SUMMARY FINDINGS FROM A COMPARISON OF DATA AND FORECASTS ON THE OIL MARKET BY THE INTERNATIONAL ENERGY AGENCY (IEA) AND ORGANIZATION OF THE PETROLEUM EXPORTING COUNTRIES (OPEC).

FEATURING A COMPARATIVE ANALYSIS OF OIL INVENTORY DATA REPORTED BY JODI, THE IEA, OPEC AND SECONDARY SOURCES IN COLLABORATION WITH THE RAPIDAN ENERGY GROUP.

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1. NOTE BY THE SECRETARY GENERAL

The IEF conducts a comprehensive comparative analysis of the short-, medium-, and long-term energy outlooks of the IEA and OPEC, to inform the IEA-IEF-OPEC Symposium on Energy Outlooks that the IEF hosts in Riyadh as part of the trilateral work programme on a yearly basis.

To inform IEF stakeholders on how perspectives on the oil market of both organisations evolve over time more regularly, this monthly summary provides:

- Key findings and a snapshot overview of data points gained from comparing basic historical data and short-term forecasts of the IEA Oil Market Report and the OPEC Monthly Oil Market Report
- Features a comparative analysis of oil inventory data reported by JODI, the IEA, OPEC, and secondary sources in collaboration with the Rapidan Energy Group

Moreover, international developments this month that will have an impact on oil market balances are as follows:

IEF Energy Dialogue

- In response to a tweet by U.S. President Trump requesting oil producers to “relax,” the Minister of Industry, Energy and Mineral Resources of Saudi Arabia, Khalid Al-Falih said at the 9th IEA-IEF-OPEC Symposium on Energy Outlooks that “OPEC plus” is taking a very slow and measured approach in the interest of market stability.

Venezuela Instability

- As political instability in Venezuela continues coupled with US sanctions, the country is increasingly looking to export more of its oil to India and China.

Nigeria Election

- Muhammadu Buhari won a second term as president of Nigeria, Africa’s biggest oil producer.

I trust this month’s analysis helps to sharpen focus on evolving short-term market perspectives.

Dr Sun Xiansheng
Secretary General
International Energy Forum
2. KEY POINTS

2.1 DEMAND

- **OPEC’s reported world demand growth of 1.24 mb/d for 2019 is the lowest demand growth figure since February 2017.** OPEC revised down its growth figure by 50 kb/d from last month to reach **1.24 mb/d** while IEA growth projections dropped by 60 kb/d to reach **1.38 mb/d** leading to a 140 kb/d difference between the two organizations. The IEA and OPEC estimates for absolute world demand in 2019 are **100.61 mb/d** and **100 mb/d**, respectively.

- **The IEA forecasts greater OECD and non-OECD demand growth than OPEC, albeit marginally.** The IEA’s demand growth forecast for 2019 in non-OECD countries drops by 90 kb/d to reach **1.06 mb/d** in February. Conversely, OECD growth rises by 40 kb/d to **0.32 mb/d**. Meanwhile, OPEC’s non-OECD demand growth is **1.00 mb/d**, down only 40 kb/d from last month. OPEC’s OECD demand growth projection decreases 10 kb/d to reach **0.24 mb/d**. The IEA and OPEC now differ in their 2019 assessments on OECD and non-OECD demand growth by 80 kb/d and 60 kb/d, respectively.

2.2 SUPPLY

- **Both the IEA and OPEC increase their non-OPEC supply growth for February.** The IEA’s February 2019 assessment for non-OPEC growth is up by 170 kb/d for a total growth of **1.81 mb/d**. OPEC’s growth assessment is more optimistic at **2.18 mb/d** up by 80 kb/d from last month. In absolute values OPEC and the IEA estimate non-OPEC supply at **64.34 mb/d** and **64.39 mb/d** respectively for 2019.

- **The IEA and OPEC report an increase in OECD supply growth for 2019 mostly due to US growth.** The IEA revised its growth up by 180 kb/d for 2019 from the month before to reach total supply growth of **1.40 mb/d**. OPEC also revised its assessment by 100 kb/d to reach total growth of **1.68 mb/d**. The difference between the IEA and OPEC OECD supply growth is 180 kb/d for February.

