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.

- 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:

7th OPEC+ Meeting

- The 7th OPEC and non-OPEC Ministerial Meeting decided for an additional production adjustment of 500 kb/d on 6 December 2019. Additional voluntary adjustments will bring the total supply adjustment by OPEC+ to 2.1 mb/d when implemented on 1 January 2020.

Saudi Arabia G20 Presidency

- The first Arab nation to hold the position, Saudi Arabia assumed the G20 Presidency on 1 December 2019. Dedicated to “Realizing Opportunities of the 21st Century for All,” Saudi Arabia supports the groups’ efforts to forge global stability, growth, and cooperation, and will host the G20 Leaders’ Summit on 21-22 November 2020.

US Sanctions Nord Stream 2

- The US Congress House of Representatives and Senate adopted a bill sanctioning the Nord Stream 2 project which was signed into law by President Trump on 21 December 2019. The project is expected to double total transport capacity of Russian gas deliveries into North West Europe to 110 bcm/y when completed in 2020.

US-China Trade Conflict

- China and the United States have agreed to a Phase 1 trade deal under which the United States reduced some tariffs and Beijing canceled retaliatory duties that were scheduled to take effect on 15 December 2019.

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 and IEA world demand growth estimates remain steady. OPEC growth projections have remained the same for three consecutive months at 0.98 mb/d, and the IEA decreased its forecast by 20 kb/d to 0.96 mb/d – its lowest growth since January 2017. The IEA and OPEC estimates for absolute world demand in 2019 are 100.25 mb/d and 99.80 mb/d, respectively.

• IEA OECD demand growth continues into negative territory while OPEC OECD growth remains the same as last month. The IEA's estimate for OECD demand growth decreases by 40 kb/d to reach a total growth of -0.07 mb/d, while OPEC's growth estimate remains the same at 0.02 mb/d. The IEA's non-OECD growth increased by 30 kb/d for total growth of 1.04 mb/d, while OPEC growth again remains the same at 0.95 mb/d. The IEA and OPEC differ by 90 kb/d on both OECD and non-OECD demand growth.

2.2 SUPPLY

• IEA non-OPEC supply growth sees an increase in December. The IEA's December 2019 assessment for non-OPEC growth is up by 60 kb/d to reach 1.89 mb/d while OPEC's growth assessment has remained the same for three consecutive months at 1.82 mb/d. In absolute values, IEA and OPEC estimate non-OPEC supply estimates at 64.83 mb/d and 64.30 mb/d respectively for 2019. IEA reports OECD growth at 1.53 mb/d, an increase of 30 kb/d from last month. The OPEC's OECD growth decreased by 20 kb/d for a total growth of 1.54 mb/d. In absolute values, IEA and OPEC estimate OECD supply estimates at 28.44 mb/d and 29.87 mb/d respectively.

• The IEA and OPEC disagree on non-OECD supply growth in December. The IEA's growth assessment decreased by 20 kb/d to 0.18 mb/d while OPEC revised its assessment by 20 kb/d to reach 0.26 mb/d. In absolute values, IEA and OPEC non-OECD supply estimates are 31.27 mb/d and 32.15 mb/d respectively for 2019.

2.3 STOCKS

• The IEA and OPEC continue to report strong alignment on stock figures. IEA stocks are back below the five-year average since late 2018. The IEA reports OECD stock levels at 2904 mb, which is close to OPEC's assessment of 2933 mb for OECD stock that is 2.9 mb below and 33 mb above the five-year average, respectively. The divergence between OPEC and the IEA stands at 29 mb for December. Total US crude inventories (excluding SPR) amount to about 441 mb according to the US Energy Information Administration (EIA). The EIA reports U.S. crude oil inventories are about 2 percent above the five-year average for this time of year. OPEC reports US stocks above the five-year average by about 5.9 mb.
### 2.4 SNAPSHOT (mb/d)

