	0.0
Venezuela	2.5	2.4	2.3	2.2	2.1	2.2	2.1	2.0	2.0	1.8	2.0	1.5	1.4	1.3	1.2	1.4	1.1	0.9	-0.2	-0.3	-0.6	-0.3	-0.1
Gabon	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0
Equatorial Guinea	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0
Congo	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.1	0.0	0.0
Implied stock build/(draw)	1.2	1.1	0.0	0.0	1.1	0.6	0.2	-1.0	-0.4	-0.4	-0.4	0.1	0.6	0.4	0.1	0.3	0.1	0.1					

* Unconventionals excluding Canadian oil sands production, which are included under crude+condensate
Source: IEA, Morgan Stanley Research estimates

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STOCK RATING CATEGORY	COVERAGE UNIVERSE		INVESTMENT BANKING CLIENTS (IBC)			OTHER MATERIAL INVESTMENT SERVICES CLIENTS (MISC)	
	COUNT	% OF TOTAL	COUNT	% OF TOTAL IBC	% OF RATING CATEGORY	COUNT	% OF TOTAL OTHER MSC
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Equal-weight/Hold	1380	44%	335	46%	24%	632	45%
Not-Rated/Hold	47	1%	7	1%	15%	7	0%
Underweight/Sell	553	18%	82	11%	15%	220	16%
TOTAL	3,137		729			1403	

Data include common stock and ADRs currently assigned ratings. Investment Banking Clients are companies from whom Morgan Stanley received investment banking compensation in the last 12 months. Due to rounding off of decimals, the percentages provided in the "% of total" column may not add up to exactly 100 percent.

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