



مركز الملك عبدالله للدراسات والبحوث البترولية
King Abdullah Petroleum Studies and Research Center

KAPSARC Oil Market Outlook (KOMO)

Q4, 2019

Summary

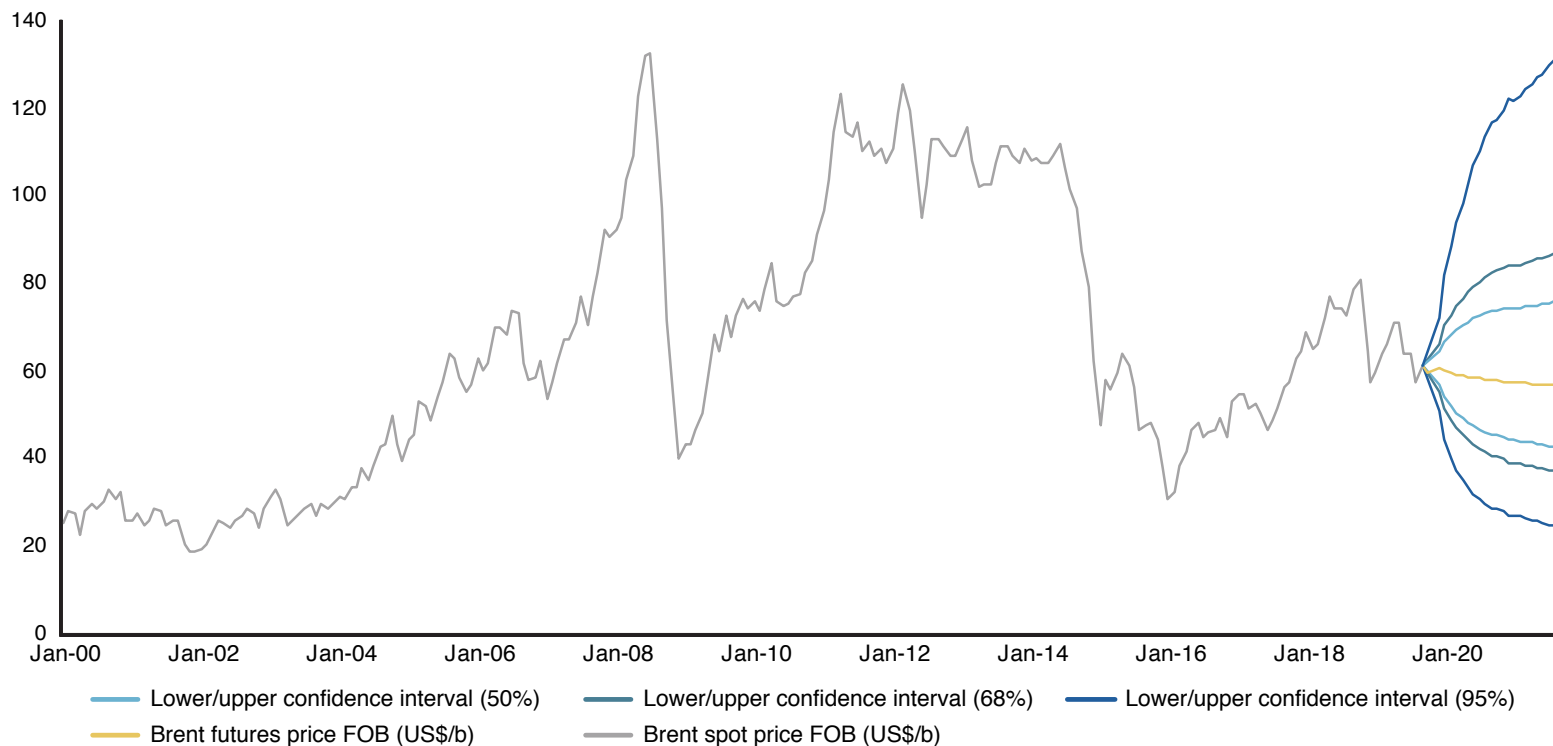
Slowing demand growth and the continued increases in U.S. supply suggest that OPEC may need production cuts to be extended throughout 2020.