**Demand**

<table>
<thead>
<tr>
<th></th>
<th>OECD</th>
<th>Growth</th>
<th>Δ m/m</th>
<th>Non-OECD</th>
<th>Growth</th>
<th>Δ m/m</th>
<th>World</th>
<th>Growth</th>
<th>Δ m/m</th>
</tr>
</thead>
<tbody>
<tr>
<td>IEA</td>
<td>47.77</td>
<td>-0.07</td>
<td>-0.04</td>
<td>52.48</td>
<td>1.04</td>
<td>0.03</td>
<td>100.25</td>
<td>0.96</td>
<td>-0.02</td>
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<tr>
<td>OPEC</td>
<td>47.95</td>
<td>0.02</td>
<td>0</td>
<td>51.85</td>
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<td>0</td>
<td>99.80</td>
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<td>0</td>
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<tr>
<td>Difference</td>
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<td>0.09</td>
<td>0.04</td>
<td>0.63</td>
<td>0.09</td>
<td>0.03</td>
<td>0.45</td>
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**Supply**

<table>
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<tr>
<th></th>
<th>OECD</th>
<th>Growth</th>
<th>Δ m/m</th>
<th>Non-OECD</th>
<th>Growth</th>
<th>Δ m/m</th>
<th>NOPEC</th>
<th>Growth</th>
<th>Δ m/m</th>
<th>OPEC</th>
<th>Growth</th>
<th>Δ m/m</th>
<th>Difference</th>
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<tr>
<td>IEA</td>
<td>28.44</td>
<td>1.53</td>
<td>0.03</td>
<td>31.27</td>
<td>0.18</td>
<td>-0.02</td>
<td>64.83</td>
<td>1.89</td>
<td>0.06</td>
<td>29.66</td>
<td>-0.27</td>
<td>-1.33</td>
<td></td>
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<tr>
<td>OPEC</td>
<td>29.87</td>
<td>1.54</td>
<td>-0.02</td>
<td>32.15</td>
<td>0.26</td>
<td>0.02</td>
<td>64.30</td>
<td>1.82</td>
<td>0</td>
<td>29.55</td>
<td>-0.19</td>
<td>-1.13</td>
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<tr>
<td>Difference</td>
<td>1.43</td>
<td>0.01</td>
<td>0.05</td>
<td>0.88</td>
<td>0.08</td>
<td>0.04</td>
<td>0.53</td>
<td>0.07</td>
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**Stocks (mb)**

<table>
<thead>
<tr>
<th></th>
<th>OECD</th>
<th>US</th>
<th>OECD to 5-Year Average</th>
<th>US to 5-Year Average</th>
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<tbody>
<tr>
<td>IEA</td>
<td>2904</td>
<td>-</td>
<td>2.9 mb below</td>
<td>-</td>
</tr>
<tr>
<td>OPEC</td>
<td>2933</td>
<td>447</td>
<td>33.0 mb above</td>
<td>5.9 mb above</td>
</tr>
<tr>
<td>EIA</td>
<td>441</td>
<td>-</td>
<td>2 percent above</td>
<td>-</td>
</tr>
</tbody>
</table>


*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 decreased by 20 kb/d to 0.96 mb/d for an absolute demand of 100.25 mb/d in 2019. Demand growth for 2019 is driven by continuing growth in non-OECD Asia which the IEA reports at 0.86 mb/d.

OPEC’s global demand outlook remained the same as last month for a total growth of 0.98 mb/d in 2019. Absolute demand is just under the 100 mb/d mark at 99.80 mb/d. OPEC-IEA divergence in absolute world demand is 0.45 mb/d.

OECD Demand

The IEA sees OECD oil demand growth at -0.07 mb/d, down from last month’s figure of -0.03 mb/d. The IEA anticipates total OECD consumption for 2019 at 47.77 mb/d. OPEC’s growth projection for the OECD region remains the same at 0.02 mb/d with total OECD demand for 2019 at 47.95 mb/d. Divergence in overall OECD oil demand growth between the IEA and OPEC for December is 0.09 mb/d while the difference in absolute demand is 0.18 mb/d.

