Global Oil Outlook

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S&P Global
Platts
Strong growth in India and China and a buoyant US economy has kept global economic expansion above its long-term trend at 3.5%.

Source: S&P Global & Platts Analytics
In the U.S., indicators for real economic activity remain strong, with GDP growth picking up and unemployment at a historic low.

**Real GDP Growth**

- Graph showing annual percentage change in real GDP from 2005 to 2019.
- Forecast for 2018 and 2019 indicated.

**Unemployment Rate**

- Graph showing unemployment rate from 2005 to 2019.
- 2018 YTD indicated.

Source: BEA, BLS
Yet, non-OECD Asia will account for 60% of world global growth in 2018-2020 versus 20% for OECD. Any slowdown in this mega-region will have global repercussions.
China has managed to maintain GDP growth by increasing debt. If Beijing were to start deleveraging, GDP growth could be impacted.

Source: NBS, Bloomberg, BIS
US dollar strength means that oil importing countries with floating exchange rates are now paying ~25% more for oil imports.
If tariff negotiation between China and US descends into a “trade war”, the combined direct and indirect GDP impact will be large.

Negative Effects on GDP Growth from Higher Tariffs, Deviation from Baseline, %

Source: S&P Global Ratings
While price elasticity has a smaller impact on consumer demand, a slow down in global growth would be much more significant.

<table>
<thead>
<tr>
<th>Annual expected oil demand change, MMBD</th>
<th>Annual global GDP growth assumptions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2.0%</td>
</tr>
<tr>
<td>2018 Annual average oil price assumptions, $/bbl</td>
<td></td>
</tr>
<tr>
<td>51</td>
<td>1.3</td>
</tr>
<tr>
<td>68</td>
<td>0.9</td>
</tr>
<tr>
<td>75</td>
<td>0.7</td>
</tr>
<tr>
<td>102</td>
<td>0.2</td>
</tr>
<tr>
<td>127</td>
<td>(0.4)</td>
</tr>
</tbody>
</table>
Oil demand growth: 2017-2019

MMB/D

- Other
- Residual Fuel Oil
- Distillates
- JK
- Gasoline
- Naphtha
- LPG

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In the US, high gasoline prices have arrested demand growth despite a thriving economy which has seen strong middle distillates growth and booming ethane demand for Petchems.
The call on refining is significantly below oil demand due to increasing supply of NGLs, biofuels and refinery volume gain.
Despite the strong demand growth, the call on refining has been far less, as supply has been dominated by NGLs. Call on crude increases in 2019 due to less volume gain from light crudes.
Despite OPEC declines, global supply growth is strong, driven by a recovery in non-OPEC crude and increasing NGLs.

Liquids Supply and Demand Growth, Y/Y (MMB/D)

Supply Growth, Y/Y (MMB/D)

Liquids supply includes biofuels, refinery gain, and other non-conventional liquids.
In OPEC, we expect major losses out of Iran and Venezuela, which Saudi, other core OPEC, and Iraq will struggle to fully offset.

OPEC Crude Supply Growth, Y/Y (MMB/D)

- Rest of OPEC crude
- Iraq
- Other core OPEC
- Venezuela
- Saudi Arabia

Saudi Arabia include its portion of the Neutral Zone.
Saudi Arabia, other core OPEC (Kuwait and the UAE), Iraq, and Russia are responding to impending losses.

Crude Production (MMB/D)

All countries are crude oil except Russia which is crude & condensate.

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However, potential for much higher output from Saudi Arabia and the Neutral Zone remains possible.
Non-OPEC supply growth has been strong dominated by US and NGLs.

Non-OPEC Supply Growth, Y/Y (MMB/D)
U.S. shale activity is slowing, with DUCs set to build, and the Permian is facing infrastructure constraints until 4Q19.
Shale costs are rising while the pace of productivity gains are slowing.