- Global oil demand growth is expected to increase at a slower pace in 2019, but it should rebound slightly in 2020 from 1.01 MMb/d to 1.24 MMb/d, respectively. The forecast slowdown in demand in 2019 is due to plateauing growth in non-OECD countries and diminishing demand from OECD countries. While OECD demand is expected to rebound by 200 Kb/d in 2020, trade and geopolitical conflicts can be expected to hinder both market confidence and gross domestic product (GDP) growth, and, consequently, global oil demand growth.
- Most of the new global oil supply coming online in 2019 and 2020 is expected to be from North American tight oil, followed by condensate.
 - Total liquids is expected to stay flat in 2019 and grow by 1.15 MMb/d in 2020. Expectations of total tight oil supply growth are at 1.96 MMb/d in 2019 and 1.29 MMb/d in 2020.
 - KOMO assumes that OPEC+ cuts will be maintained throughout 2020, resulting in an average annual decline in 2020 of 540 Kb/d for OPEC members and 240 Kb/d for its partners.
- These trends suggest that there will be an average surplus of 400 Kb/d in 2019 and 310 Kb/d in 2020. However, by Q1 2021, the surplus is expected to build again. The disruptions to supply from Iran and Venezuela, coupled with the natural decline in production of other OPEC+ members and strong compliance, could reduce the surplus more rapidly and support higher prices in 2020. Oil inventories are expected to tighten by the third quarter of 2020 as real inventories are expected to hover below target levels.
- Under these assumptions, target inventory levels for the OECD are expected to average 4,540 MMb in 2019 and grow by 2 MMb in 2020 due to increased geopolitical tensions, with the expectation of a resolution in 2020. Real inventory levels are expected to reach 4,480 MMb in 2019 and grow by 53 MMb in 2020, surpassing the target inventories in the first half of 2021.

| MMb/d | 2018 | 2019 | | 2020 | |
|---------------|-------|-------|-----|-------|-----|
| Demand | 99.2 | 100.3 | 1.0 | 101.5 | 1.2 |
| Supply | 100.7 | 100.7 | 0.0 | 101.8 | 1.1 |
| Δ | 1.4 | 0.4 | | 0.3 | |

Summary

Brent crude oil price and 50%, 68%, and 95% confidence intervals (US\$/b)



Source: KAPSARC calculations based on NYMEX data, CME Group, FINCAD, October 2019.

| US\$/b | Q4 2019 | Q1 2020 | Q2 2020 | Q3 2020 | Q4 2020 | Q1 2021 | Q2 2021 | Q3 2021 |
|---------|---------|---------|---------|----------|----------|----------|----------|----------|
| Futures | 60 | 60 | 59 | 58 | 58 | 57 | 57 | 57 |
| 50% CI | 58 - 61 | 52 - 68 | 48 - 71 | 46 - 73 | 44 - 74 | 44 - 74 | 43 - 75 | 42 - 75 |
| 68% CI | 57 - 62 | 48 - 72 | 44 - 78 | 41 - 81 | 39 - 83 | 38 - 84 | 38 - 58 | 37 - 86 |
| 95% CI | 55 - 65 | 40 - 88 | 33 - 10 | 29 - 119 | 27 - 119 | 26 - 123 | 25 - 126 | 24 - 130 |

Note: CI= confidence interval

The confidence interval is derived from options market prices and the futures curve, which represent the views of a wide array of market participants, such as speculators, producers, refiners, airlines, etc.

