

December 8, 2018 12:01 AM GMT

## The Oil Manual | Global

## OPEC+: Back to Balance

The production cut announced by OPEC+ is likely sufficient to balance the market in 1H19 and prevent inventories from building. Although there are limiting factors too, this should still support a partial recovery in oil prices. We estimate Brent to reach \$67.5/bbl by 2Q19, down from \$77.5 before.

**OPEC and partners have agreed to cut production by a headline figure of 1.2 mb/d:**

Following a sharp fall in oil prices, OPEC and its non-OPEC partners have announced an agreement to stabilize the market. The deal calls for a headline reduction in output of 1.2 mb/d, which is in-line with the consensus expectations for a cut of 1-1.5 mb/d ahead of the meeting. OPEC members will reduce output by 0.8 mb/d, and non-OPEC, will shoulder the remaining 0.4 mb/d. The agreement does not specify individual country quotas but the starting point for OPEC countries is a 2.5% reduction from their October 2018 level. Iran, Venezuela and Libya are exempt from the agreement. Non-OPEC countries have agreed to cut by 2%, which implies a 230 kb/d reduction in output for Russia. Exhibit 7 summarizes our assumptions for participating countries on this basis.

**This removes the overhang in 1H19 and likely prevents inventories from building:**

During the press conference, Saudi Arabia's oil minister Khalid al-Falih was clear that Iran, Venezuela and Libya are exempt and will not be asked to contribute to the 0.8 mb/d OPEC reduction. Instead, Saudi Arabia and its neighbours will absorb their 2.5% reductions, effectively over-complying with their own quotas. Yet, Iran will likely see a sharp fall in production of ~0.7 mb/d between October and 1H19 due to US sanctions, we estimate. For Venezuela, we estimate that production will decline another 0.15 mb/d over this period due to lack of investment. These declines come on top of the agreed cut of 1.2 mb/d, bringing the total OPEC+ decline close to 2 mb/d, much larger than the headline cut. As economic growth indicators have weakened recently, we reduce our global demand growth estimate for 2019 by 0.1 mb/d. Nevertheless, these production cuts should lead to a balanced market in 1H19 and stabilise inventories, which otherwise would have built aggressively.

**Prices are set to recover but three factors limit upside:** The OPEC+ agreement sharply reduced the likelihood of an oversupplied market in 1H19, and as a result oil prices – rightly – responded positively. After the steep decline in recent weeks, we expect that prices can continue to rally. However, upside is limited, in our view, and the highs of early October are unlikely to be achieved again in coming quarters. Three factors play a role here:

...Continued inside

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**Exhibit 1: Changes to our forecasts**

ICE Brent

|        | 1Q19  | 2Q19  | 3Q19 | 4Q19 | 1Q20  | 2Q20  | 3Q20  | 4Q20  |
|--------|-------|-------|------|------|-------|-------|-------|-------|
| New    | 65.0  | 67.5  | 70.0 | 72.5 | 75.0  | 75.0  | 72.5  | 70.0  |
| Old    | 77.5  | 77.5  | 77.5 | 80.0 | 85.0  | 85.0  | 85.0  | 85.0  |
| Change | -12.5 | -10.0 | -7.5 | -7.5 | -10.0 | -10.0 | -12.5 | -15.0 |

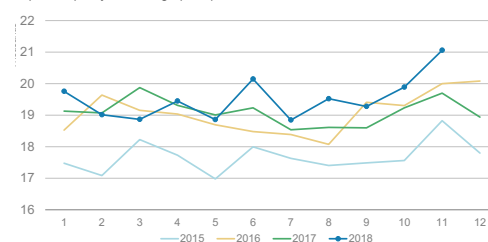
NYMEX WTI

|        | 1Q19  | 2Q19  | 3Q19 | 4Q19 | 1Q20  | 2Q20  | 3Q20  | 4Q20  |
|--------|-------|-------|------|------|-------|-------|-------|-------|
| New    | 56.0  | 58.5  | 61.0 | 63.5 | 66.0  | 67.0  | 64.5  | 62.0  |
| Old    | 68.5  | 68.5  | 68.5 | 71.0 | 77.0  | 77.0  | 77.0  | 77.0  |
| Change | -12.5 | -10.0 | -7.5 | -7.5 | -11.0 | -10.0 | -12.5 | -15.0 |

Source: Morgan Stanley Research

**Exhibit 2: Ahead of the OPEC+ meeting, the 'Spare Capacity 5' – Saudi Arabia, Kuwait, UAE, Iraq and Russia – ramped up seaborne exports substantially, up 1.8 mb/d between Sep and Nov.**

'Spare Capacity 5' Loadings (mb/d)



Note: horizontal axis shows month in each year

Source: ClipperData

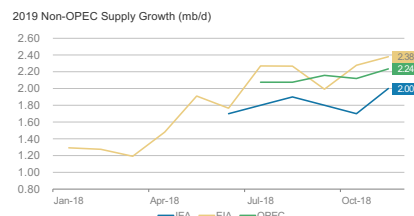
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## OPEC+: Back to Balance

**Exhibit 3:** Even after four years of upstream capex cuts, the three main forecasting agencies see non-OPEC supply growing 2-2.4 mb/d in 2019



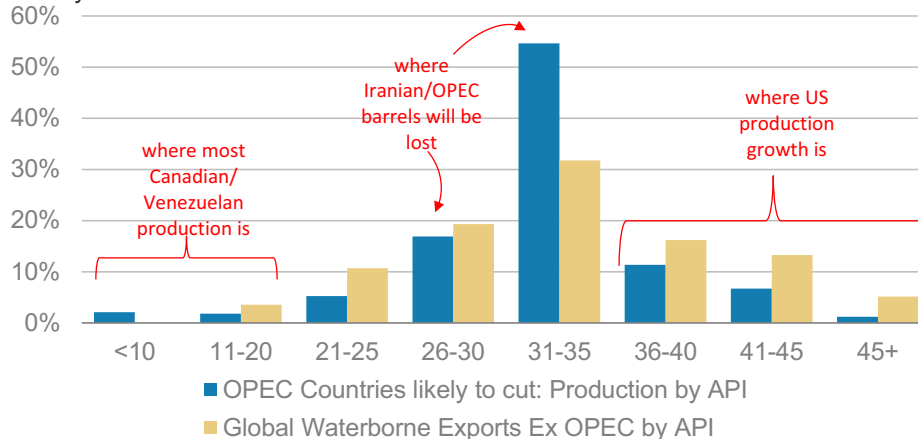
Source: IEA, EIA, OPEC Secretariat

**First, following this agreement, non-OPEC growth is now unlikely to slow:** Upstream capex over the last four years has been half the 2013/14 level. Still, all main forecasting agencies estimate non-OPEC supply to grow 2-2.4 mb/d in 2019. This is similar to 2014 when non-OPEC supply grew 2.2 mb/d, following several years of \$100+ oil and record capex. Also, it far outstrips demand, which we expect to grow ~1.3 mb/d next year. Production cuts by the OPEC+ group will likely keep the oil price supported but will also allow non-OPEC growth to continue. This implies market share loss for OPEC. This may be modest at first, but if history is any guide, this stores up problems for the future.

**Second, OPEC cuts may not resolve the oversupply of light oil:** Over the course of 2018, the global crude slate has been getting lighter. The oversupply that has recently emerged is entirely in light crudes, not medium and heavy grades. This is visible in several differentials, for example Dalia (API gravity: 23 degrees) is now trading at a \$4/bbl premium to CPC blend (API gravity: 45 degrees), compared to a historical discount of \$2/bbl. It can also be seen in product crack spreads, with gasoline and naphtha cracks now close to zero in all main regions, the result of refiners processing too much light crude. Yet, the crudes that the main OPEC countries produce are on average heavier than the market's average. If those grades are cut, this will likely exacerbate the heavy/light imbalance that already exists. The main crude benchmarks that are widely watched – Brent and WTI – are based on light crudes. OPEC production cuts may be a blunt tool in addressing the oversupply of those light grades.

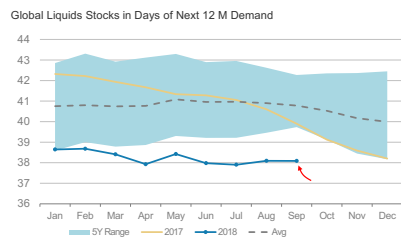
**Exhibit 4:** OPEC cuts may not fully address the oversupply in light barrels. Blue bars below show the API gravity distribution of OPEC countries likely to reduce production; the yellow bars show the same but for the global seaborne market excl. those OPEC countries. On average, OPEC produces a heavier barrel.

Share of OPEC Production and Global Waterborne Exports by API Gravity



Note: OPEC countries likely to cut includes:  
Source: ClipperData, Morgan Stanley Research

**Exhibit 5:** Unlike the Nov 2016 agreement, the current OPEC deal does not target inventory draws, which are already low



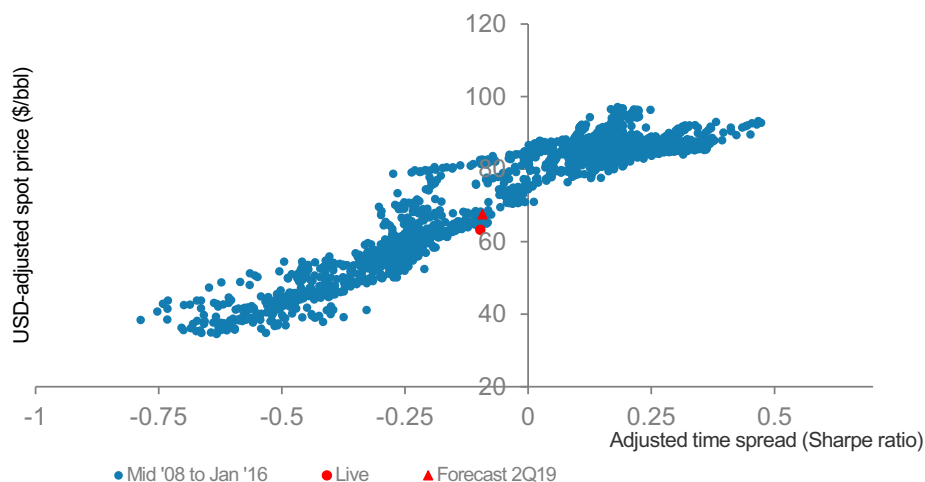
Source: IEA, EIA, JODI, Xinhua, ClipperData, Morgan Stanley Research

**Third, this is not 2016 when OPEC targeted actual undersupply:** When OPEC announced production cuts at the end of 2016, its objective was a normalisation of inventories which had grown to bloated levels during the preceding 2-3 years. To achieve this, OPEC targeted – and delivered – a supply deficit. When inventories draw, oil futures curves typically move into backwardation (i.e. a downward sloping structure). For financial investors in oil futures, backwardated forward curves offer positive roll yields. This tends to attract financial inflows into oil futures, driving prices higher. At the moment, OPEC's stated objective is merely to stabilise rather than draw inventories. This does not require the same degree of backwardation in the forward curve. This is unlikely to attract the same financial inflows, capping price upside.

**We see Brent reaching \$67.5/bbl by 2Q19, down from \$77.5/bbl before:** Stable inventories during 1H19 will likely lead to a broadly flat forward curve. Considering the historical relationship between time spreads and spot prices (also see [Regime Shift in the Oil Market](#), 29 Oct 2018), we estimate that this will support a recovery in Brent prices to \$65/bbl in 1Q19 and \$67.5/bbl in 2Q19. After that, we see a further temporary increase to ~\$75/bbl during 1H20 as the upcoming IMO specification changes will likely drive middle distillate demand sharply higher, requiring an increase in refinery crude runs, tightening the crude market. After this effect normalises, we see prices reverting back to our long-term assumption of ~\$70/bbl.

**Exhibit 6:** Currently, Brent's spot price already appears low given where time spreads are. On top of this, if inventories stabilize, time spreads should improve modestly, creating upside in spot prices too. This underpins our forecast for a recovery to \$67.5/bbl by 2Q19.

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



Note: Flat price adjusted for the strength of the US dollar using a trade-weighted index; adjusted time spreads reflect the percentage different between the 1st and 12th month Brent futures, taken as a spread over the 1-yr risk free rate and scaled by the implied volatility in option on Brent futures.  
Source: Bloomberg, Morgan Stanley Research

**Exhibit 7: Estimated production 1H19 of OPEC+ countries**
*OPEC (2.5% reduction)*

|                   | Production   |              |              | Cut<br>@2.5% | Implied<br>quota | Assumed<br>Compliance | Est. 1H19<br>Production | Cut from    |             |
|-------------------|--------------|--------------|--------------|--------------|------------------|-----------------------|-------------------------|-------------|-------------|
|                   | Sep          | Oct          | Nov          |              |                  |                       |                         | Oct         | Nov         |
| Saudi Arabia      | 10.52        | 10.65        | 11.10        | 0.27         | 10.38            | 140%                  | 10.28                   | 0.37        | 0.82        |
| Iraq              | 4.67         | 4.65         | 4.50         | 0.12         | 4.53             | 100%                  | 4.53                    | 0.12        | - 0.03      |
| UAE               | 3.05         | 3.21         | 3.27         | 0.08         | 3.13             | 120%                  | 3.11                    | 0.10        | 0.16        |
| Kuwait            | 2.78         | 2.76         | 2.80         | 0.07         | 2.69             | 100%                  | 2.69                    | 0.07        | 0.11        |
| Nigeria           | 1.66         | 1.67         | 1.76         | 0.04         | 1.63             | 100%                  | 1.63                    | 0.04        | 0.13        |
| Angola            | 1.50         | 1.50         | 1.49         | 0.04         | 1.46             | 100%                  | 1.46                    | 0.04        | 0.03        |
| Algeria           | 1.07         | 1.07         | 1.05         | 0.03         | 1.04             | 100%                  | 1.04                    | 0.03        | 0.01        |
| Qatar*            | 0.59         | 0.61         | 0.61         | -            | 0.61             | -                     | 0.60                    | 0.01        | 0.01        |
| Ecuador           | 0.53         | 0.52         | 0.52         | 0.01         | 0.51             | 100%                  | 0.51                    | 0.01        | 0.01        |
| Congo             | 0.34         | 0.33         | 0.32         | 0.01         | 0.32             | 100%                  | 0.32                    | 0.01        | - 0.00      |
| Gabon             | 0.19         | 0.19         | 0.18         | 0.00         | 0.19             | 100%                  | 0.19                    | 0.00        | - 0.01      |
| Equatorial Guinea | 0.12         | 0.11         | 0.11         | 0.00         | 0.11             | 100%                  | 0.11                    | 0.00        | 0.00        |
| <b>Sub-total</b>  | <b>27.02</b> | <b>27.27</b> | <b>27.71</b> | <b>0.67</b>  | <b>26.60</b>     | <b>120%</b>           | <b>26.47</b>            | <b>0.80</b> | <b>1.24</b> |

*Exempt OPEC countries*

|                       |              |              |              |  |  |  |              |             |             |
|-----------------------|--------------|--------------|--------------|--|--|--|--------------|-------------|-------------|
| Venezuela             | 1.27         | 1.26         | 1.23         |  |  |  | 1.10         | 0.16        | 0.13        |
| Libya                 | 1.06         | 1.12         | 1.18         |  |  |  | 1.10         | 0.02        | 0.08        |
| Iran                  | 3.44         | 3.34         | 3.09         |  |  |  | 2.60         | 0.74        | 0.49        |
| <b>Sub-total OPEC</b> | <b>32.79</b> | <b>32.99</b> | <b>33.21</b> |  |  |  | <b>31.27</b> | <b>1.72</b> | <b>1.94</b> |

*Non-OPEC (2.0% reduction)*

|                           | Production   |              |              | Cut<br>@2.0% | Implied<br>quota | Assumed<br>Compliance | Est. 1H19<br>Production | Cut from    |             |
|---------------------------|--------------|--------------|--------------|--------------|------------------|-----------------------|-------------------------|-------------|-------------|
|                           | Sep          | Oct          | Nov          |              |                  |                       |                         | Oct         | Nov         |
| Russia                    | 11.37        | 11.41        | 11.37        | 0.23         | 11.18            | 79%                   | 11.23                   | 0.18        | 0.14        |
| Mexico                    | 2.07         | 2.05         | 2.05         | 0.04         | 2.01             | 122%                  | 2.00                    | 0.05        | 0.05        |
| Kazakhstan                | 1.91         | 1.86         | 1.86         | 0.04         | 1.82             | 81%                   | 1.83                    | 0.03        | 0.03        |
| Others                    | 1.20         | 1.18         | 1.18         | 0.02         | 1.16             | 100%                  | 1.16                    | 0.02        | 0.02        |
| Oman                      | 0.98         | 0.98         | 0.98         | 0.02         | 0.96             | 100%                  | 0.96                    | 0.02        | 0.02        |
| Azerbaijan                | 0.80         | 0.78         | 0.78         | 0.02         | 0.76             | 103%                  | 0.76                    | 0.02        | 0.02        |
| <b>Sub-total non-OPEC</b> | <b>18.33</b> | <b>18.26</b> | <b>18.22</b> | <b>0.37</b>  | <b>17.89</b>     | <b>87%</b>            | <b>17.94</b>            | <b>0.32</b> | <b>0.28</b> |

|                    |              |              |              |  |  |  |  |             |             |
|--------------------|--------------|--------------|--------------|--|--|--|--|-------------|-------------|
| <b>Total OPEC+</b> | <b>51.12</b> | <b>51.25</b> | <b>51.43</b> |  |  |  |  | <b>2.04</b> | <b>2.22</b> |
|--------------------|--------------|--------------|--------------|--|--|--|--|-------------|-------------|

Note: Assumed compliance refers to average across 1H19; September and October production based on IEA reports; November production based on Bloomberg estimates. Qatar will withdraw from OPEC from 1 Jan 2019.  
Source: OPEC, IEA, Bloomberg, Morgan Stanley Research