2.3 STOCKS

- **The IEA and OPEC continue to report strong alignment on stock figures that are above five-year averages.** The IEA reports OECD stock levels at **2858 mb**, which is not that far off OPEC’s assessment of **2851 mb** for OECD stock that is 28 mb above the five-year average. The divergence between OPEC and the IEA stands at 7 mb for February. Total US crude inventories (excluding SPR) in December amount to about 446 mb according to the US Energy Information Administration (EIA). The EIA reports U.S. crude oil inventories are about 3 percent above the five-year average for this time of year. OPEC reports US stock above the five-year average by about 22 mb.
### 2.4 SNAPSHOT (mb/d)

<table>
<thead>
<tr>
<th></th>
<th>IEA</th>
<th>OPEC</th>
<th>Non-OPEC</th>
<th>IEA</th>
<th>OPEC</th>
<th>Non-OPEC</th>
<th>IEA</th>
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<tr>
<td><strong>Demand</strong></td>
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<td>OECD</td>
<td>48.16</td>
<td>48.09</td>
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<td>1.06</td>
<td>1.00</td>
<td>-0.09</td>
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<td>1.24</td>
<td>-0.05</td>
<td>-0.04</td>
<td>-0.09</td>
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<td>0.61</td>
<td>0.14</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Difference</td>
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<td>0.08</td>
<td>0.05</td>
<td>0.56</td>
<td>0.06</td>
<td>0.05</td>
<td>100.61</td>
<td>100.00</td>
<td>1.24</td>
<td>-0.05</td>
<td>-0.04</td>
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<td>0.61</td>
<td>0.61</td>
<td>0.14</td>
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</tbody>
</table>

| **Supply** |      |      |          |      |      |          |      |      |          |      |      |          |      |      |          |      |      |          |      |      |          |
| OECD      | 27.96| 29.79| 31.36     | 0.29 | 0.46 | -0.03    | 64.39 | 64.34 | 2.18     | 0.08 | 0.03 | 0.05     | 0.05 | 0.05 | 0.03     | 0.05 | 0.05 | 0.03     |
| Difference| 1.83 | 1.68 | 0.08      | 0.91 | 0.17 | 0.03     | 64.39 | 64.34 | 2.18     | 0.08 | 0.03 | 0.05     | 0.05 | 0.05 | 0.03     | 0.05 | 0.05 | 0.03     |

<table>
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<tr>
<th><strong>Stocks (mb)</strong></th>
<th>IEA</th>
<th>OPEC</th>
<th>US</th>
<th>OECD to 5-Year Average</th>
<th>US to 5-Year Average</th>
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<tr>
<td>OECD</td>
<td>2858</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>OPEC</td>
<td>2851</td>
<td>447</td>
<td>28 mb</td>
<td>22 mb</td>
<td>3 percent above</td>
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<tr>
<td>EIA</td>
<td>446</td>
<td>-</td>
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*Totals in table may not exactly reflect content due to independent rounding.*
3. GLOBAL ANALYSIS

3.1 DEMAND DATA

Absolute Demand

The IEA’s estimate for global demand growth in February is 1.38 mb/d, down by 60 kb/d from 1.42 mb/d in last month’s report for an absolute demand of 100.61 mb/d in 2019. Demand growth for 2019 is driven by continuing growth in non-OECD Asia.

OPEC’s global demand outlook slows and is forecast to grow by 1.24 mb/d in 2019 reaching absolute demand of 100 mb/d. The downward revision is due to lower economic expectations in 2019 for the OECD Americas and Europe, as well as Latin America and the Middle East. OPEC-IEA divergence in overall world demand stands at 0.61 mb/d up from 0.57 mb/d last month.

OECD Demand

The IEA continues to see OECD oil demand growth at 0.32 mb/d, up slightly from last month’s figure of 0.28 mb/d, anticipating total OECD consumption for 2019 at 48.16 mb/d. OPEC growth projection for the OECD region is revised slightly downwards at 0.24 mb/d for 2019 compared to 0.25 mb/d last month. OPEC total OECD demand for 2019 is 48.09 mb/d. The divergence of OECD oil demand growth between the IEA and OPEC is now 0.07 mb/d.