Key issues for the oil market in 2019 and 2020

Economic uncertainties present significant downside risks for demand and upstream investments:

- The International Monetary Fund's (IMF's) global forecast was downgraded by 0.1% to 3.2% in 2019 and 3.5% in 2020.
- China's economy is slowing, reflecting regulatory tightening and rising trade tensions with the U.S.
- The EU's economy is losing momentum due to low consumer and business confidence, as well as Britain's exit from the EU (Brexit).
- Trade tensions are creating another layer of economic uncertainty.
- Worsening global financial market sentiment is resulting in tightened lending markets.

On the other hand, a resolution of the U.S.-China trade war, the resolution of other trade, geopolitical, or technology tensions, and an increase in financial market sentiment and investor confidence could potentially increase crude oil demand and crude oil prices throughout the forecast period.

Our supply/demand forecast is an average for each period and does not take into account short term volatility. Actual changes will, of course, remain volatile amid continued geopolitical events. These challenges include sanctions, trade and technology tensions, a growing number of countries facing economic slowdowns, and unexpected oil supply cuts.

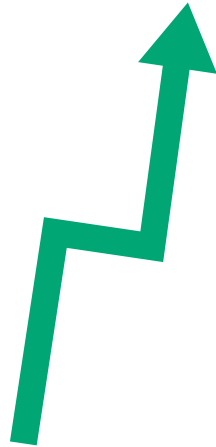
Shale production is expected to continue growing, albeit at a slower rate. Since 2015, shale producers have gradually become more resilient to lower oil prices. Having learned how to cut production costs significantly and improve productivity, they remain a key component of global supply growth.

A 40% reduction in tight oil supply growth is expected over the next few quarters. This is primarily due to the low price environment, financial constraints on operators, and abundant supply with limited transport options. However, these factors are expected to ease in the next six months. Moreover, an added 150 Kb/d of non-American tight oil supply is expected to come online from Argentina and Canada by the end of 2020.

As a result and concerning quality differentials, incremental lighter fuel production is widening the price spread between heavy and light crudes.

The transition from high sulfur fuel oil (HSFO) to low sulfur fuel oil (LSFO) in 2020 due to new International Maritime Organization (IMO) regulations has already begun, with HSFO prices dropping between September 27 and October 1 by over 50 US\$ per tonne. Long-haul ships have already started transitioning to LSFO to avoid having any residues of higher sulfur content by January 2020. Although LSFO has always been more expensive than HFO, early reactions by refineries to the IMO's regulations have created an abundance of supply, helping to stabilize prices. We expect the heavier products to glut the market momentarily, but their discounted prices will likely promote their use in other maritime and non-maritime sectors.

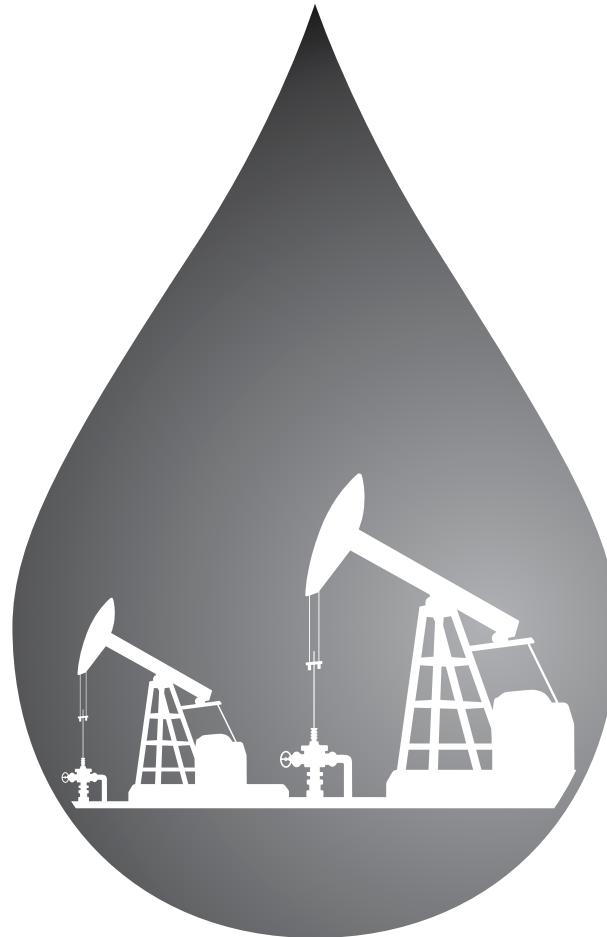
Factors influencing price



- Geopolitics (Iran, Libya, Turkey, Venezuela)
- Continued oil demand growth
- OECD Asia-Oceania recovery