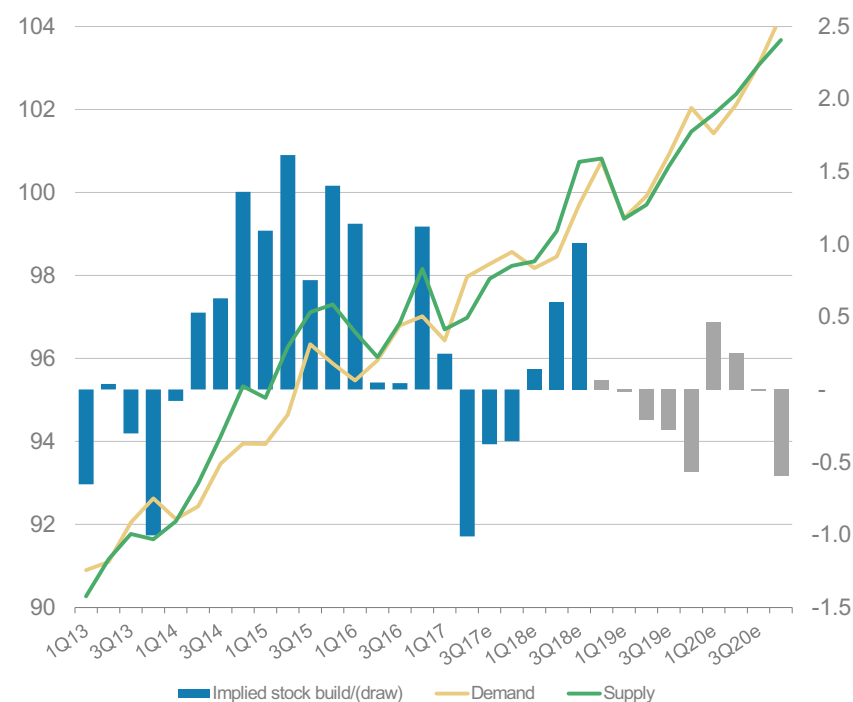
## Balance Overview

Exhibit 8: Global Balance Summary (mmb/d)

|                                   | 2018        |             |             |             |              | 2019        |             |             |              |              | YoY Change   |              |
|-----------------------------------|-------------|-------------|-------------|-------------|--------------|-------------|-------------|-------------|--------------|--------------|--------------|--------------|
|                                   | 2017        | 1Q18        | 2Q18        | 3Q18        | 4Q18         | 2018        | 1Q19        | 2Q19        | 3Q19         | 4Q19         | 2018         | 2019         |
| <b>Demand</b>                     | <b>97.8</b> | <b>98.2</b> | <b>98.5</b> | <b>99.7</b> | <b>100.7</b> | <b>99.3</b> | <b>99.4</b> | <b>99.9</b> | <b>100.9</b> | <b>102.0</b> | <b>100.6</b> | <b>102.7</b> |
| OECD                              | 47.4        | 47.8        | 47.1        | 48.0        | 48.7         | 47.9        | 48.1        | 47.3        | 48.2         | 49.0         | 48.2         | 49.0         |
| US 50                             | 20.0        | 20.2        | 20.3        | 20.6        | 20.8         | 20.5        | 20.5        | 20.6        | 20.9         | 21.0         | 20.7         | 21.1         |
| Euro 5                            | 8.3         | 8.2         | 8.2         | 8.2         | 8.3          | 8.2         | 8.2         | 8.2         | 8.2          | 8.3          | 8.2          | 8.4          |
| Non-OECD                          | 50.4        | 50.4        | 51.4        | 51.7        | 52.0         | 51.4        | 51.3        | 52.6        | 52.7         | 53.1         | 52.4         | 53.8         |
| China                             | 12.6        | 12.7        | 13.0        | 13.2        | 13.4         | 13.1        | 13.2        | 13.6        | 13.8         | 13.9         | 13.6         | 14.2         |
| India                             | 4.6         | 4.8         | 4.9         | 4.6         | 4.9          | 4.8         | 5.0         | 5.0         | 4.7          | 5.1          | 4.9          | 5.1          |
| <b>Non-OPEC Supply</b>            | <b>57.9</b> | <b>59.1</b> | <b>60.0</b> | <b>61.2</b> | <b>61.2</b>  | <b>60.3</b> | <b>61.2</b> | <b>61.4</b> | <b>62.2</b>  | <b>63.0</b>  | <b>62.0</b>  | <b>63.8</b>  |
| US                                | 13.3        | 14.4        | 15.1        | 16.0        | 16.1         | 15.4        | 16.4        | 16.6        | 17.0         | 17.3         | 16.8         | 17.9         |
| Canada                            | 4.8         | 5.2         | 5.0         | 5.1         | 5.2          | 5.1         | 5.3         | 4.8         | 5.2          | 5.2          | 5.1          | 5.2          |
| Russia                            | 11.4        | 11.3        | 11.4        | 11.6        | 11.8         | 11.5        | 11.7        | 11.6        | 11.6         | 11.7         | 11.6         | 11.8         |
| OPEC NGLs/Condensates             | 6.9         | 6.9         | 6.9         | 7.0         | 6.9          | 6.9         | 6.9         | 6.9         | 6.9          | 6.8          | 6.9          | 6.9          |
| Call on OPEC Crude                | 33.0        | 32.2        | 31.5        | 31.6        | 32.7         | 32.0        | 31.3        | 31.6        | 31.9         | 32.2         | 31.7         | 32.0         |
| OPEC Crude                        | 32.6        | 32.3        | 32.1        | 32.6        | 32.8         | 32.5        | 31.3        | 31.4        | 31.6         | 31.6         | 31.5         | 32.0         |
| <b>Implied stock build/(draw)</b> | <b>-0.4</b> | <b>0.1</b>  | <b>0.6</b>  | <b>1.0</b>  | <b>0.1</b>   | <b>0.5</b>  | <b>0.0</b>  | <b>-0.2</b> | <b>-0.3</b>  | <b>-0.6</b>  | <b>-0.3</b>  | <b>0.0</b>   |

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

Exhibit 9: Global Balance (mmb/d)



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

## Oil Price Forecasts

**Exhibit 10:** Bull, base, and bear case estimates for Brent and WTI at end of period

| (\$/bbl) | WTI       |           |           |
|----------|-----------|-----------|-----------|
|          | Bear case | Base case | Bull case |
| 1Q19     | 46.0      | 56.0      | 66.0      |
| 2Q19     | 48.5      | 58.5      | 68.5      |
| 3Q19     | 51.0      | 61.0      | 71.0      |
| 4Q19     | 53.5      | 63.5      | 73.5      |
| 1Q20     | 56.0      | 66.0      | 76.0      |
| 2Q20     | 57.0      | 67.0      | 77.0      |
| 3Q20     | 54.5      | 64.5      | 74.5      |
| 4Q20     | 52.0      | 62.0      | 72.0      |
| LT       | 54.0      | 64.0      | 74.0      |

| (\$/bbl) | Brent     |           |           |
|----------|-----------|-----------|-----------|
|          | Bear case | Base case | Bull case |
| 1Q19     | 55.0      | 65.0      | 75.0      |
| 2Q19     | 57.5      | 67.5      | 77.5      |
| 3Q19     | 60.0      | 70.0      | 80.0      |
| 4Q19     | 62.5      | 72.5      | 82.5      |
| 1Q20     | 65.0      | 75.0      | 85.0      |
| 2Q20     | 65.0      | 75.0      | 85.0      |
| 3Q20     | 62.5      | 72.5      | 82.5      |
| 4Q20     | 60.0      | 70.0      | 80.0      |
| LT       | 60.0      | 70.0      | 80.0      |

Source: Morgan Stanley Research estimates

**Exhibit 11:** Price forecast chart for Brent

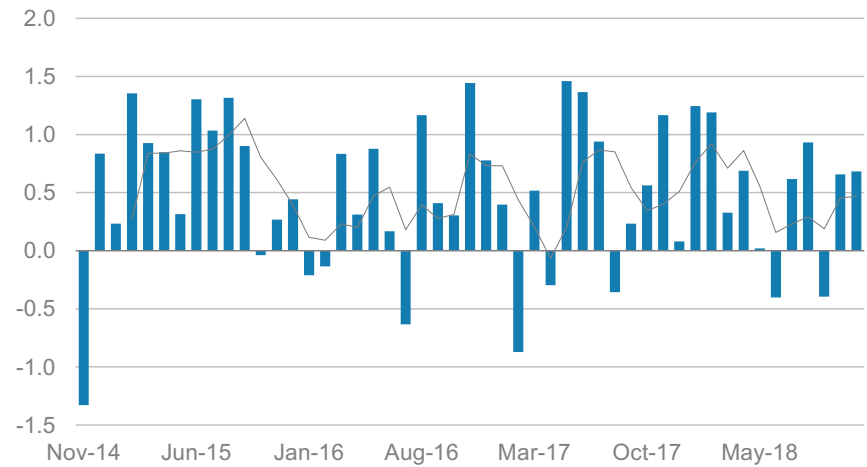
Brent price target (\$/bbl)



Source: Morgan Stanley Research estimates

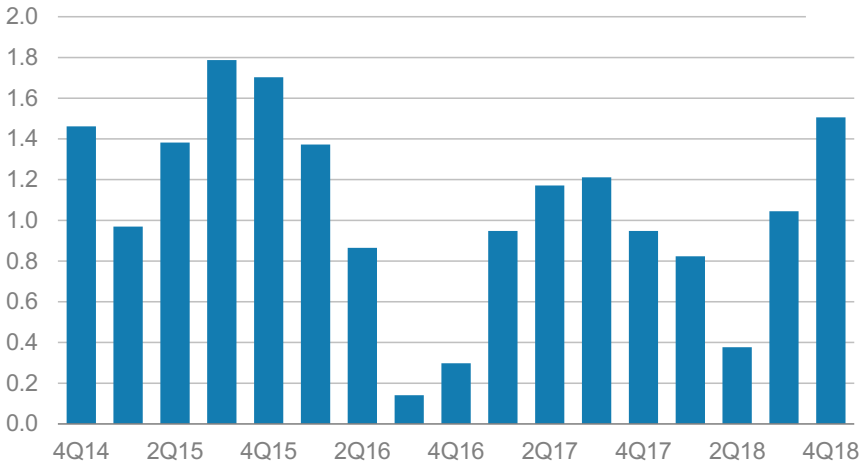
Supply – Demand Overview

Exhibit 12: OECD Demand Growth (annual, mmb/d)



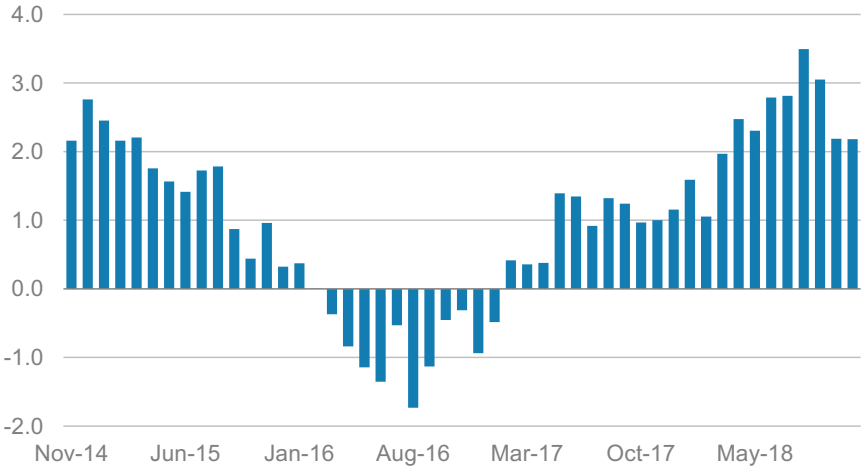
Source: IEA

Exhibit 13: Non-OECD Demand Growth (annual, mmb/d)



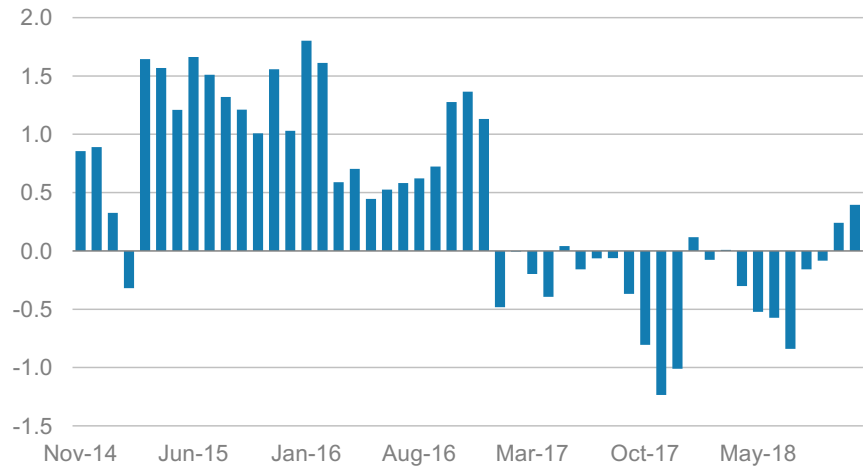
Source: IEA

Exhibit 14: Non-OPEC Supply Growth (annual, mmb/d)



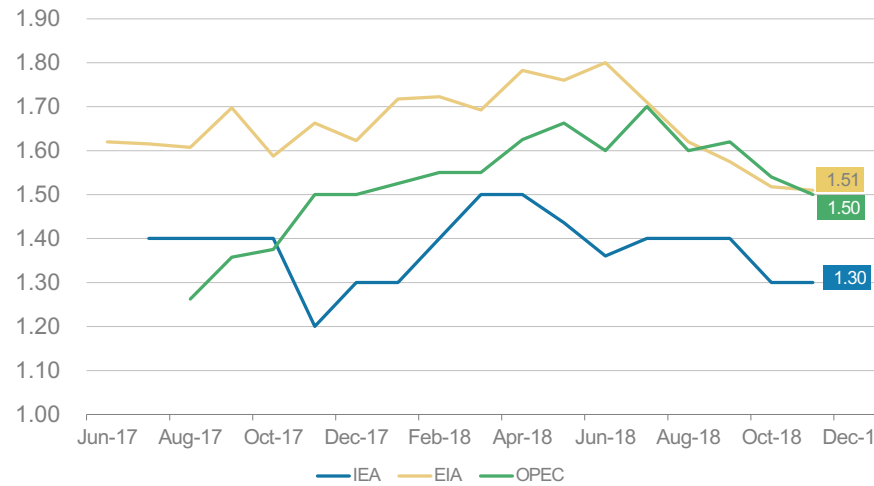
Source: IEA

Exhibit 15: OPEC Supply Growth (annual, mmb/d)



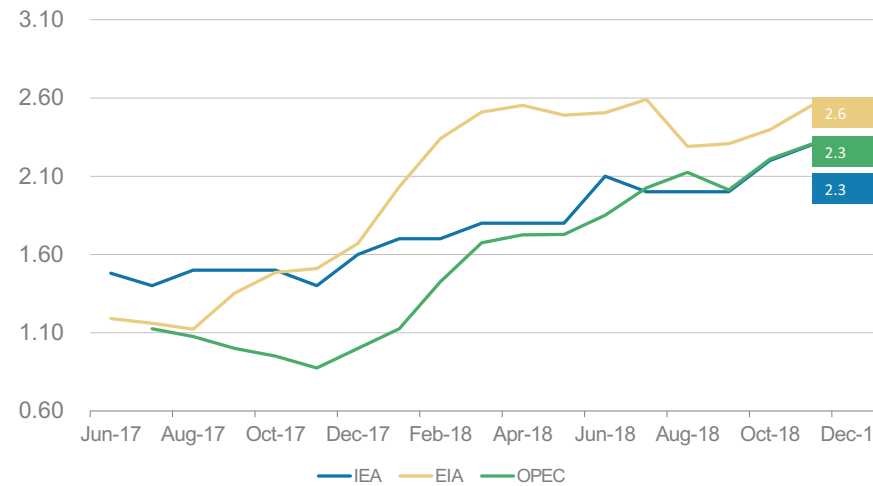
Key Agency Revisions (2018)

Exhibit 16: Oil Demand Growth 2017-18 (mmb/d)



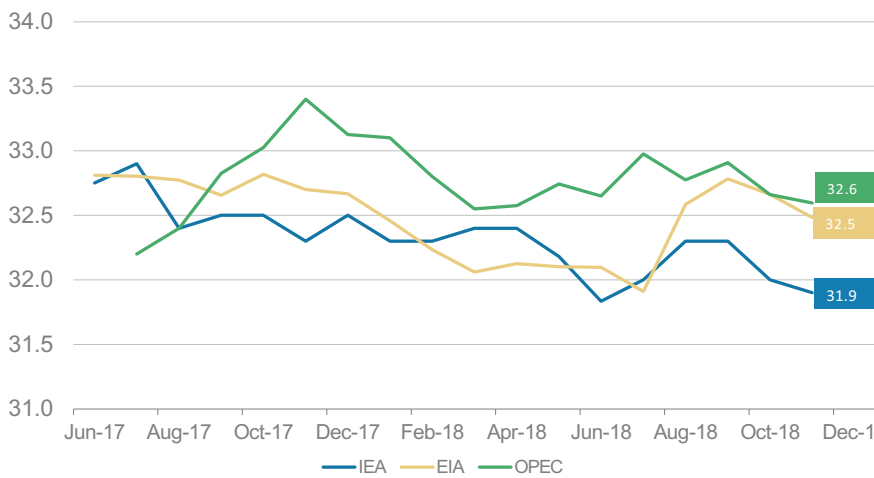
Source: EIA, IEA, OPEC

Exhibit 17: Non-OPEC Supply Growth 2017-18 (mmb/d)