The IEA reports a 0.03 mb/d upward revision in OECD Americas demand growth to reach 0.31 mb/d, while OPEC revises demand growth downwards by 0.01 mb/d to 0.25 mb/d in February. OECD Europe demand growth moves slightly upwards by 0.02 mb/d to 0.11 mb/d according to IEA data. OPEC’s OECD Europe growth figure is less at 0.01 mb/d. The IEA’s and OPEC’s assessments for demand growth and absolute demand each differ by 0.08 mb/d and 0.07 mb/d respectively.

Non-OECD Demand

The IEA and OPEC anticipate continued growth in non-OECD demand for this year at 1.06 mb/d and 1.00 mb/d respectively, with absolute non-OECD demand forecasts averaging 52.46 mb/d and 51.90 mb/d.

See the following graph for the monthly revisions of IEA and OPEC annual estimates for 2018 and new estimates for 2019 demand.
3.2 SUPPLY DATA

Non-OPEC Supply

OPEC’s February assessment of total non-OPEC supply for 2018 stands at 64.34 mb/d. Supply growth has been revised up by 0.08 mb/d to 2.18 mb/d driven by expected growth in the US (1.80 mb/d), Brazil (0.36 mb/d) and Russia (0.14 mb/d). Growing output from these countries is offset by declining production from Mexico (-0.14 mb/d), Canada (-0.04), and Norway (-0.04 mb/d). US tight crude for 2019 is forecast to grow at a slower yet still significant 1.17 mb/d y-o-y to average 7.44 mb/d. Tight crude production growth from the Permian basin is expected to reach 0.60 mb/d year-over-year for a total output averaging 3.45 mb/d. Total US liquids production is expected to be 1.80 mb/d to reach total production of 18.44 mb/d in 2019. Brazil production in 2019 is expected to rise to 3.63 mb/d as planned projects are due to come online.

The IEA forecasts 2018 non-OPEC supply at 62.39 mb/d with a year-on-year growth of 1.81 mb/d with supply increases in the US at 1.52 mb/d as the catalyst for non-OPEC supply growth. Total US production is expected to be 16.99 mb/d in 2019. Brazil is also forecasted to grow by 0.37 mb/d for total production of 3.07 mb/d for 2019.

OECD Supply

OPEC and the IEA both forecast OECD growth at 1.68 mb/d and 1.40 mb/d with total supply reaching 29.79 mb/d and 27.96 mb/d respectively in 2019. The IEA’s data shows OECD Americas liquids supply growth at 1.31 mb/d to reach 24.06 mb/d in total supply, while OPEC reports similar growth at 1.63 mb/d with total liquids supply reaching 25.56 mb/d in 2019. Growth within the region is led by the US for which OPEC revised its liquid supply forecast up to 1.80 mb/d to reach 18.44 mb/d in total, while
the IEA projects less US growth of 1.52 mb/d to amount to 16.99 mb/d in total. OPEC’s assessment for OECD Europe remains unchanged from last month for a total production of 3.77 mb/d in 2019. The IEA’s assessment for OECD Europe supply increases marginally to 3.39 mb/d for an increase in yearly growth of 0 mb/d. For 2019, both the IEA and OPEC see the UK as the primary driver of OECD Europe supply with growth figures of 0.08 mb/d and 0.06, respectively.

OPEC Supply

OPEC reports that total OPEC-14 preliminary crude oil production averaged 30.81 mb/d in January according to secondary sources. This is a decrease of 0.80 mb/d over the previous month. Crude oil output decreased mostly in Saudi Arabia, UAE, Kuwait and Libya while production rose in Nigeria. The IEA reports OPEC production at 30.83 mb/d for January.

See the graph below for the monthly revisions of IEA and OPEC annual estimates for 2018 and new estimates for 2019 supply, and the tables for annual estimates for total supply.

IEA and OPEC OECD Non-OPEC supply estimates rise
IEA and OPEC Non-OECD growth remains stable

![Graph showing monthly revisions of annual Non-OPEC liquids supplies estimates](image)

*monthly estimates rounded to the nearest barrel.