Future catalysts for price strength

- OPEC+ level of compliance
- IMO regulations
- Restoring market confidence
- Strait of Hormuz tensions
- Multilateral and national actions and policies that promote market confidence



- Global recession risk
- China - U.S. trade tensions
- OECD inventory stockpile
- Strengthened US\$
- Threat of international trade tariffs
- Stronger non-OPEC supply



Demand

Global oil demand is estimated to grow by 1.01 MMb/d in 2019 and 1.24 MMb/d in 2020. The increase in the rate of growth forecast for 2020 is due to a modest rebound in gross domestic product (GDP) growth in 2020 and an expected stabilization in oil prices until Q3 2020. This extra growth in 2020 is expected to come from OECD Asia, with non-OECD growth remaining the same.

In 2018, global demand grew by 1.09 MMb/d, with 480 Kb/d coming from OECD countries and 610 Kb/d from non-OECD countries.

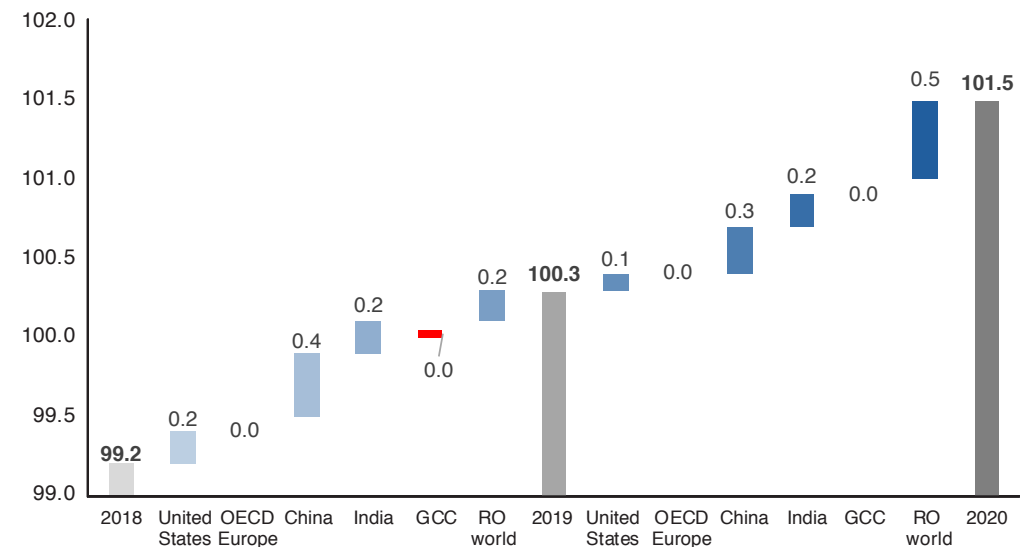
In 2019, OECD oil demand growth is expected to slow to 100 Kb/d, with an increase of 164 Kb/d from North America countered by decreases in demand from Italy, Japan, South Korea and Turkey. Japan is shifting back to nuclear energy and reducing demand for oil where demand for liquefied petroleum gas (LPG), ethane, and gasoline, among other products, has been slowing down. South Korea's economy and petrochemicals sector, in particular, is weakening, and OECD Oceania is expected to experience a short-term economic slowdown before rebounding in 2020. This should result in total demand growth from the OECD of around 310 Kb/d in 2020.