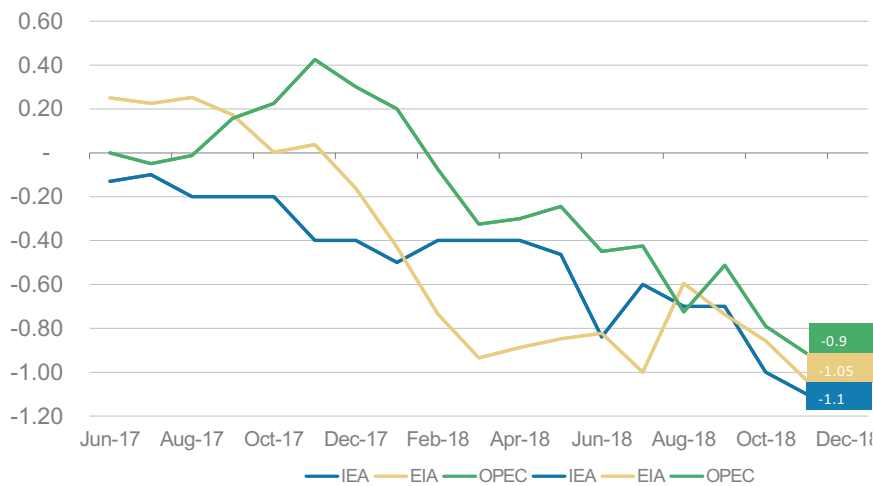
Source: EIA, IEA, OPEC

Exhibit 18: Call on OPEC 2018 (mmb/d)



Source: EIA, IEA, OPEC

Exhibit 19: Change in the Call on OPEC 2017-18 (mmb/d)

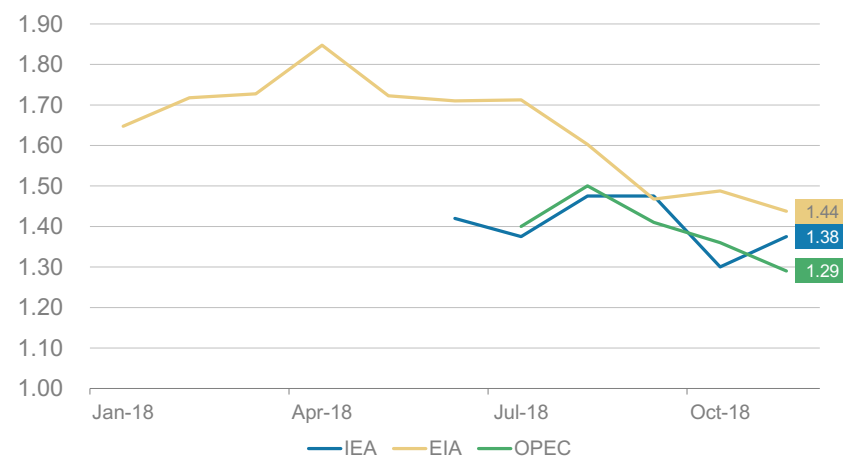


Source: EIA, IEA, OPEC



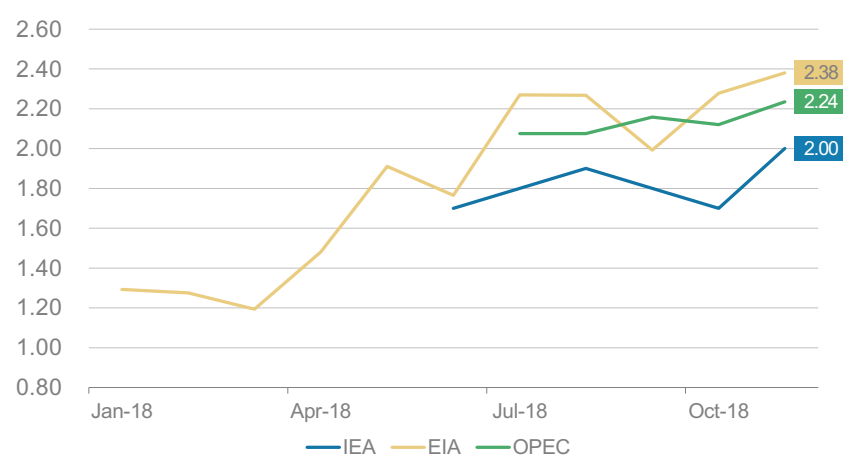
Key Agency Revisions (2019)

Exhibit 20: Oil Demand Growth 2018-19 (mmb/d)



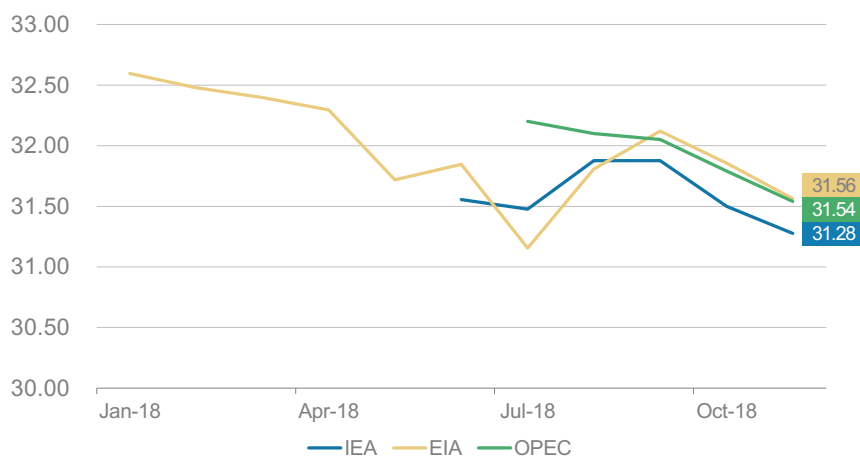
Source: EIA, IEA, OPEC

Exhibit 21: Non-OPEC Supply Growth 2018-19 (mmb/d)



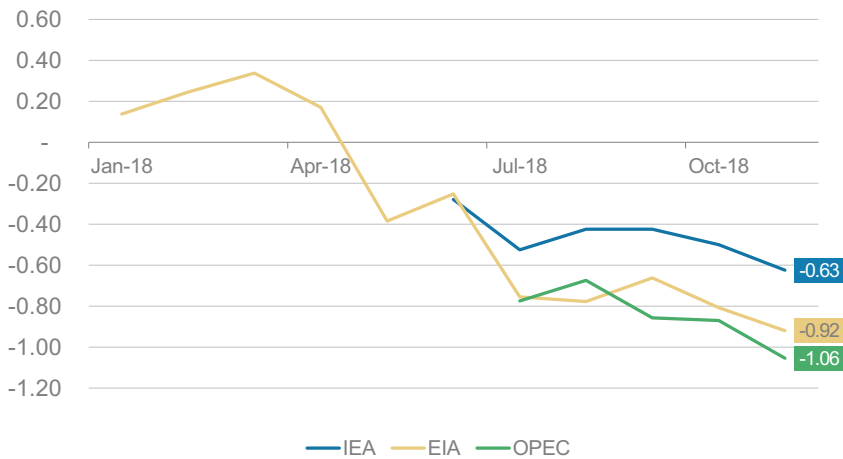
Source: EIA, IEA, OPEC

Exhibit 22: Call on OPEC 2019 (mmb/d)



Source: EIA, IEA, OPEC

Exhibit 23: Change in the Call on OPEC 2018-19 (mmb/d)



Source: EIA, IEA, OPEC

## Prices & Differentials

**Exhibit 24: Crude Prices (\$/bbl)**



Source: Bloomberg

**Exhibit 26: Brent vs. WTI (\$/bbl)**



Source: Bloomberg

**Exhibit 28: Brent vs. Dubai (\$/bbl)**



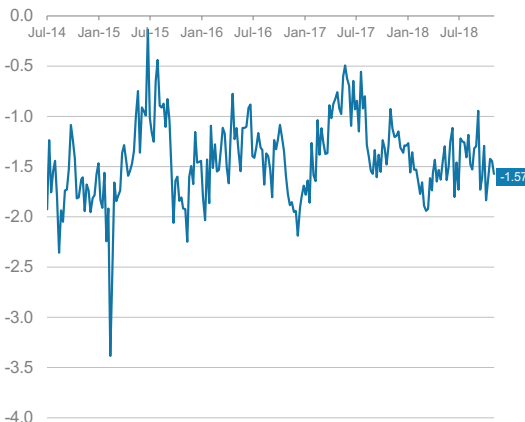
Source: Bloomberg

**Exhibit 25: Angola vs. Brent (\$/bbl)**



Source: Platts, Bloomberg

**Exhibit 27: Sweet vs. Sour: Discount per 1% of Sulphur Content (\$/bbl)**



Source: Platts, Bloomberg

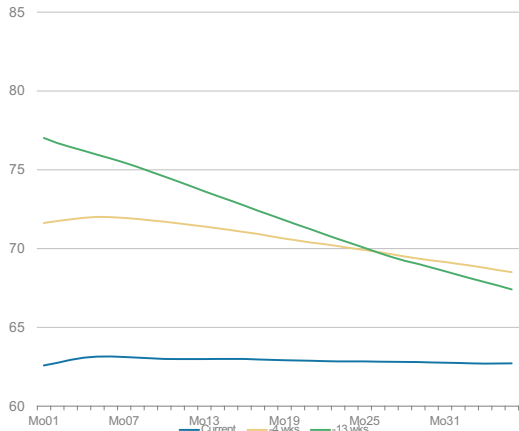
**Exhibit 29: Heavy - Light: Premium per Degree of API Gravity (\$/bbl)**



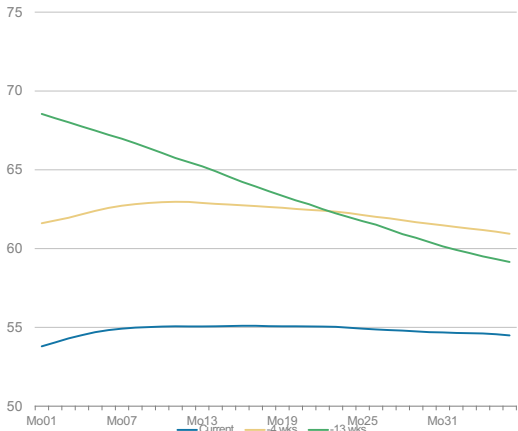
Source: Platts, Bloomberg

# Crude Oil Forward Curves and Time Spreads

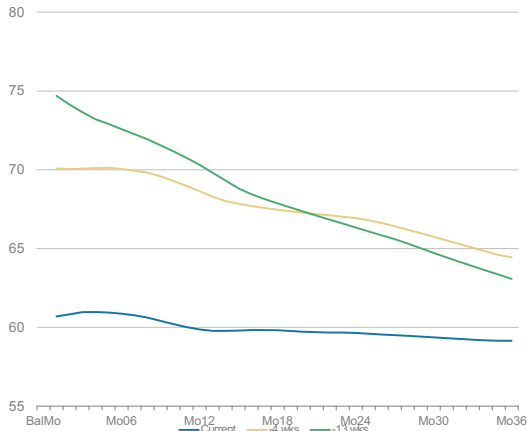
**Exhibit 30: Brent Forward Curve (\$/bbl)**



**Exhibit 32: WTI Forward Curve (\$/bbl)**



**Exhibit 34: Dubai Forward Curve (\$/bbl)**



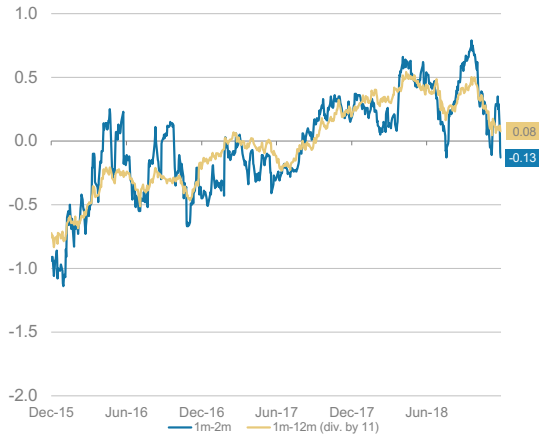
**Exhibit 31: Brent Time Spreads (\$/bbl)**



**Exhibit 33: WTI Time Spreads (\$/bbl)**

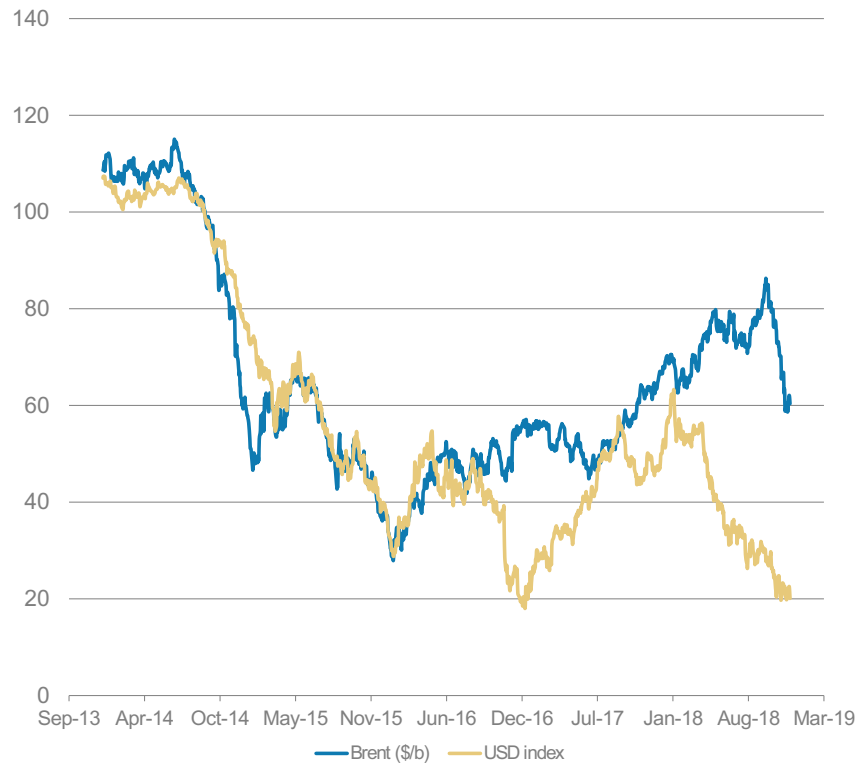


**Exhibit 35: Dubai Time Spreads (\$/bbl)**



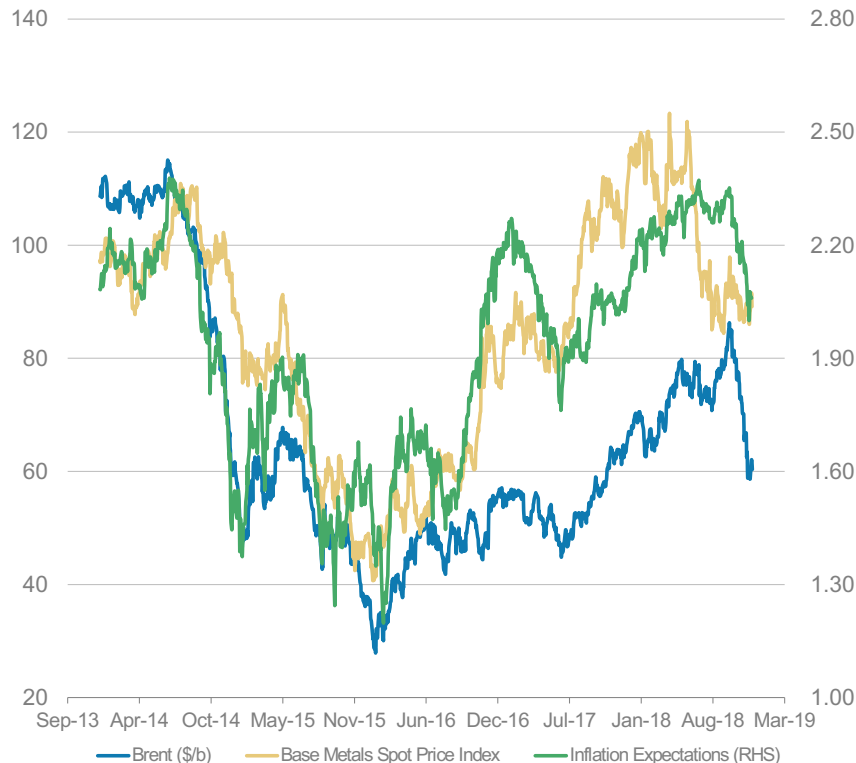
Oil vs. Other Things

Exhibit 36: Brent Crude vs. Inverse TWD



Source: Reuters

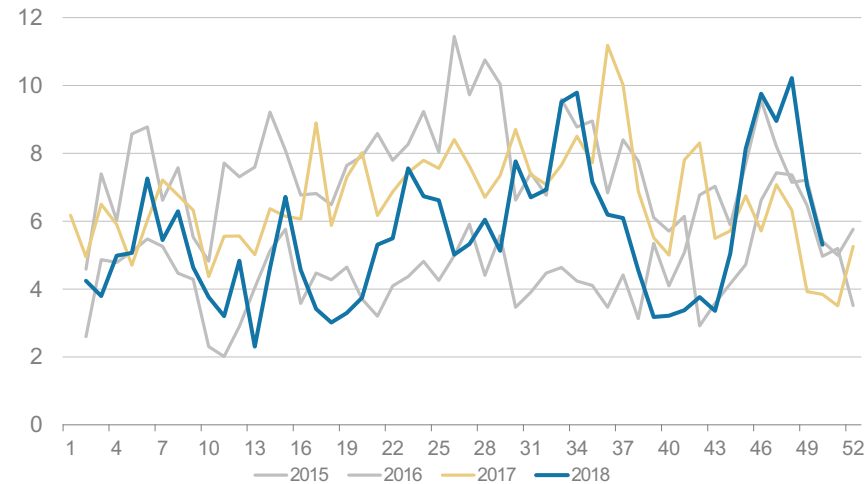
Exhibit 37: Brent Crude vs. Inflation vs. Base Metals