Non-OECD Demand

Both, the IEA and OPEC anticipate continued growth in non-OECD demand for this year at 1.04 mb/d and 0.95 mb/d, respectively. Total non-OECD demand forecasts average 52.48 mb/d and 51.85 mb/d, respectively. The IEA’s and OPEC’s assessments for 2019 non-OECD demand growth and absolute demand now differ by a 0.09 mb/d and 0.63 mb/d, respectively.

According to the IEA, China’s oil demand grew 710 kb/d y-o-y (year-over-year), faster than seen in the first nine months of the year. Both gasoil/diesel and jet/kerosene demand increased although gasoline growth was lower than at the start of the year. Although manufacturing is struggling given reduced exports, public support for infrastructure projects support demand growth. Demand growth from January to October has risen 600 kb/d y-o-y driven largely by transport and growth in the petrochemical sector. The IEA expects demand growth in 2019 to be 0.63 mb/d while falling to 0.41 mb/d in 2020.

According to OPEC, China’s demand remained strong in October rising by around 0.35 mb/d y-o-y driven by jet/kerosene, naphtha, and gasoil/diesel. Gasoline demand declined again this month by a continued decrease in vehicle sales which dropped by 4 percent y-o-y during October. The lack of vehicle sales combined with slower manufacturing activity has lowered demand growth in 2019. Oil demand is projected to be 0.35 mb/d in 2019 dropping to 0.31 mb/d in 2020.

The IEA expects demand growth in India by 0.14 mb/d in 2019 and 0.18 mb/d in 2020. Oil consumption was roughly unchanged due to heavy monsoon rains causing flooding in North India, decreased economic activity, and lower gasoil consumption. Demand for Jet/kerosene and naphtha decreased while LPG and gasoline demand increased. Industrial output recorded its largest annual fall since February 2013 which underscores the weakening of economic activity. On a positive note, air passenger traffic rose by 4 percent y-o-y and vehicle sales are stabilising after falling earlier in the year.

India’s oil demand decreased in October by 0.07 mb/d y-o-y according to OPEC due to lingering effects of the monsoon season which has limited demand for transportation and industrial fuels. LPG, meanwhile, grew by more than 0.12 mb/d due to government policies encouraging LPG household consumption. Gasoline also grew slightly due to a rare improvement in vehicle sales in October.
Die fuel also dropped due to slower construction and heavy monsoon rains which affected industrial and transportation sectors. Overall, Indian demand growth is 0.12 mb/d for 2019 with a slight increase of 0.16 mb/d in 2020.

See the graph below 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 December assessment of total non-OPEC supply for 2019 stands at 64.30 mb/d. Supply growth remains the same for the third consecutive month at 1.82 mb/d driven by the US (1.62 mb/d), Brazil (0.19 mb/d), Canada (0.10 mb/d), and China (0.09 mb/d). Growing output from these countries is offset by declining production from Mexico (-0.15 mb/d) and Norway (-0.14 mb/d) and Malaysia (-0.04). For 2020, non-OPEC supply will grow by 2.17 mb/d for an average of 66.46 mb/d.

The IEA forecasts 2019 non-OPEC supply at 64.83 mb/d with growth of 1.89 mb/d, 60 kb/d more than last month, driven mainly by the US and Brazil. The US comprises the bulk of this growth at 1.60 mb/d with total production estimated at 17.14 mb/d in 2019. Brazil’s production is expected to grow by 0.16 mb/d with a total production of 2.87 mb/d for 2019. Other increases are due to come from Russia, China, Canada, and Australia. Although US production is expected to slow, new projects in Norway, UK, and Brazil have non-OPEC production rising by 2.12 mb/d in 2020.
OPEC Supply

OPEC and the IEA forecast OECD growth at 1.54 mb/d and 1.53 mb/d with total supply reaching 29.87 mb/d and 28.44 mb/d respectively in 2019. The IEA’s data also shows OECD Americas oil supply growth at 1.58 mb/d to reach 24.61 mb/d in total. OPEC reports a growth of 1.57 mb/d growth with total oil supply reaching 25.65 mb/d in 2019. Growth within the region is led by the US at 1.62 mb/d to reach 18.33 mb/d in total, while the IEA projects less US growth of 1.60 mb/d to amount to 17.14 mb/d in total. OPEC’s assessment for total OECD Europe production in 2019 is 3.73 mb/d with a decline in growth by 0.11 mb/d from last year. The IEA’s assessment for OECD Europe supply decreases to 3.33 mb/d; a decrease in growth of 0.14 mb/d.