3.3 STOCK DATA

IEA data shows OECD commercial inventories fell by 5.6 mb m-o-m (month-on-month) in December to 2858 mb. According to OPEC, preliminary data for November showed that total OECD commercial oil stocks fell by 10.8 mb m-o-m to 2851 mb and are now 28 mb above the latest five-year average. While both organizations report closely aligned data on OECD stocks due to a continuous and reliable data stream and data harmonization efforts, comprehensive data on stock developments for non-OECD countries is still work in progress.

See the graphs below for monthly estimates of OECD total commercial oil stocks from 2017 to 2019.
IEA and OPEC data shows convergence on OECD stock draws
Comprehensive non-OECD stock data remains missing

IEA and OPEC report closely aligned OECD stock balances
Surplus stocks rise above the five-year average

*monthly estimates rounded to the nearest barrel.
OECD and JODI non-OECD crude and product inventory data show a net 19.0 mb draw in December

- IEA data shows OECD commercial inventories fell by 5.6 mb/m in December to 2858 mb. OPEC estimates total OECD commercial stocks fell by 10.8 mb in December to 2851 mb. Both agencies now estimate that December’s OECD stocks were above the five-year average for the second consecutive month.

- JODI non-OECD* data for December imply crude and product stocks drew by 8.6 mb and 2.7 mb, respectively. The largest crude draw occurred in Saudi Arabia (-2.8 mb), where crude stocks declined in 11 of the past 12 months for a net 39.6 mb draw in 2018. Saudi crude inventories have fallen steadily since the beginning of 2016 by 120.1 mb. On the product side, the largest draw in December occurred in Taiwan (-3.2 mb).

- Together, IEA’s OECD commercial and SPR inventory data and JODI’s non-OECD* data imply global crude and product stocks drew by 19 mb in December. The data also implies inventories drew by a net 42.3 mb in 4Q18 and drew by 16.9 mb for the year.

- While available data suggests global inventories drew by 16.9 mb in 2018, IEA and OPEC’s balances imply large global inventories builds (by 274.5 mb and 87.6 mb, respectively). Data transparency efforts have progressed in recent years; however, some key data remain opaque and unreliable. IEA’s Oil Market Report in January noted that Chinese custom data, as well as estimates for crude production and refinery throughput, imply Chinese crude stocks built by a massive 247 mb in 2018. However, statistics from China Oil, Gas and Petrochemicals have not been published since May and stock data from China to JODI has not been available since August.

* Non–OECD data is the aggregate of country-level data through JODI. Not all non-OECD countries report inventory data and the countries in the aggregate may vary monthly depending on the regularity of individual country reporting.

### Global Inventory Changes

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<th>December 2018</th>
<th>4Q18</th>
<th>2018</th>
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<tbody>
<tr>
<td></td>
<td>Crude</td>
<td>Products</td>
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<tr>
<td>OECD Commercial</td>
<td>-13.7</td>
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<tr>
<td>(IEA)</td>
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<tr>
<td>OECD SPR (IEA)</td>
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<tr>
<td>Available JODI Non-</td>
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<td>OECD Data*</td>
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<tr>
<td><strong>Total</strong></td>
<td>-23.5</td>
<td>4.4</td>
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<th>2018 Implied Global</th>
<th>2018 Implied Global</th>
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<tbody>
<tr>
<td></td>
<td>Supply Surplus</td>
<td>Supply Surplus</td>
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<tr>
<td>IEA’s</td>
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<tr>
<td>OPEC’s</td>
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</tbody>
</table>

*Aggregate of all non-OECD data available through JODI. Not all non-OECD countries report inventory data and the countries in the aggregate may vary monthly depending on regularity of individual country reporting.

Source: IEA, JODI, OPEC, Platts, Rapidan Energy Group
Monthly Change in OECD and Non-OECD* Crude + Product Inventories

Accumulative OECD and Non-OECD* Crude + Product Builds Since End-2014

* Aggregate of all non-OECD data available through JODI. Not all non-OECD countries report inventory data and the countries in the aggregate may vary monthly depending on the regularity of individual country reporting.

Source: IEA, JODI, Rapidan Energy Group