Source: Bloomberg

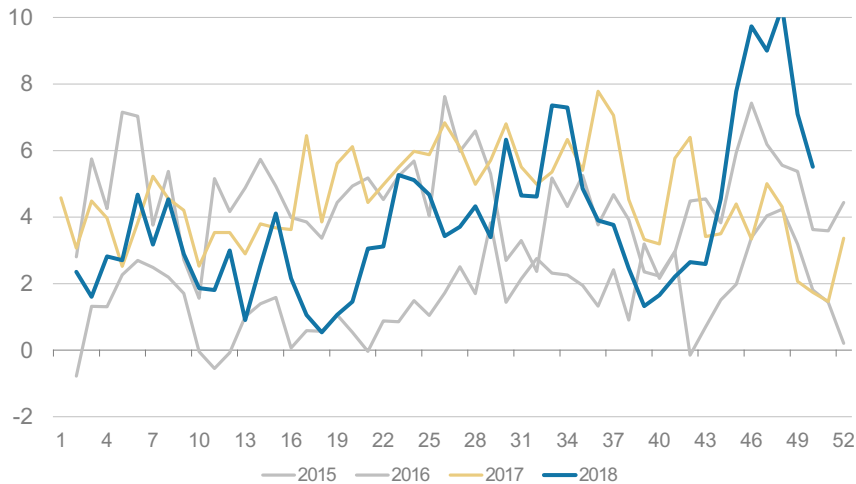
Refining Margins

Exhibit 38: Rotterdam – Brent Cracking (\$/bbl)



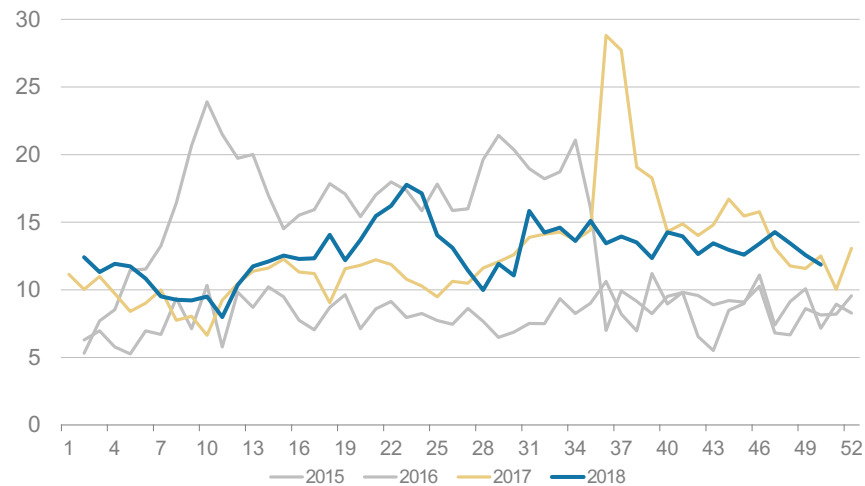
Source: Thomson Reuters

Exhibit 39: Rotterdam – Brent Hydroskimming (\$/bbl)



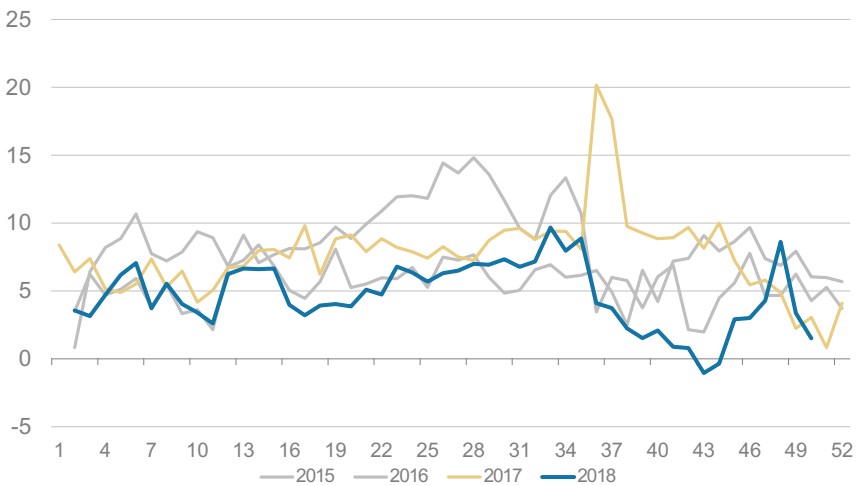
Source: Thomson Reuters

Exhibit 40: USGC – WTI Cracking (\$/bbl)



Source: Thomson Reuters

Exhibit 41: USGC – Brent Cracking (\$/bbl)



Source: Thomson Reuters

Exhibit 42: Med – Urals Cracking (\$/bbl)

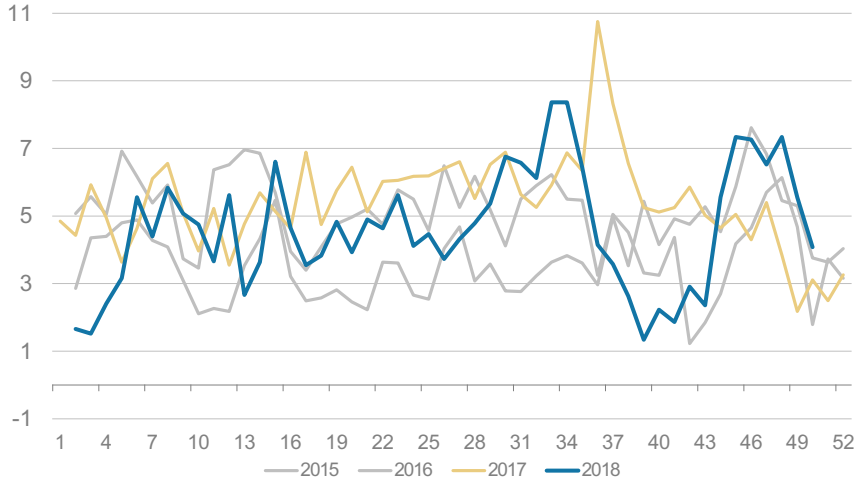


Exhibit 43: Med – Urals Hydroskimming (\$/bbl)

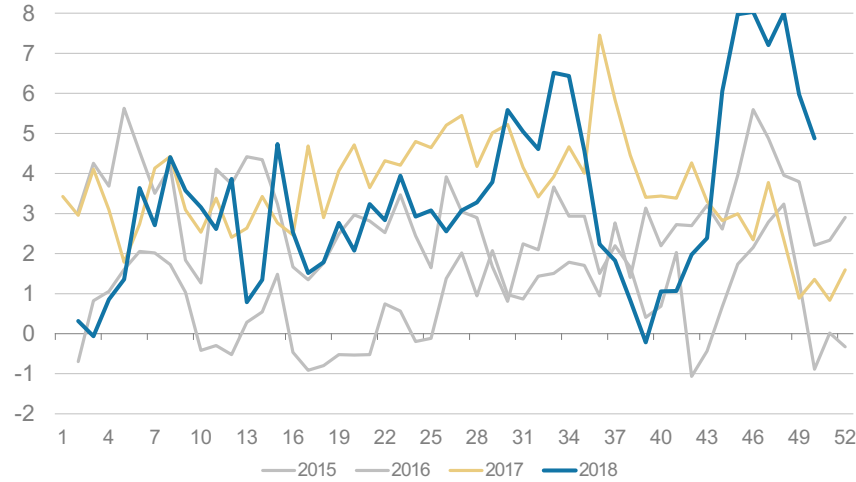


Exhibit 44: Singapore – Dubai Cracking (\$/bbl)

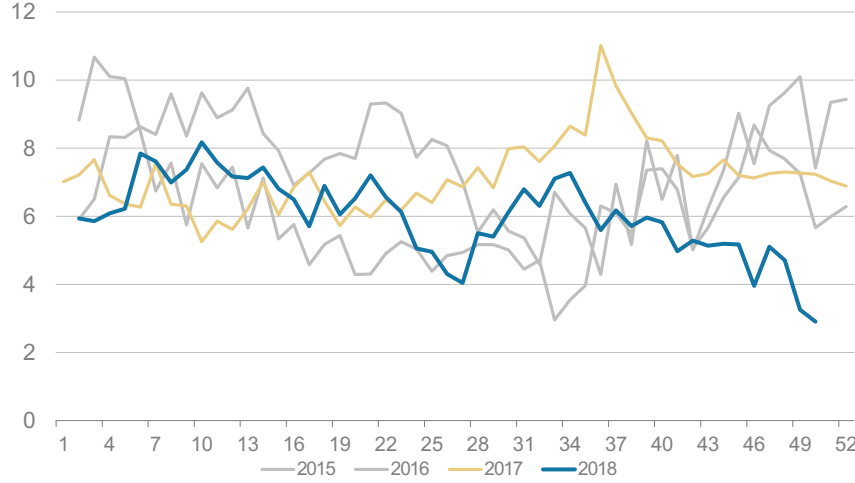
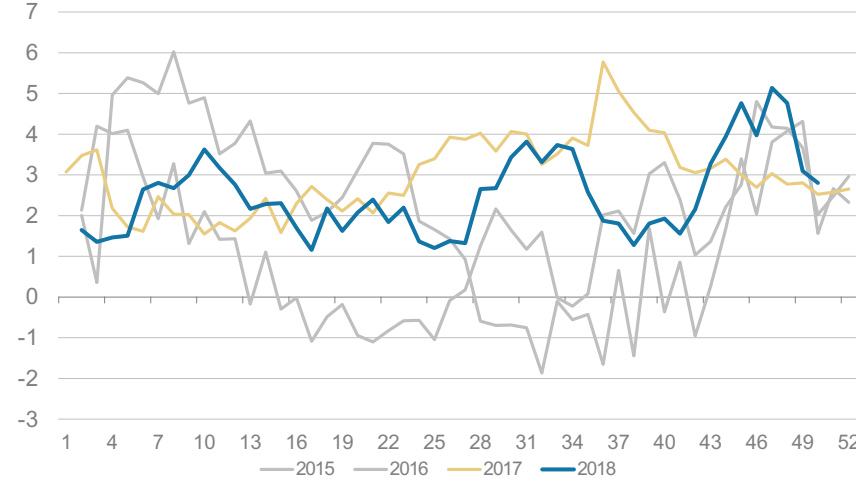
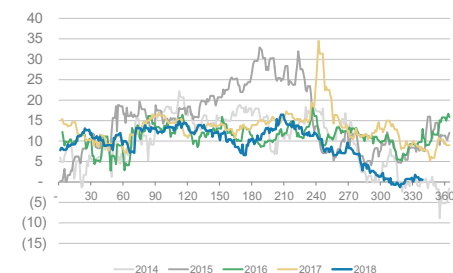


Exhibit 45: Singapore – Dubai Hydroskimming (\$/bbl)



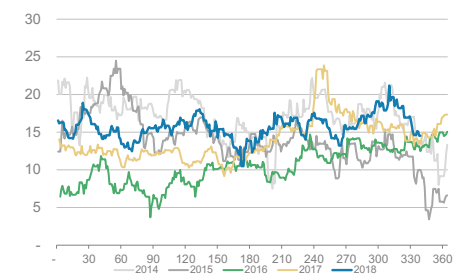
# Product Cracks

**Exhibit 46: Gasoline US vs. WTI (\$/bbl)**



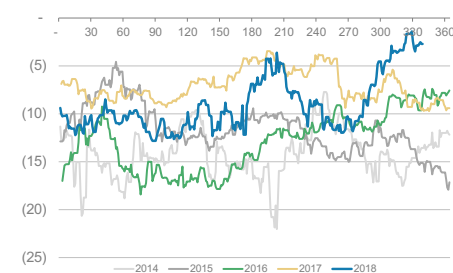
Source: Platts, Bloomberg

**Exhibit 47: Diesel US vs. WTI (\$/bbl)**



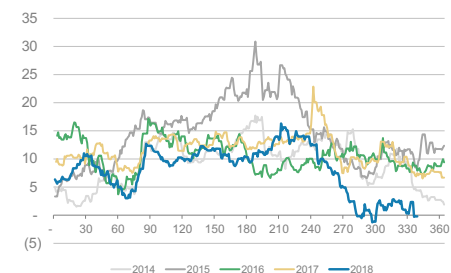
Source: Platts, Bloomberg

**Exhibit 48: US Fuel Oil Crack (\$/bbl)**



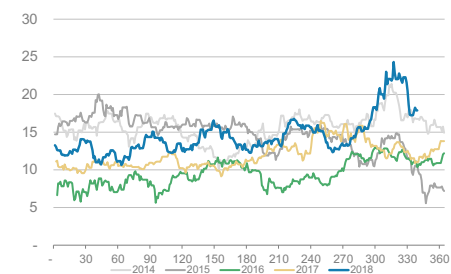
Source: Platts, Bloomberg

**Exhibit 49: Gasoline NWE vs. Brent (\$/bbl)**



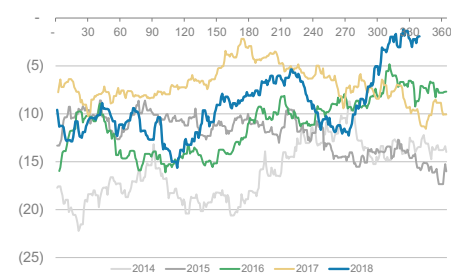
Source: Platts, Bloomberg

**Exhibit 50: Diesel NWE vs. Brent (\$/bbl)**



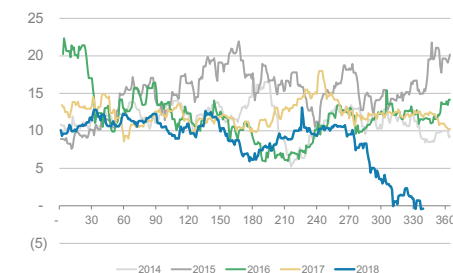
Source: Platts, Bloomberg

**Exhibit 51: Fuel Oil NWE vs. Brent (\$/bbl)**



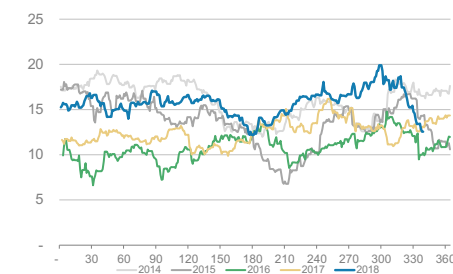
Source: Platts, Bloomberg

**Exhibit 52: Gasoline Singapore vs. Brent (\$/bbl)**



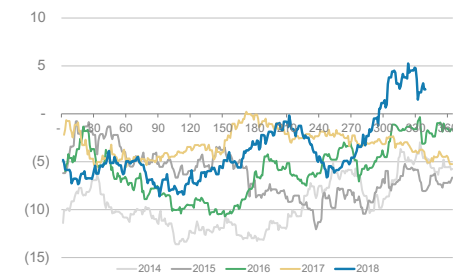
Source: Platts, Bloomberg

**Exhibit 53: Gasoil Singapore vs. Brent (\$/bbl)**



Source: Platts, Bloomberg

**Exhibit 54: Fuel Oil Singapore vs. Brent (\$/bbl)**



Source: Platts, Bloomberg

European Product Crack Forward Curves

Exhibit 55: Gasoline Crack NWE Forward Curve (\$/bbl)

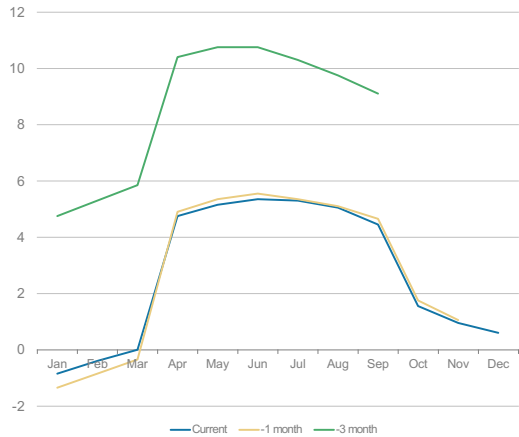


Exhibit 57: Naphtha Crack NWE Forward Curve (\$/bbl)

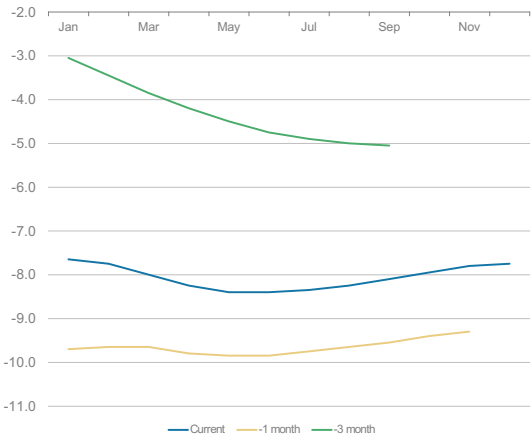


Exhibit 59: Gasoil 0.1% Crack NWE Forward Curve (\$/bbl)

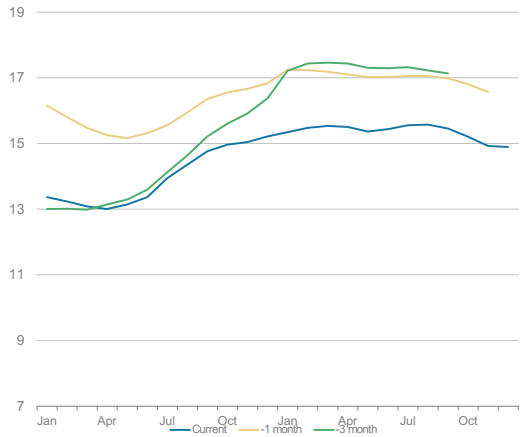


Exhibit 56: ULSD 10ppm Crack Forward Curve (\$/bbl)