The bulk of non-OECD oil demand growth is expected to come from China (415 Kb/d), followed by India (180 Kb/d). Total non-OECD growth is estimated to reach 910 Kb/d in 2019 and 910 Kb/d in 2020.

Asia is expected to witness lower economic growth over the next two years due to an economic slowdown in China. Latin American countries are also expected to contract during this period. However, they are estimated to be nearing the end of their economic slump.

Moreover, the continued strengthening of the U.S. dollar is expected to play a minor role in limiting oil demand growth as prices continue to float around their current values. A stronger dollar is expected to positively impact the economies of oil-producing countries and consequently increase their demand growth for 2020.

Annual global oil demand growth, MMb/d, 2019-2020



Source: KAPSARC, October 2019.

United States

| | 2018 | Q1 | Q2 | Q3 | Q4 | 2019 | Q1 | Q2 | Q3 | Q4 | 2020 | Q1 | Q2 | Q3 | 2021 |
|-----------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| United States (MMb/d) | 20.8 | 20.9 | 20.8 | 21.1 | 21.1 | 21 | 21.0 | 21.0 | 21.2 | 21.2 | 21.1 | 21.1 | 21.0 | 21.2 | 21.2 |

Yearly

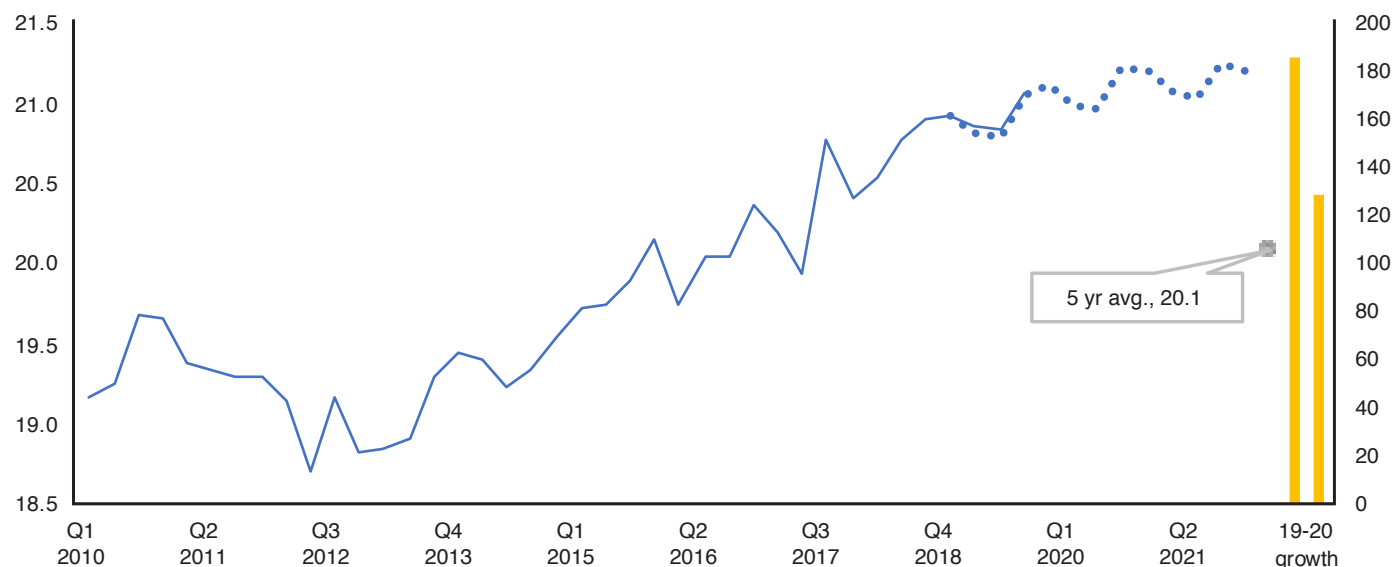
U.S. oil demand growth is expected to fall to 185 Kb/d in 2019, far below its 460 Kb/d growth in 2018. U.S. demand growth is expected to continue at a slower pace in 2020 at 125 Kb/d, declining to 100 Kb/d in 2021 due to a reduction in its economic growth forecast.