OPEC Supply

OPEC reports that total OPEC-14 preliminary crude oil production averaged 29.55 mb/d in November according to secondary sources. This is a decrease of 193 kb/d over the previous month. Crude oil output increased mostly in Ecuador, Kuwait, and Libya while production decreased in Saudi Arabia, Angola, Iraq, and Iran. The IEA reports that OPEC production declined 300 kb/d m-o-m (month-on-month) to reach 29.66 mb/d mostly due to Saudi Arabia limiting production ahead of the Saudi Aramco IPO and Angolan production declining to a 13-year low due to maintenance.

See the graph below for the monthly revisions of IEA and OPEC annual estimates for 2018 and new estimates for 2019 supply.
3.3 STOCK DATA

IEA data shows OECD commercial inventories decreased by 32.5 mb m-o-m in October to 2904 mb and are 2.9 mb below the five-year average for the first time since December 2018. According to OPEC, preliminary data for July showed that total OECD commercial oil stocks fell by 5.1 mb m-o-m to 2933 mb and are now 33 mb above the latest five-year average. While both organisations 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 and the monthly comparison versus the five-year average.

IEA and OPEC data shows convergence on OECD stock draws
Comprehensive non-OECD stock data remains missing

IEA and OPEC begin to diverge on stock balances over time
IEA stocks return below the five-year average for first time since 2018
3.3.1 GLOBAL STOCK ANALYSIS

IEA and JODI inventory data imply crude and product stocks drew by 10.8 mb in October

- IEA estimates OECD inventories fell below the five-year average for the first time since 2018 following a 32.5 mb draw in October (more than 2x the seasonal draw). IEA now estimates OECD stocks stand at 2,904 mb - 2.9 mb below the latest 5-year average and 1 day below the average in demand cover terms. OPEC estimates OECD stocks fell by a smaller 5.1 mb in October to 2,933 – 32.8 mb above the latest five-year average, but 0.2 days below the average in days cover terms.

- JODI non-OECD* data for October imply crude stocks built by 21.2 mb and product stocks built by 2.1 mb. The significant builds were largely driven by Saudi Arabia, which built 15.6 mb of crude, partially offsetting the steep draws that occurred in Saudi Arabia following the September 14 attacks in Abqaiq and Khurais. Together, IEA’s OECD and JODI’s non-OECD* inventory data imply global crude and product stocks drew by 10.8 mb in October.

- It is worth noting the continued large divergence in reported and implied crude stock changes in China. IEA’s report this month noted Chinese data implied a massive 52.1 mb build in 3Q19 while data reported to JODI show a 7.8 mb crude draw over the same period.

* 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 regularity of individual country reporting.

<table>
<thead>
<tr>
<th>Global Inventory Changes</th>
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</thead>
<tbody>
<tr>
<td>(mb)</td>
</tr>
<tr>
<td>------</td>
</tr>
<tr>
<td>OECD Commercial (IEA)</td>
</tr>
<tr>
<td>OECD SPR (IEA)</td>
</tr>
<tr>
<td>Available JODI Non-OECD Data*</td>
</tr>
<tr>
<td>Total</td>
</tr>
<tr>
<td>IEA's Implied Global Supply Surplus</td>
</tr>
<tr>
<td>OPEC's Implied Global Supply Surplus</td>
</tr>
</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 the regularity of individual country reporting.
Source: IEA, JODI, OPEC, Rapidan Energy Group.
COMPARATIVE ANALYSIS OF MONTHLY REPORTS ON THE OIL MARKET

RIYADH, SAUDI ARABIA

DECEMBER 2019

MONTHLY CHANGE IN OECD AND NON-OECD* CRUDE + PRODUCT INVENTORIES

* 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

ACUMULATIVE 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