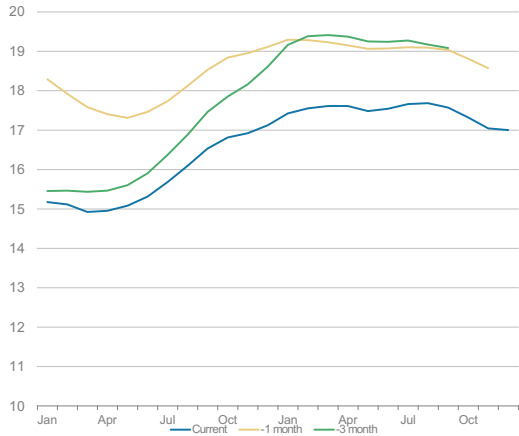


Exhibit 58: Jet Kero Crack NWE Forward Curve (\$/bbl)

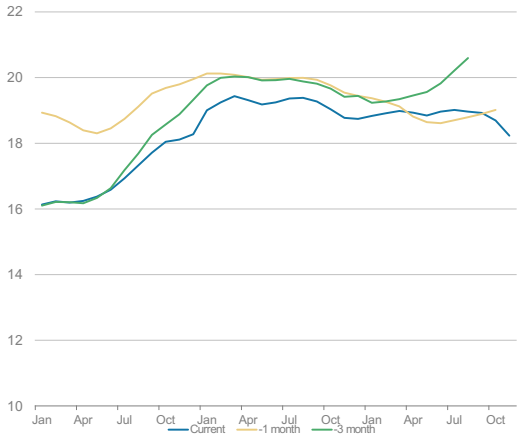
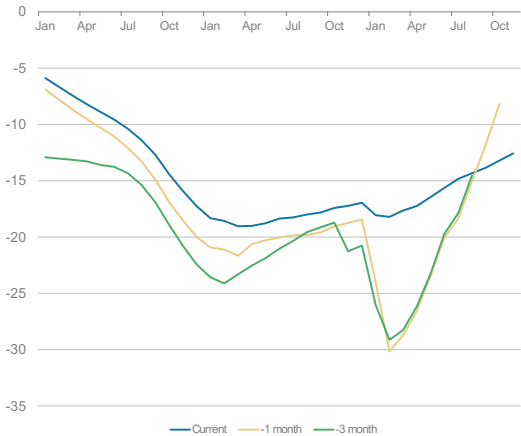


Exhibit 60: Fuel Oil 3.5% Crack Forward Curve (\$/bbl)

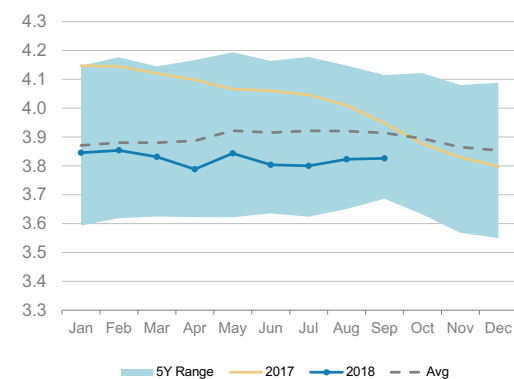




# Global Stocks – Monthly

**Exhibit 61: Total Liquid Stocks (bln bbls)**

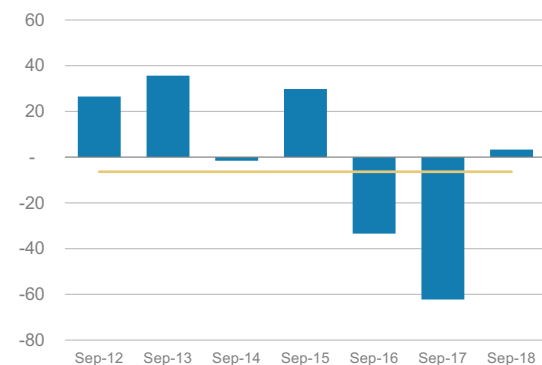
Total Liquid Stocks (bln bbls)



Source: IEA, JODI, Xinhua

**Exhibit 62: Historical Global Liquids Stock Change (Latest Month)**

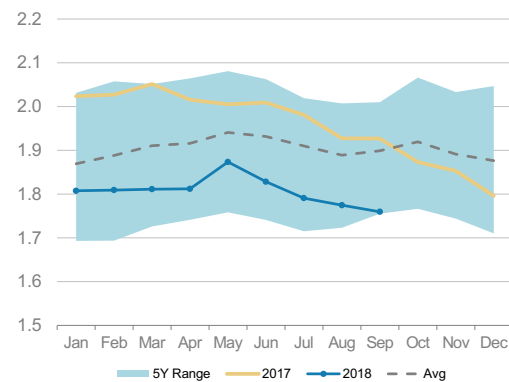
MoM Change in Global Liquids Stocks in Sept of Each Year (mln bbls)



Source: IEA, JODI, Xinhua

**Exhibit 63: Total Crude Stocks (bln bbls)**

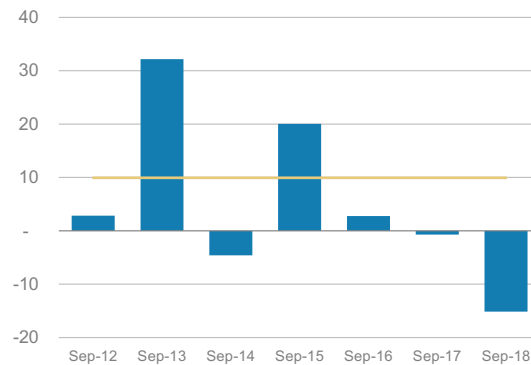
Total Crude Stocks (bln bbls)



Source: IEA, JODI, Xinhua

**Exhibit 64: Historical Global Crude Stock Change (Latest Month)**

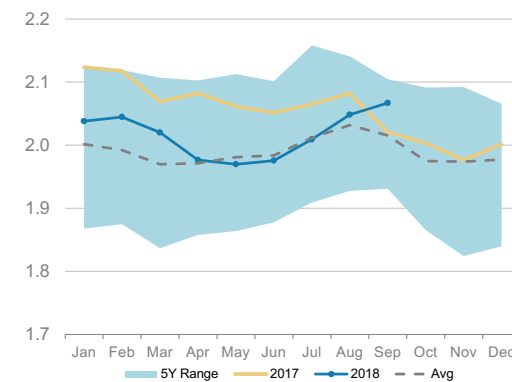
MoM Change in Global Crude Stocks in Sept of Each Year (mln bbls)



Source: IEA, JODI, Xinhua

**Exhibit 65: Total Product Stocks (bln bbls)**

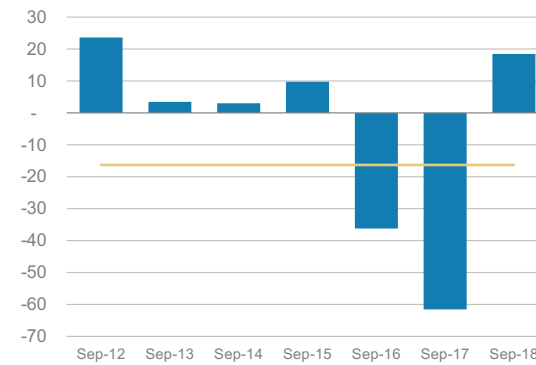
Total Product Stocks



Source: IEA, JODI, Xinhua

**Exhibit 66: Historical Global Products Stock Change (Latest Month)**

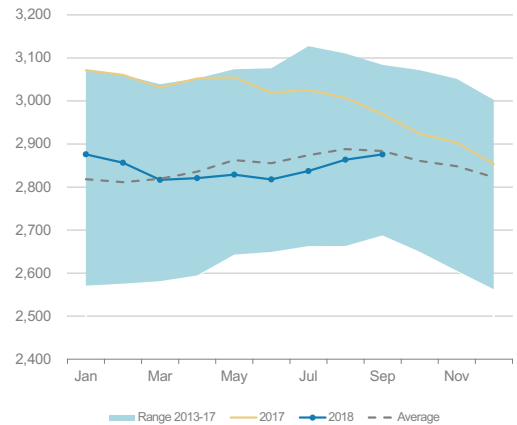
MoM Change in Global Product Stocks in Sept of Each Year (mln bbls)



Source: IEA, JODI, Xinhua

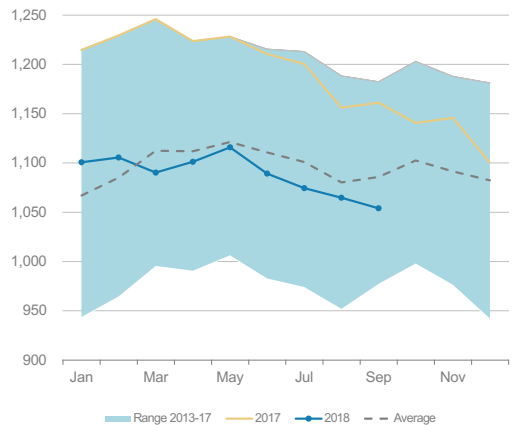
# OECD Stocks – Monthly

**Exhibit 67:** OECD Total Liquid Stocks (bln bbls)



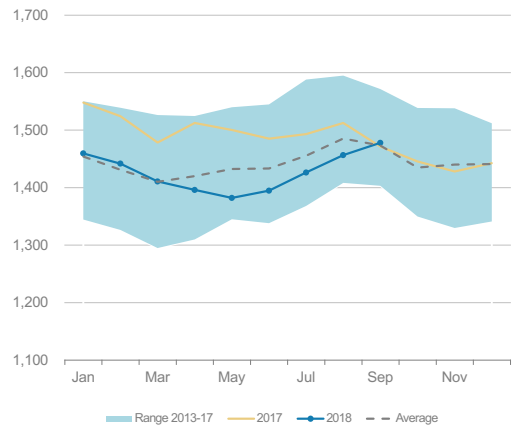
Source: IEA

**Exhibit 69:** OECD Total Crude Stocks (bln bbls)



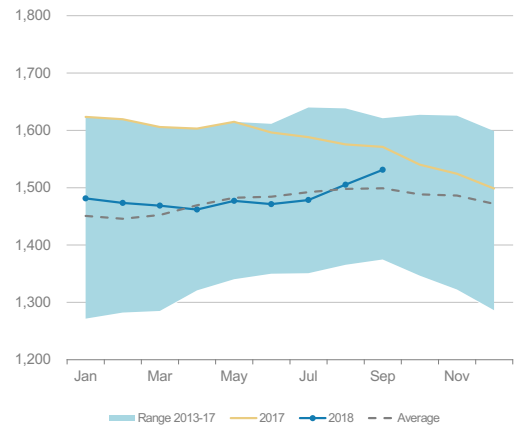
Source: IEA

**Exhibit 71:** OECD Total Product Stocks (bln bbls)



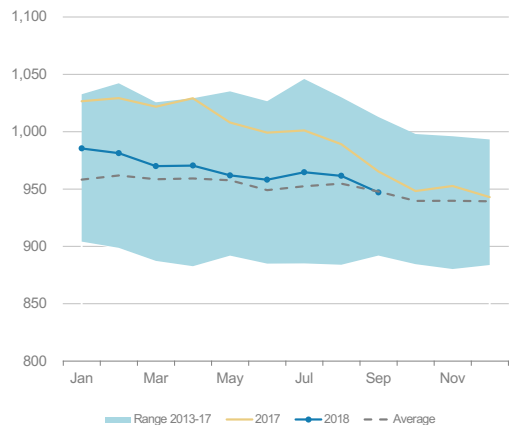
Source: IEA

**Exhibit 68:** OECD Americas Total Liquid Stocks (bln bbls)



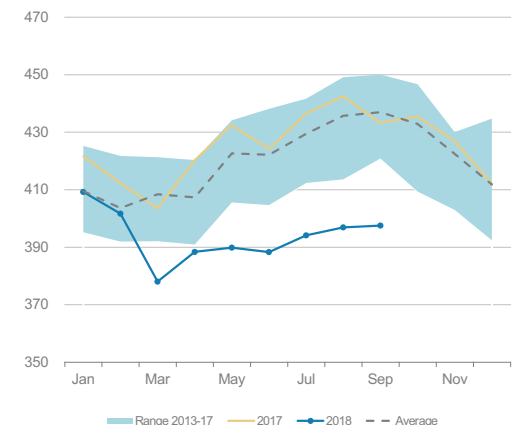
Source: IEA

**Exhibit 70:** OECD Europe Total Liquid Stocks (bln bbls)



Source: IEA

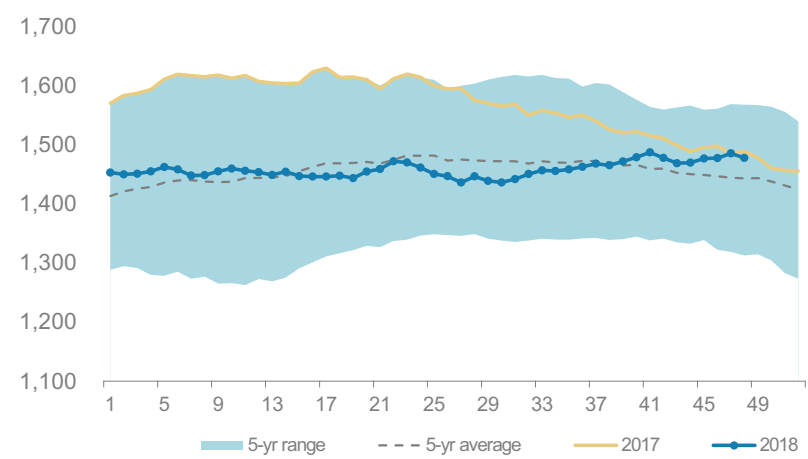
**Exhibit 72:** OECD Asia Oceania Total Liquid Stocks (bln bbls)



Source: IEA

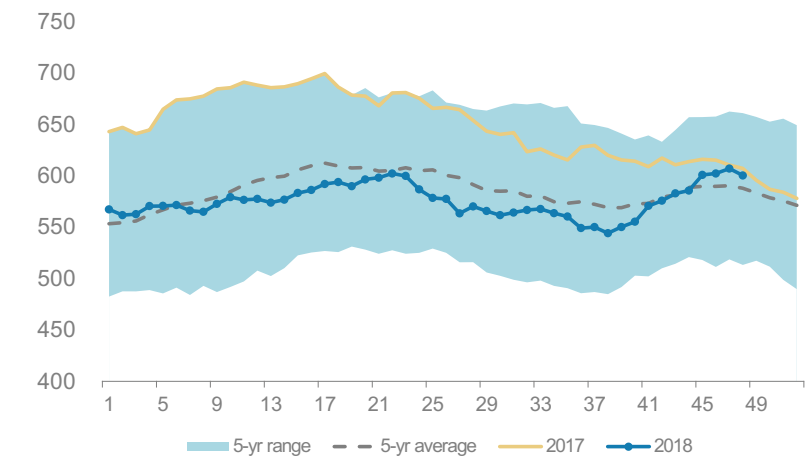
Global Stocks – Weekly

Exhibit 73: Total Oil (US, Japan, ARA, Singapore)



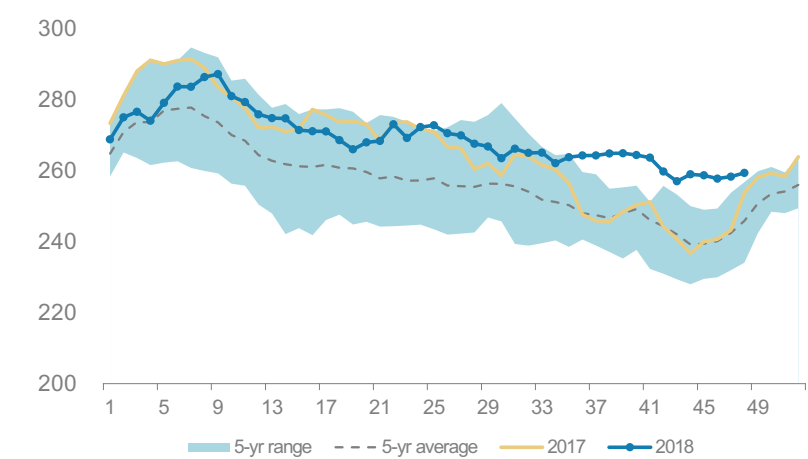
Source: EIA, PAJ, Genscape

Exhibit 74: Crude (US, Japan, ARA)



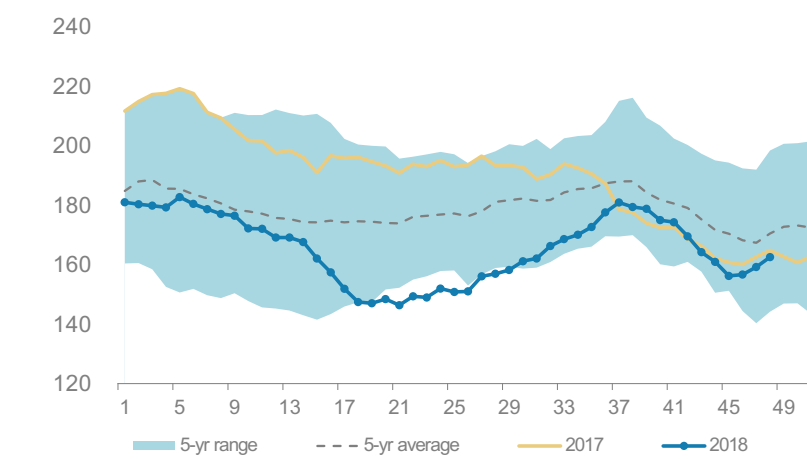
Source: EIA, PAJ, PKJ, IE

Exhibit 75: Gasoline (US, Japan, ARA, Singapore)