<table>
<thead>
<tr>
<th>Cost Component</th>
<th>% of Total Well Cost</th>
<th>Expected Cost Inflation (2018 Y/Y)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drilling Rig</td>
<td>16</td>
<td>8%</td>
</tr>
<tr>
<td>Other Drilling</td>
<td>17</td>
<td>5%</td>
</tr>
<tr>
<td><strong>Drilling Subtotal</strong></td>
<td><strong>33</strong></td>
<td><strong>7%</strong></td>
</tr>
<tr>
<td>Proppants</td>
<td>15</td>
<td>9%</td>
</tr>
<tr>
<td>Frack Pump</td>
<td>24</td>
<td>15%</td>
</tr>
<tr>
<td>Other Completion</td>
<td>11</td>
<td>5%</td>
</tr>
<tr>
<td><strong>Completion Subtotal</strong></td>
<td><strong>50</strong></td>
<td><strong>11%</strong></td>
</tr>
<tr>
<td>Other</td>
<td>17</td>
<td>3%</td>
</tr>
<tr>
<td><strong>Total Cost Inflation 2018</strong></td>
<td><strong>100</strong></td>
<td><strong>8%</strong></td>
</tr>
</tbody>
</table>

IP Rate (BOE/D)

![Graph showing IP Rate (BOE/D)](image-url)
Onshore growth will be dominated by the Permian and NGLs increasing in 2h19 as infrastructure constraints ease.
NGLs produce “purity products” which do not need to be processed in a refinery and balances Ethane between oil and gas.
Infrastructure tightness has pushed up ethane price, driven down ethane cracking margin advantage.

**US ethane prices**

- **Mt Belvieu ethane**
- **Conway e/p mix**

**US steam cracker margins**

- Ethane
- Pentanes+

Source: S&P Global Platts Analytics
Ethylene market is a case of the Goldilocks Paradox: zero margins in US, too expensive for derivatives in Asia and just right in Europe.
Healthy refinery margins have softened with weaker gasoline cracks while Singapore has been more resilient due to Naphtha.
Refinery utilization has been strong with runs outpacing capacity growth between 2015-18, helped by LATAM unreliability.
Lighter average crude quality is increasing the supply of naphtha weighing on both gasoline and naphtha
US gasoline demand growth YTD has been sluggish. Brazil’s drop depends on hydrous ethanol, whose competitiveness is due to collapse in global sugar prices.

Source: PIRA Global Oil Service
With the API of global crude/cond rising, the yield of residue is falling with net production stagnant over the last 4 years.
Therefore, HSFO cracks have been firm in 2018 but will weaken in 2H19 ahead of IMO 2020, consistent with the forward curve.

*Europe vs. Brent; US cracks vs. LLS; Singapore vs. Dubai
Global bunker fuel spec changes in 2020 will force 2.8 MMB/D of HSFO to switch to LSFO and distillates.
Exports from North America will surge with a wide range of buyers

Export Surge in 2020 due Pull for LS Bunkers

*Includes condensates*
Runs growth in Asia will increasingly be covered by Atlantic Basin sweet exports
Atlantic Basin is becoming net long supply which puts pressure on Brent and WTI to arb cargos out of the region

* Atlantic Basin includes U.S., Canada, Latin America, Europe, and Africa; Crude includes FSU supply to West.
Weekly DOEs have become more volatile since the export ban was lifted and with the growth in shale exports.
Managed Money’s short positions on Brent & WTI are at historical low levels providing support to the front end of the curve.

Ratio Short vs Long Positions on WTI & Brent Futures and Options, Managed Money

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Dated Brent realized volatilities point to potential further retracement in next couple of months.
Global CDU outages are slightly above the 5-year average, peaking at 9MMB/D slightly below last year’s (Harvey impacted) outages.
Yet, in Europe weak refining margins imply likely refinery runs cuts ~500 MB/D.
Commercial oil stocks are down, but not out. Global SPR builds represent implied demand and is adding to global stocks.
Compared with the 11MMB being released now, the US has significantly greater stocks (300MMB) which could be released.

U.S. SPR (million barrels)

Planned and Potential U.S. SPR Draws (million barrels)

Today: 660 MMB

254 MMB Projected sales from recent legislation

66 MMB Potential for release

340 MMB Congress mandated floor

600 MMB

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The IMO spec change could decrease global GDP growth by up to 0.6% and, in worst case scenario, produce an inflation spike that triggers a recession.
U.S. shale breakevens are rising, but conventional breakevens are improving on cost reduction and time to production.
The back of the curve is likely to be increasingly anchored to lower production costs and US Shale break-evens.
Many solutions, one purpose:

Bringing you essential intelligence.