Source: EIA, PAJ, PKJ, IE

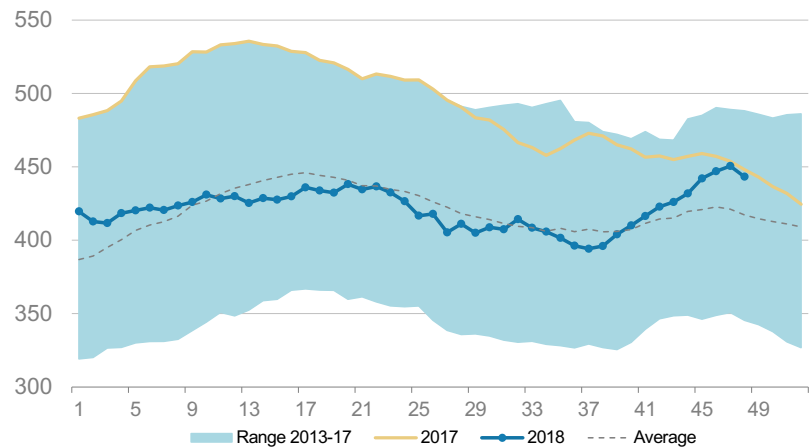
Exhibit 76: Distillates (US, Japan, ARA, Singapore)



Source: EIA, PAJ, PKJ, IE

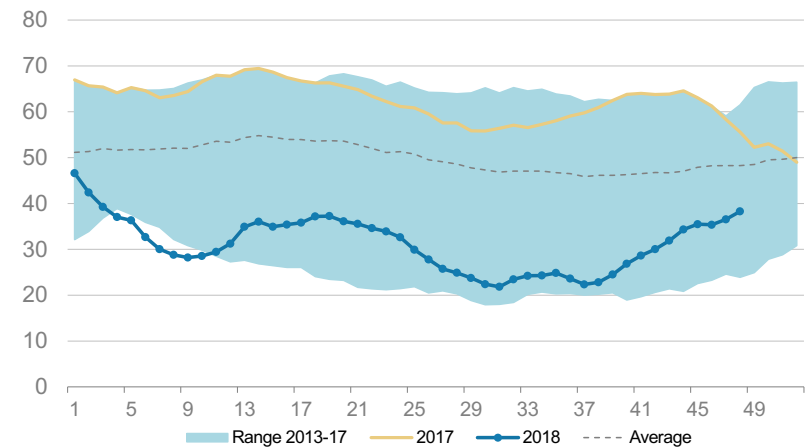
US Stocks – Weekly

Exhibit 77: US Crude – Total (mmb)



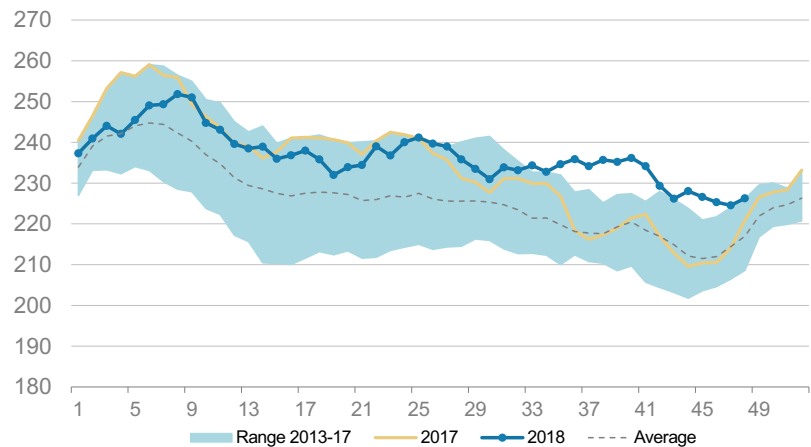
Source: EIA, Reuters

Exhibit 78: US Crude – Cushing (mmb)



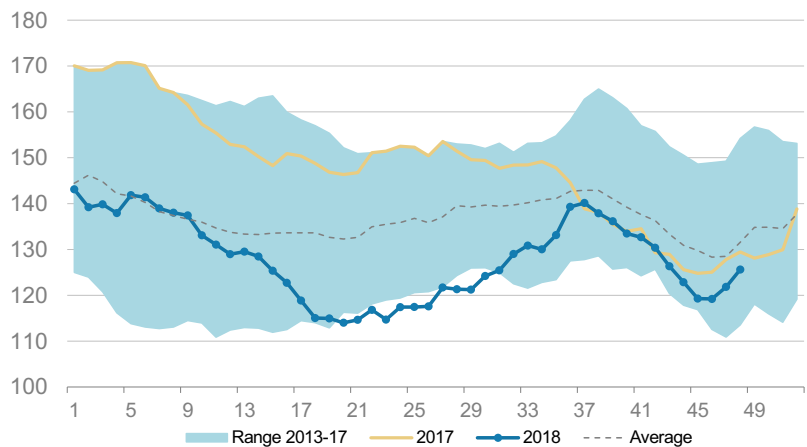
Source: EIA, Reuters

Exhibit 79: US Gasoline (mmb)



Source: EIA, Reuters

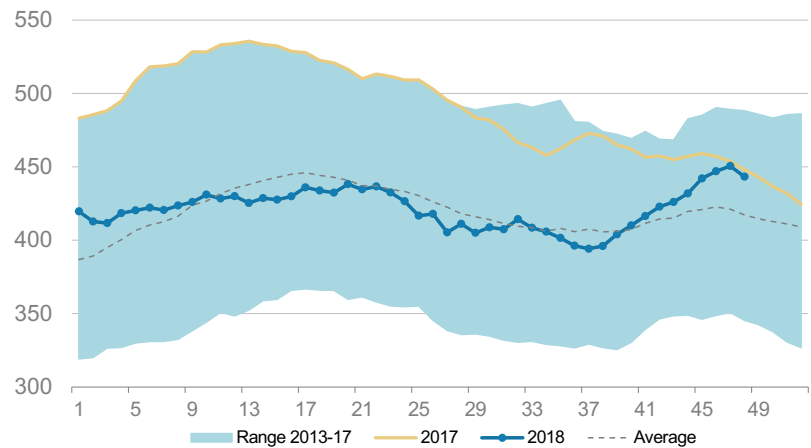
Exhibit 80: US Distillate (mmb)



Source: EIA, Reuters

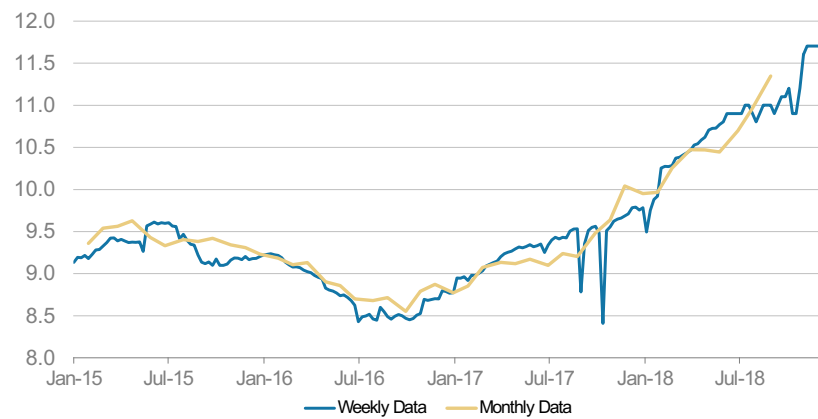
EIA – Crude Oil

Exhibit 81: Crude Oil Stocks (mmb)



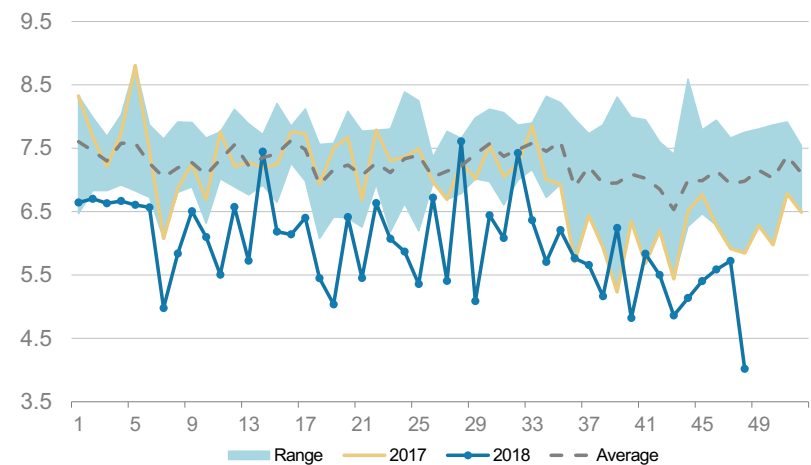
Source: EIA, Reuters

Exhibit 82: Crude Oil Production (mmb/d)



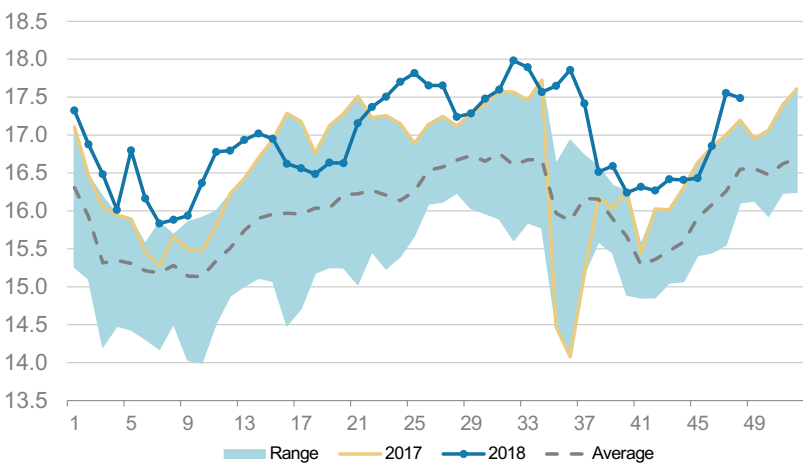
Source: EIA, Reuters

Exhibit 83: Net Crude Imports (mmb/d)



Source: EIA, Reuters

Exhibit 84: Crude Runs (mmb/d)



Source: EIA, Reuters

EIA – Gasoline

Exhibit 85: Gasoline Stocks (mmb)

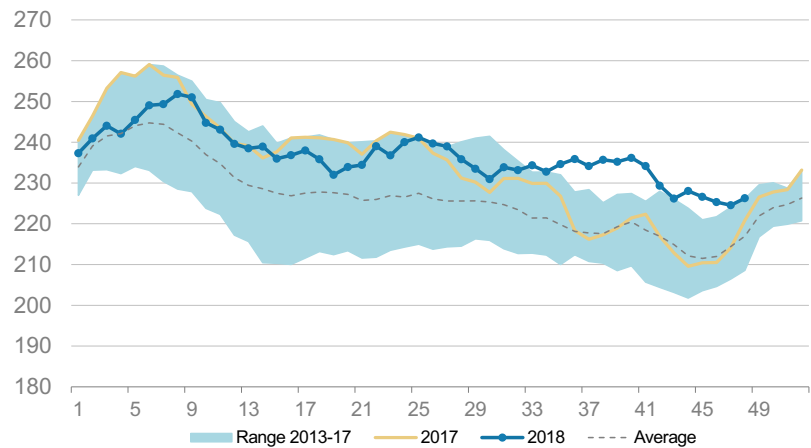


Exhibit 86: Long-term Gasoline Stocks (mmb)

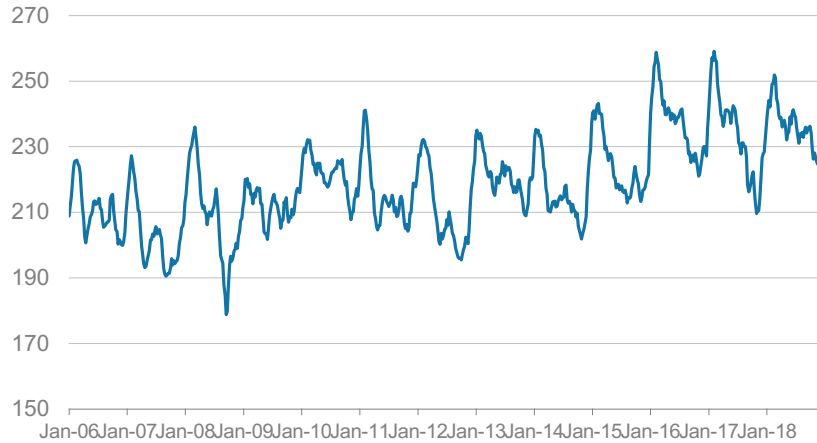


Exhibit 87: Gasoline Product Supplied (mmb/d)

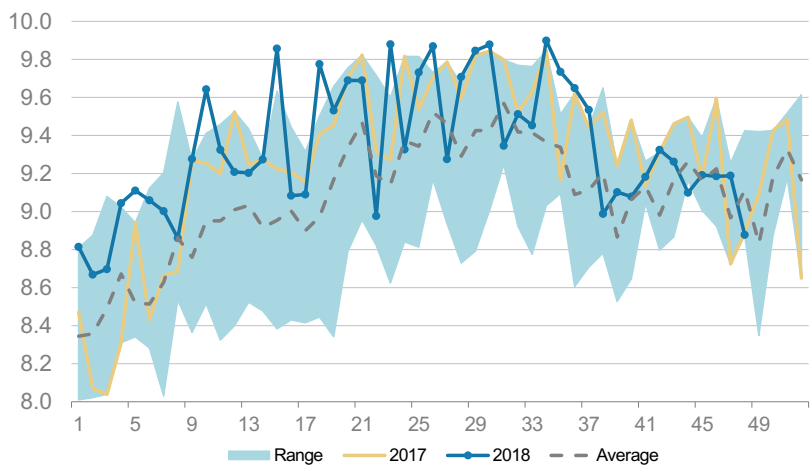


Exhibit 88: Gasoline Product Supplied (% YoY)

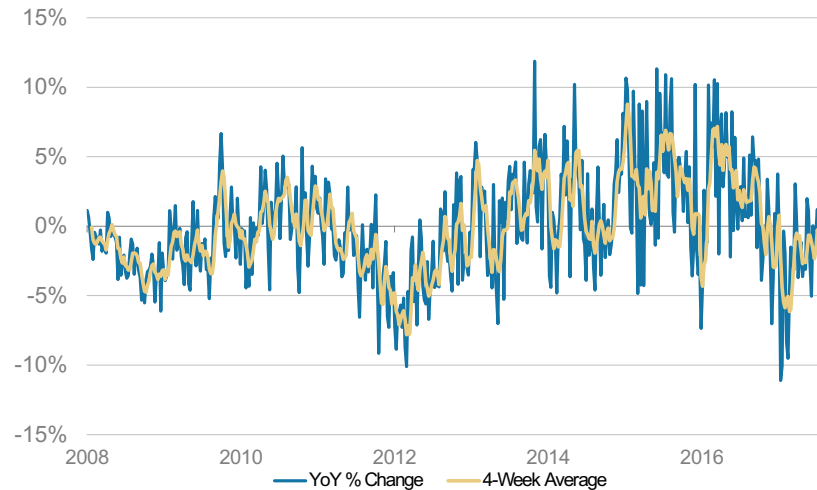
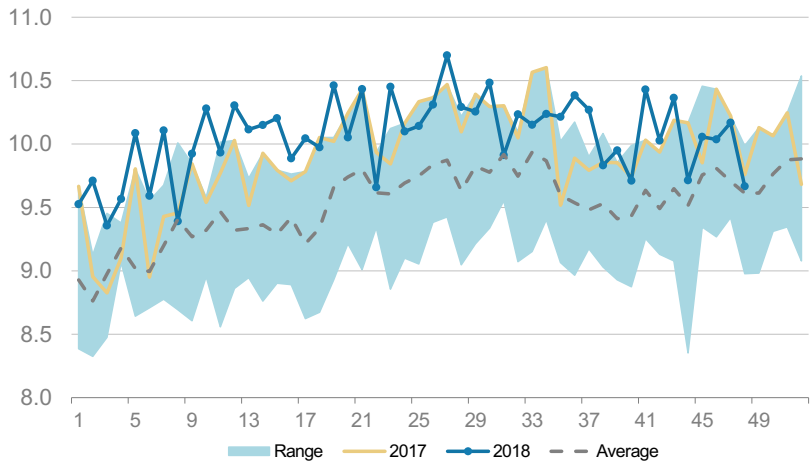
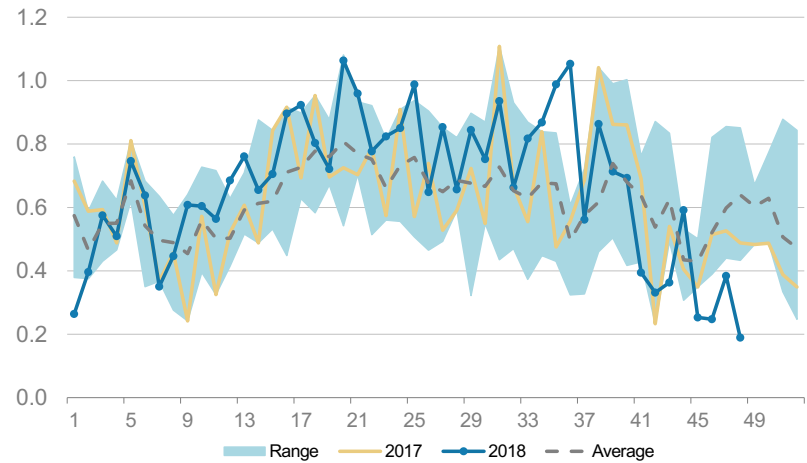


Exhibit 89: Gasoline Production (mmb/d)



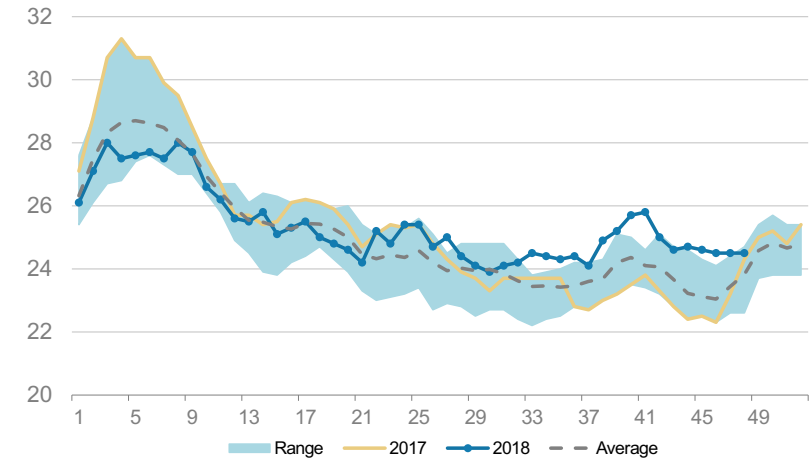
Source: EIA, Reuters

Exhibit 90: Gasoline Imports (mmb/d)



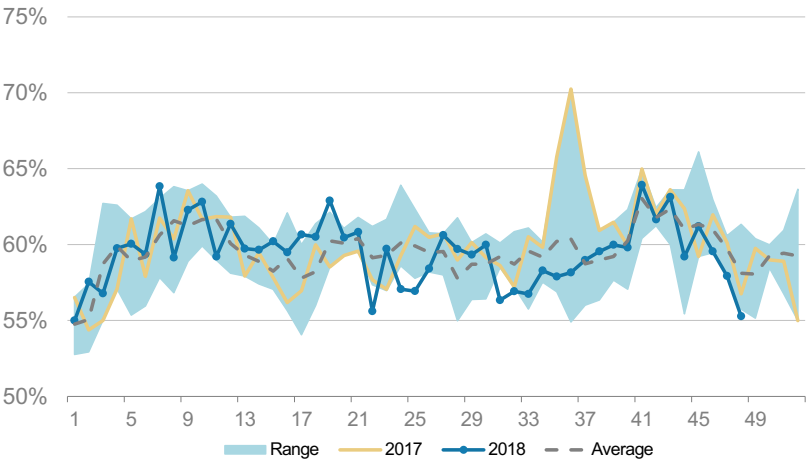
Source: EIA, Reuters

Exhibit 91: Gasoline Stocks Days of Supply (4 wk avg)



Source: EIA, Bloomberg

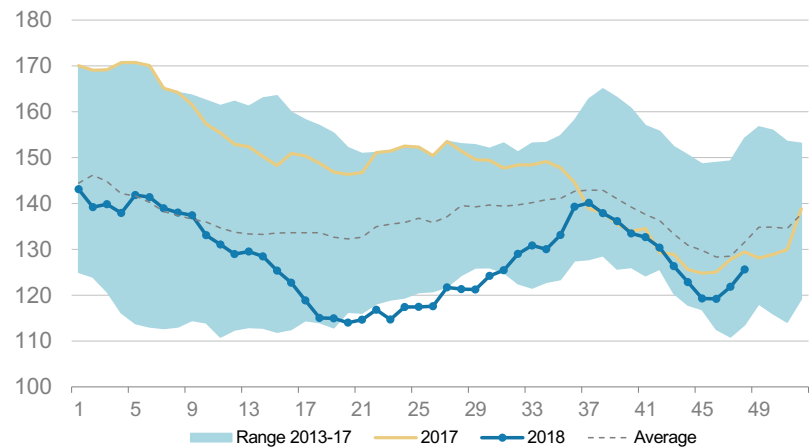
Exhibit 92: Gasoline Yield (%)



Source: EIA, Reuters

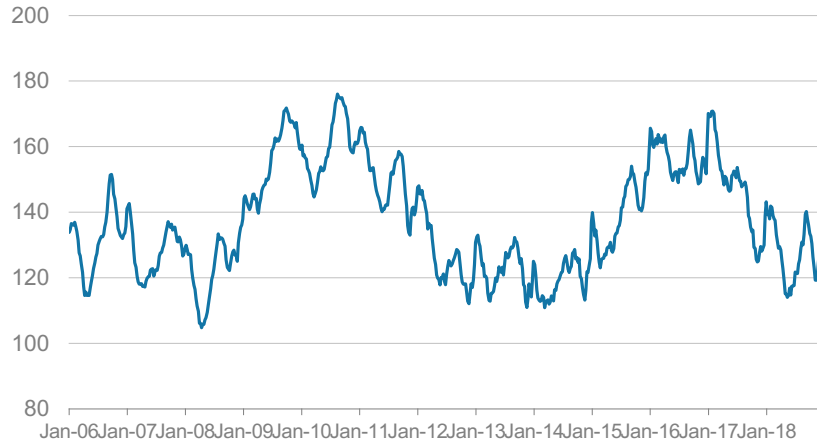
EIA – Distillate

Exhibit 93: Distillate Stocks (mmb)



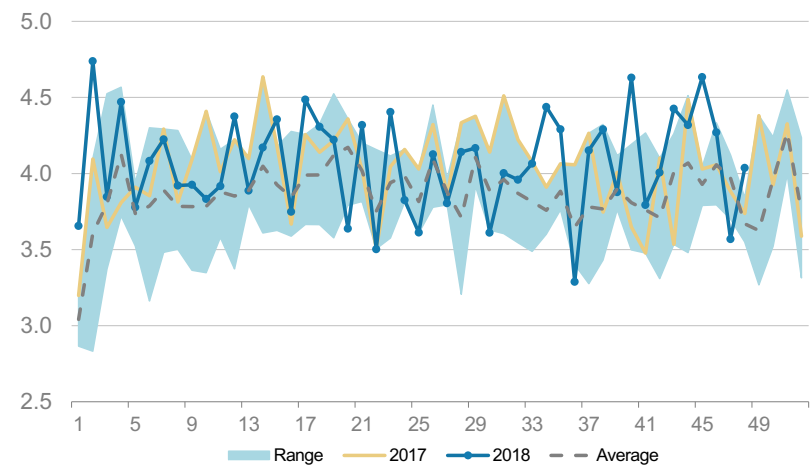
Source: EIA, Reuters

Exhibit 94: Long-term Distillate Stocks (mmb)



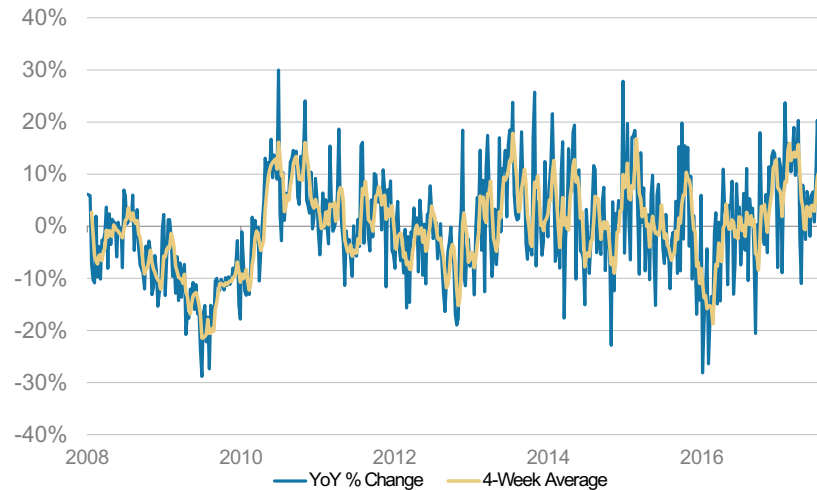
Source: EIA, Reuters

Exhibit 95: Distillate Product Supplied (mmb/d)



Source: EIA, Reuters

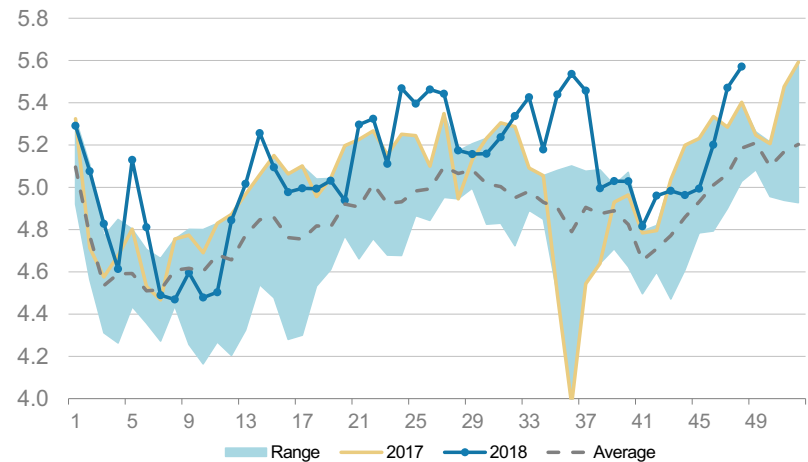
Exhibit 96: Distillate Product Supplied (% YoY)



Source: EIA, Bloomberg

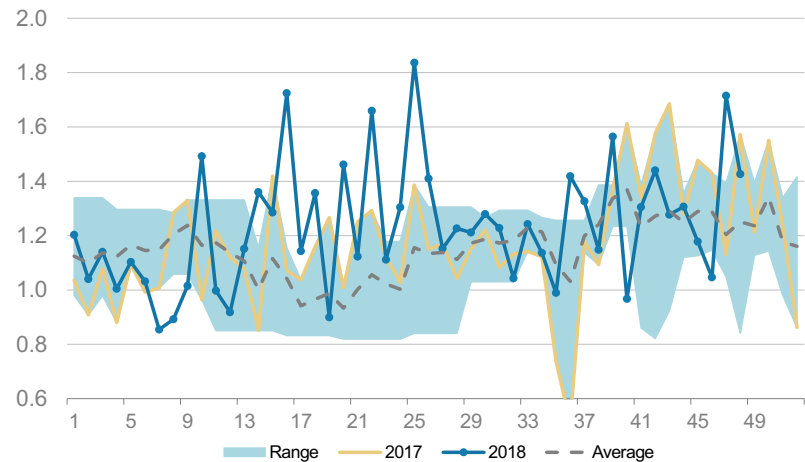


Exhibit 97: Distillate Production (mmb/d)



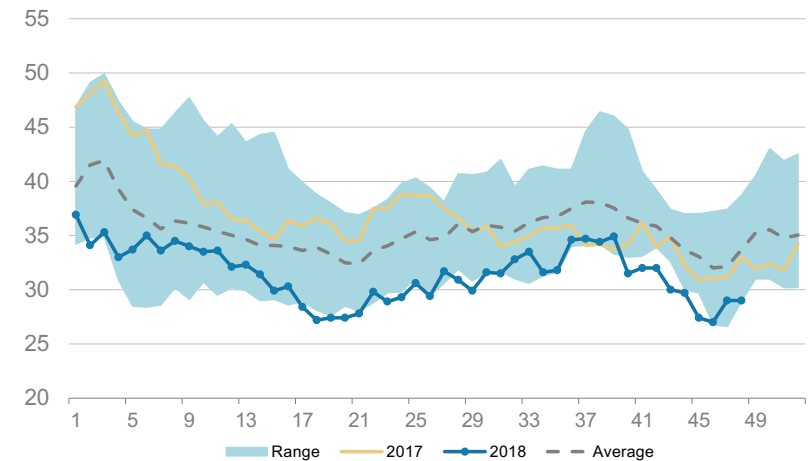
Source: EIA, Reuters

Exhibit 98: Distillate Exports (mmb/d)



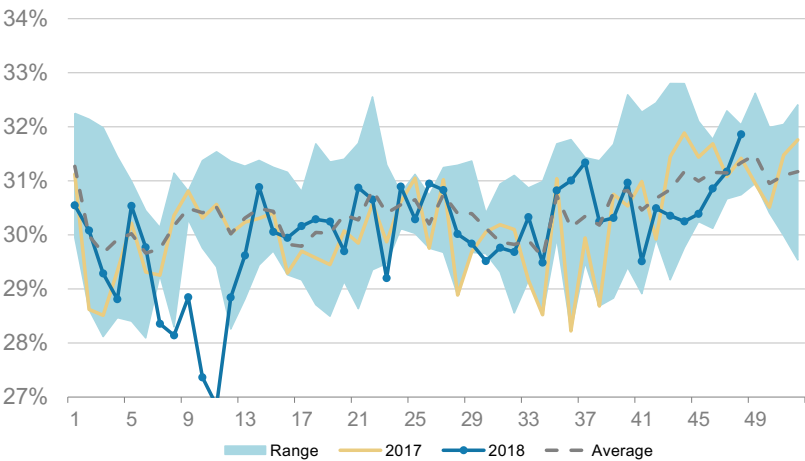
Source: EIA, Reuters

Exhibit 99: Distillate Stocks Days of Supply (4 wk avg)



Source: EIA, Reuters

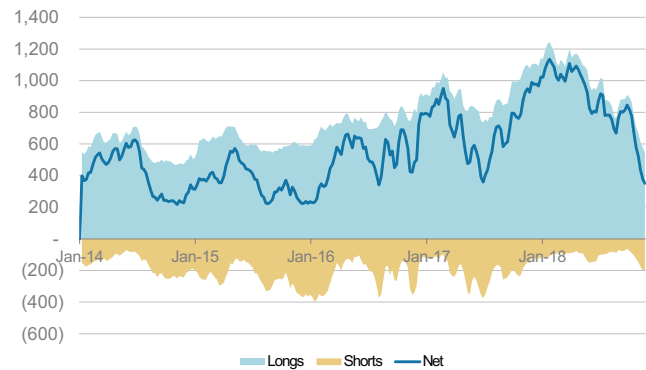
Exhibit 100: Distillate Yield (%)



Source: EIA, Reuters

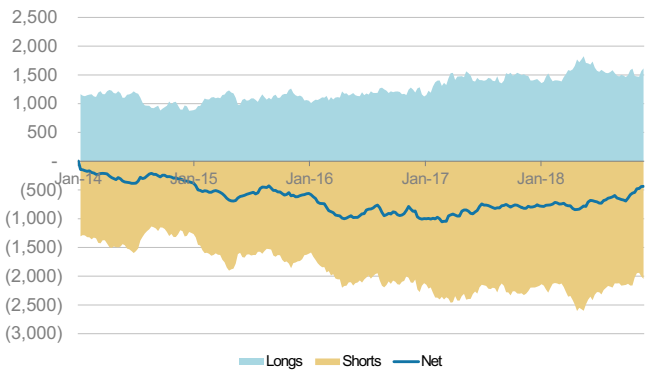
Positioning

Exhibit 101: Managed Money Crude Positioning ('000 lots)



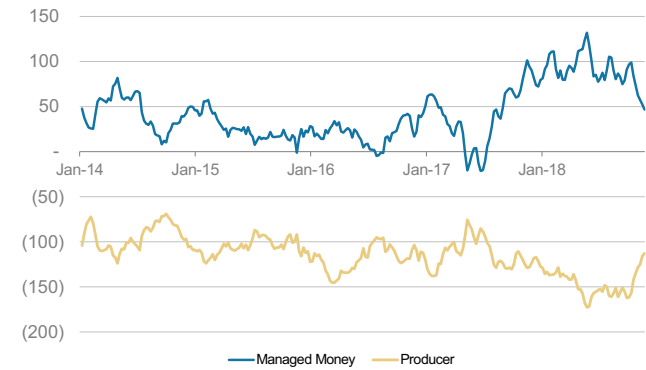
Source: ICE, CFTC, Reuters

Exhibit 102: Producer/Merchant Crude Positioning ('000 lots)



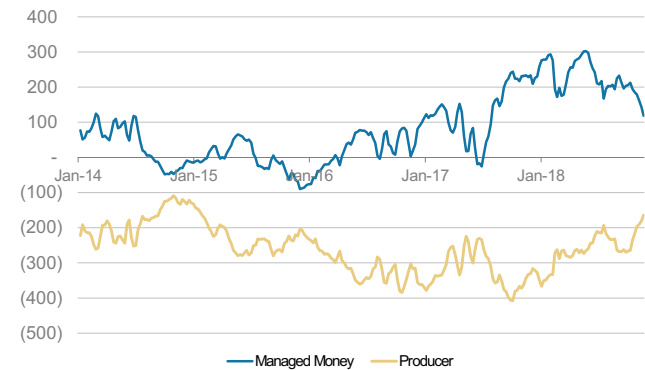
Source: ICE, NYMEX, CFTC, Reuters

Exhibit 103: Net Long Positioning – Gasoline ('000 lots)



Source: NYMEX, CFTC, Reuters

Exhibit 104: Net Long Positioning – Distillate ('000 lots)



Source: ICE, CFTC, Reuters

# Supply/Demand Balance

Exhibit 105: Global Demand and Non-OPEC Supply (mb/d)

|                             | 2016 | 1Q17 | 2Q17 | 3Q17 | 4Q17 | 2017 | 1Q18 | 2Q18 | 3Q18 | 4Q18  | 2018 | 1Q19 | 2Q19 | 3Q19  | 4Q19  | 2019  | 2020  | 2016-17 | 2017-18 | 2018-19 | 2019-20 |
|-----------------------------|------|------|------|------|------|------|------|------|------|-------|------|------|------|-------|-------|-------|-------|---------|---------|---------|---------|
| <b>Demand</b>               |      |      |      |      |      |      |      |      |      |       |      |      |      |       |       |       |       |         |         |         |         |
| OECD                        | 46.9 | 46.9 | 47.0 | 47.6 | 48.0 | 47.4 | 47.8 | 47.1 | 48.0 | 48.7  | 47.9 | 48.1 | 47.3 | 48.2  | 49.0  | 48.2  | 49.0  | 0.4     | 0.5     | 0.3     | 0.8     |
| US50                        | 19.7 | 19.5 | 20.1 | 20.0 | 20.2 | 20.0 | 20.2 | 20.3 | 20.6 | 20.8  | 20.5 | 20.5 | 20.6 | 20.9  | 21.0  | 20.7  | 21.1  | 0.3     | 0.5     | 0.3     | 0.4     |
| Europe 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  | 8.2  | 8.2   | 8.3   | 8.2   | 8.4   | 0.1     | -0.1    | 0.0     | 0.2     |
| Japan                       | 4.0  | 4.3  | 3.6  | 3.6  | 4.1  | 3.9  | 4.3  | 3.4  | 3.5  | 4.0   | 3.8  | 4.2  | 3.4  | 3.5   | 3.9   | 3.7   | 3.7   | -0.1    | -0.1    | -0.1    | 0.0     |
| Canada                      | 2.5  | 2.4  | 2.4  | 2.5  | 2.5  | 2.4  | 2.3  | 2.3  | 2.5  | 2.5   | 2.4  | 2.3  | 2.3  | 2.5   | 2.5   | 2.4   | 2.4   | 0.0     | 0.0     | 0.0     | 0.0     |
| Mexico                      | 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  | 2.0   | 1.9   | 2.0   | 2.0   | -0.1    | 0.0     | 0.0     | 0.0     |
| Other                       | 10.6 | 10.5 | 10.6 | 11.0 | 11.1 | 10.8 | 10.8 | 10.8 | 11.1 | 11.2  | 11.0 | 10.9 | 10.9 | 11.2  | 11.3  | 11.1  | 11.3  | 0.2     | 0.2     | 0.1     | 0.3     |
| Non-OECD                    | 49.4 | 49.6 | 51.0 | 50.7 | 50.5 | 50.4 | 50.4 | 51.4 | 51.7 | 52.0  | 51.4 | 51.3 | 52.6 | 52.7  | 53.1  | 52.4  | 53.8  | 1.1     | 0.9     | 1.0     | 1.4     |
| China                       | 12.0 | 12.4 | 12.9 | 12.3 | 12.7 | 12.6 | 12.7 | 13.0 | 13.2 | 13.4  | 13.1 | 13.2 | 13.6 | 13.8  | 13.9  | 13.6  | 14.2  | 0.6     | 0.5     | 0.5     | 0.6     |
| India                       | 4.4  | 4.5  | 4.7  | 4.4  | 4.7  | 4.6  | 4.8  | 4.9  | 4.6  | 4.9   | 4.8  | 5.0  | 5.0  | 4.7   | 5.1   | 4.9   | 5.1   | 0.1     | 0.2     | 0.1     | 0.1     |
| Russia                      | 3.3  | 3.1  | 3.3  | 3.5  | 3.3  | 3.3  | 3.3  | 3.4  | 3.7  | 3.5   | 3.5  | 3.2  | 3.5  | 3.8   | 3.5   | 3.5   | 3.5   | 0.0     | 0.2     | 0.0     | 0.0     |
| Brazil                      | 3.0  | 2.9  | 3.0  | 3.1  | 3.0  | 3.0  | 2.9  | 2.9  | 3.1  | 3.1   | 3.0  | 3.0  | 3.0  | 3.1   | 3.1   | 3.1   | 3.1   | 0.0     | 0.0     | 0.1     | 0.1     |
| Middle East                 | 6.6  | 6.4  | 6.8  | 7.0  | 6.4  | 6.7  | 6.3  | 6.6  | 6.9  | 6.4   | 6.5  | 6.3  | 6.6  | 6.7   | 6.5   | 6.5   | 6.7   | 0.1     | -0.1    | 0.0     | 0.1     |
| Other                       | 20.0 | 20.2 | 20.4 | 20.4 | 20.4 | 20.3 | 20.3 | 20.6 | 20.3 | 20.7  | 20.5 | 20.6 | 20.9 | 20.6  | 21.0  | 20.8  | 21.2  | 0.3     | 0.2     | 0.3     | 0.4     |
| Total demand                | 96.3 | 96.4 | 98.0 | 98.3 | 98.6 | 97.8 | 98.2 | 98.5 | 99.7 | 100.7 | 99.3 | 99.4 | 99.9 | 100.9 | 102.0 | 100.6 | 102.7 | 1.5     | 1.5     | 1.3     | 2.2     |
| <b>Supply</b>               |      |      |      |      |      |      |      |      |      |       |      |      |      |       |       |       |       |         |         |         |         |
| Non-OPEC Crude + Condensate | 45.6 | 46.2 | 45.5 | 45.7 | 46.5 | 46.0 | 47.1 | 47.1 | 47.9 | 48.4  | 47.6 | 48.7 | 48.3 | 48.9  | 49.9  | 49.0  | 50.6  | 0.4     | 1.6     | 1.3     | 1.6     |
| United States               | 8.8  | 9.0  | 9.1  | 9.3  | 9.9  | 9.4  | 10.2 | 10.5 | 11.2 | 11.6  | 10.9 | 11.8 | 12.0 | 12.2  | 12.5  | 12.1  | 13.0  | 0.5     | 1.5     | 1.2     | 0.8     |
| - Shale production          | 5.3  | 5.4  | 5.6  | 5.9  | 6.5  | 5.9  | 6.7  | 7.2  | 7.7  | 7.9   | 7.4  | 8.1  | 8.4  | 8.6   | 8.9   | 8.5   | 9.5   | 0.5     | 1.5     | 1.1     | 1.0     |
| - Alaska                    | 0.5  | 0.5  | 0.5  | 0.5  | 0.5  | 0.5  | 0.5  | 0.5  | 0.4  | 0.5   | 0.5  | 0.5  | 0.5  | 0.4   | 0.5   | 0.5   | 0.4   | 0.0     | 0.0     | 0.0     | 0.0     |
| - Other Lower 48            | 3.0  | 3.1  | 3.0  | 3.0  | 2.9  | 3.0  | 3.0  | 2.9  | 3.1  | 3.2   | 3.0  | 3.2  | 3.2  | 3.2   | 3.1   | 3.2   | 3.1   | 0.0     | 0.0     | 0.1     | -0.1    |
| Canada                      | 3.7  | 4.1  | 3.7  | 4.0  | 4.1  | 4.0  | 4.2  | 4.1  | 4.3  | 4.2   | 4.2  | 4.4  | 4.0  | 4.4   | 4.4   | 4.3   | 4.5   | 0.3     | 0.2     | 0.1     | 0.2     |
| Mexico                      | 2.2  | 2.0  | 2.0  | 1.9  | 1.9  | 1.9  | 1.9  | 1.9  | 1.8  | 1.8   | 1.8  | 1.8  | 1.7  | 1.7   | 1.7   | 1.7   | 1.6   | -0.2    | -0.1    | -0.1    | -0.1    |
| UK                          | 0.9  | 1.0  | 0.9  | 0.9  | 0.9  | 0.9  | 1.0  | 0.9  | 0.9  | 1.0   | 0.9  | 1.0  | 1.0  | 0.9   | 1.1   | 1.0   | 1.0   | 0.0     | 0.0     | 0.1     | 0.0     |
| Norway                      | 1.6  | 1.7  | 1.7  | 1.6  | 1.6  | 1.6  | 1.6  | 1.5  | 1.5  | 1.4   | 1.5  | 1.4  | 1.4  | 1.4   | 1.5   | 1.4   | 1.6   | 0.0     | -0.1    | -0.1    | 0.2     |
| Russia                      | 11.0 | 11.1 | 11.0 | 10.9 | 10.9 | 11.0 | 11.0 | 11.0 | 11.3 | 11.4  | 11.2 | 11.3 | 11.2 | 11.2  | 11.3  | 11.2  | 11.4  | 0.0     | 0.2     | 0.1     | 0.1     |
| China                       | 3.9  | 3.8  | 3.8  | 3.7  | 3.7  | 3.8  | 3.7  | 3.7  | 3.7  | 3.7   | 3.7  | 3.6  | 3.6  | 3.6   | 3.6   | 3.6   | 3.6   | -0.1    | -0.1    | -0.1    | 0.0     |
| Kazakhstan                  | 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  | 1.8   | 1.9   | 1.8   | 1.8   | 0.2     | 0.1     | -0.1    | 0.0     |
| Azerbaijan                  | 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   | 0.8   | 0.8   | 0.8   | 0.0     | 0.0     | 0.0     | 0.0     |
| Brazil                      | 2.5  | 2.6  | 2.6  | 2.6  | 2.6  | 2.6  | 2.6  | 2.6  | 2.5  | 2.7   | 2.6  | 2.7  | 2.9  | 3.1   | 3.3   | 3.0   | 3.5   | 0.1     | 0.0     | 0.4     | 0.4     |
| Colombia                    | 0.9  | 0.8  | 0.9  | 0.9  | 0.9  | 0.9  | 0.8  | 0.9  | 0.9  | 0.9   | 0.9  | 0.9  | 0.8  | 0.8   | 0.8   | 0.8   | 0.8   | 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  | 0.7   | 0.8  | 0.7  | 0.7  | 0.7   | 0.7   | 0.7   | 0.7   | 0.0     | 0.0     | 0.0     | 0.0     |
| Other                       | 6.8  | 6.6  | 6.5  | 6.5  | 6.5  | 6.5  | 6.5  | 6.5  | 6.5  | 6.4   | 6.5  | 6.5  | 6.5  | 6.4   | 6.3   | 6.4   | 6.4   | -0.2    | -0.1    | -0.1    | -0.1    |

Source: IEA, Morgan Stanley Research estimates

## Supply/Demand Balance (cont'd)

Exhibit 106: OPEC supply (mb/d)

|                                    | 2016        | 1Q17        | 2Q17        | 3Q17        | 4Q17        | 2017        | 1Q18        | 2Q18        | 3Q18        | 4Q18        | 2018        | 1Q19        | 2Q19        | 3Q19        | 4Q19        | 2019        | 2020        | 2016-17     | 2017-18     | 2018-19     | 2019-20    |
|------------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|------------|
| <b>Supply (cont'd)</b>             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |            |
| NGLs                               | 6.4         | 6.6         | 6.6         | 6.7         | 7.0         | 6.7         | 7.1         | 7.2         | 7.4         | 7.4         | 7.3         | 7.5         | 7.4         | 7.4         | 7.7         | 7.5         | 7.6         | 0.3         | 0.5         | 0.3         | 0.1        |
| Unconventionals*                   | 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         | 0.5         | 0.5         | 0.5         | 0.5         | 0.0         | 0.1         | -0.1        | 0.0        |
| Biofuels                           | 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         | 2.4         | 0.0         | 0.0         | 0.0         | 0.0        |
| Processing gains                   | 2.4         | 2.0         | 2.5         | 2.9         | 2.5         | 2.5         | 2.1         | 2.7         | 3.0         | 2.5         | 2.6         | 2.2         | 2.8         | 3.0         | 2.7         | 2.7         | 2.7         | 0.1         | 0.1         | 0.1         | 0.1        |
| <b>Total non-OPEC supply</b>       | <b>57.1</b> | <b>57.5</b> | <b>57.5</b> | <b>58.0</b> | <b>58.7</b> | <b>57.9</b> | <b>59.1</b> | <b>60.0</b> | <b>61.1</b> | <b>61.2</b> | <b>60.3</b> | <b>61.2</b> | <b>61.4</b> | <b>62.2</b> | <b>63.1</b> | <b>62.0</b> | <b>63.8</b> | <b>0.8</b>  | <b>2.4</b>  | <b>1.6</b>  | <b>1.8</b> |
| OPEC NGLs                          | 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         | 6.9         | 6.8         | 6.9         | 6.9         | 0.1         | 0.0         | -0.1        | 0.1        |
| <b>Call on OPEC crude + Astock</b> | <b>32.4</b> | <b>32.1</b> | <b>33.6</b> | <b>33.3</b> | <b>33.0</b> | <b>33.0</b> | <b>32.2</b> | <b>31.5</b> | <b>31.6</b> | <b>32.7</b> | <b>32.0</b> | <b>31.3</b> | <b>31.6</b> | <b>31.9</b> | <b>32.1</b> | <b>31.7</b> | <b>32.0</b> | <b>0.6</b>  | <b>-1.0</b> | <b>-0.3</b> | <b>0.3</b> |
| <b>OPEC</b>                        | <b>33.0</b> | <b>32.3</b> | <b>32.6</b> | <b>33.0</b> | <b>32.6</b> | <b>32.6</b> | <b>32.3</b> | <b>32.1</b> | <b>32.6</b> | <b>32.8</b> | <b>32.5</b> | <b>31.3</b> | <b>31.4</b> | <b>31.6</b> | <b>31.6</b> | <b>31.5</b> | <b>32.0</b> | <b>-0.4</b> | <b>-0.2</b> | <b>-1.0</b> | <b>0.6</b> |
| Saudi Arabia                       | 10.4        | 9.9         | 10.0        | 10.0        | 10.0        | 10.0        | 10.0        | 10.1        | 10.4        | 10.8        | 10.3        | 10.2        | 10.3        | 10.4        | 10.4        | 10.3        | 10.4        | -0.5        | 0.4         | 0.0         | 0.1        |
| Iran                               | 3.6         | 3.8         | 3.8         | 3.8         | 3.8         | 3.8         | 3.8         | 3.8         | 3.6         | 3.0         | 3.6         | 2.6         | 2.6         | 2.4         | 2.4         | 2.5         | 2.7         | 0.3         | -0.2        | -1.1        | 0.2        |
| Iraq                               | 4.4         | 4.5         | 4.5         | 4.5         | 4.5         | 4.5         | 4.5         | 4.5         | 4.6         | 4.7         | 4.6         | 4.5         | 4.5         | 4.6         | 4.7         | 4.6         | 4.8         | 0.1         | 0.1         | 0.0         | 0.3        |
| UAE                                | 3.0         | 3.0         | 2.9         | 2.9         | 2.9         | 2.9         | 2.8         | 2.9         | 3.0         | 3.2         | 3.0         | 3.1         | 3.1         | 3.2         | 3.2         | 3.2         | 3.2         | -0.1        | 0.0         | 0.2         | 0.1        |
| Kuwait                             | 2.9         | 2.7         | 2.7         | 2.7         | 2.7         | 2.7         | 2.7         | 2.7         | 2.8         | 2.8         | 2.7         | 2.7         | 2.7         | 2.8         | 2.9         | 2.8         | 2.9         | -0.2        | 0.0         | 0.0         | 0.1        |
| Neutral Zone                       | 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         | 0.1         | 0.2         | 0.1         | 0.2         | 0.0         | 0.0         | 0.1         | 0.1        |
| Qatar                              | 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         | 0.6         | 0.6         | 0.6         | 0.6         | 0.0         | 0.0         | 0.0         | 0.0        |
| Angola                             | 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         | 1.4         | 1.4         | 1.4         | 1.4         | -0.1        | -0.1        | -0.1        | -0.1       |
| Nigeria                            | 1.5         | 1.4         | 1.5         | 1.6         | 1.6         | 1.5         | 1.7         | 1.5         | 1.6         | 1.7         | 1.6         | 1.6         | 1.6         | 1.7         | 1.8         | 1.7         | 1.7         | 0.1         | 0.1         | 0.1         | 0.1        |
| Libya                              | 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         | 1.1         | 1.1         | 1.1         | 1.1         | 0.4         | 0.2         | 0.1         | 0.0        |
| Algeria                            | 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         | 1.1         | 1.0         | 1.0         | 1.0         | -0.1        | 0.0         | 0.0         | -0.1       |
| Ecuador                            | 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         | 0.5         | 0.5         | 0.5         | 0.0         | 0.0         | 0.0         | 0.0        |
| Venezuela                          | 2.2         | 2.1         | 2.0         | 2.0         | 1.8         | 2.0         | 1.5         | 1.4         | 1.3         | 1.2         | 1.4         | 1.1         | 1.1         | 1.0         | 1.0         | 1.1         | 0.9         | -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         | 0.0         | 0.0         | 0.0         | 0.0        |
| Equatorial Guinea                  | 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         | 0.1         | 0.0         | 0.0         | 0.0         | 0.0        |
| Congo                              | 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         | 0.3         | 0.3         | 0.3         | 0.3         | 0.0         | 0.1         | 0.0         | 0.0        |
| <b>Implied stock build/(draw)</b>  | <b>0.6</b>  | <b>0.2</b>  | <b>-1.0</b> | <b>-0.4</b> | <b>-0.4</b> | <b>-0.4</b> | <b>0.1</b>  | <b>0.6</b>  | <b>1.0</b>  | <b>0.1</b>  | <b>0.5</b>  | <b>0.0</b>  | <b>-0.2</b> | <b>-0.3</b> | <b>-0.4</b> | <b>-0.3</b> | <b>0.0</b>  |             |             |             |            |

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

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| STOCK RATING<br>CATEGORY | COVERAGE UNIVERSE |               | INVESTMENT BANKING CLIENTS (IBC) |                   |                            | OTHER MATERIAL<br>INVESTMENT SERVICES<br>CLIENTS (MISC) |                               |
|--------------------------|-------------------|---------------|----------------------------------|-------------------|----------------------------|---|-------------------------------|
|                          | COUNT             | % OF<br>TOTAL | COUNT                            | % OF<br>TOTAL IBC | % OF<br>RATING<br>CATEGORY | COUNT   | % OF<br>TOTAL<br>OTHER<br>MSC |
| Overweight/Buy           | 1156              | 37%           | 295                              | 40%               | 26%                        | 541   | 38%                           |
| Equal-weight/Hold        | 1405              | 44%           | 342                              | 47%               | 24%                        | 641   | 45%                           |
| Not-Rated/Hold           | 46                | 1%            | 7                                | 1%                | 15%                        | 7   | 0%                            |
| Underweight/Sell         | 555               | 18%           | 85                               | 12%               | 15%                        | 226   | 16%                           |
| <b>TOTAL</b>             | <b>3,162</b>      |               | <b>729</b>                       |                   |                            | <b>1415</b>   |                               |

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