In 2019, LPG and diesel/gas oil are expected to account for most of the growth in U.S. oil demand, with a notable decrease in the demand for naphtha, motor gasoline, fuel oil and other products.

Q4 2019

Quarter-on-quarter (QoQ) growth of 50 Kb/d is expected for the fourth quarter, with less demand for transportation fuels but more demand for heating fuels. LPG demand growth is expected to be around 400 Kb/d, while gas/diesel oil demand growth is expected to increase by around 200 Kb/d. The remaining fuels should witness a decline, except for motor gasoline, which is not expected to change from Q3.

United States, MMb/d (L) and 19-20 growth Kb/d (R)



Source: KAPSARC, October 2019.

OECD Europe

| | 2018 | Q1 | Q2 | Q3 | Q4 | 2019 | Q1 | Q2 | Q3 | Q4 | 2020 | Q1 | Q2 | Q3 | 2021 |
|---------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| OECD Europe (MMb/d) | 14.4 | 14.2 | 14.3 | 14.8 | 14.6 | 14.5 | 14.3 | 14.3 | 14.3 | 14.5 | 14.5 | 14.3 | 14.3 | 14.7 | 14.6 |

Yearly

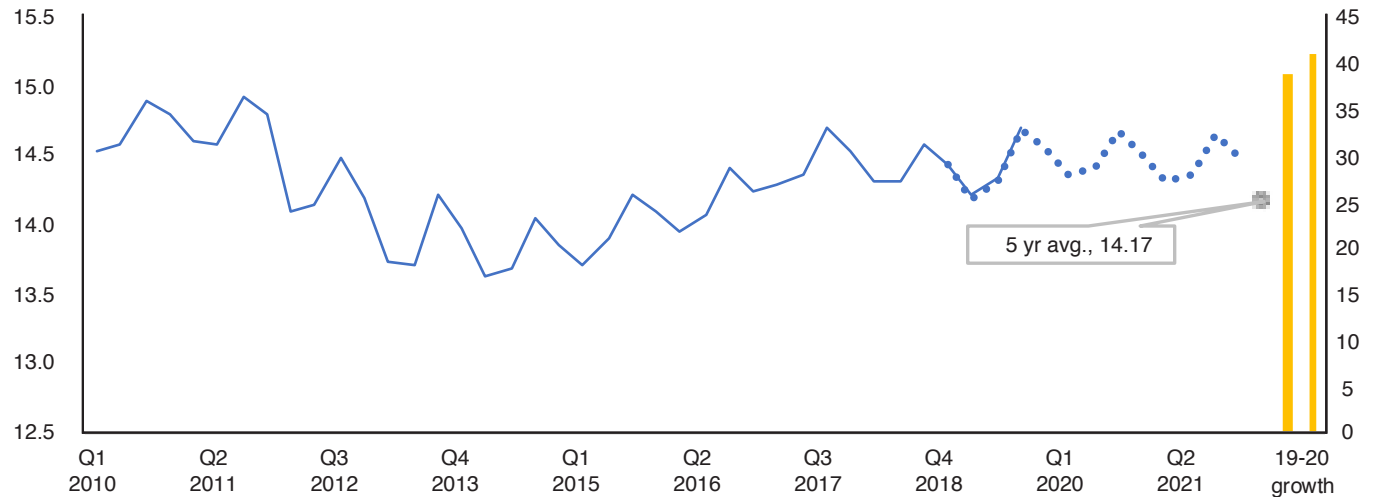
OECD Europe's oil demand is expected to grow by 40 Kb/d in 2019 and 41 Kb/d in 2020, despite the prospect of a no-deal Brexit and the warnings of a recession in Germany. Indeed, apart from the United Kingdom, Turkey and Italy, demand seems to be relatively healthy in OECD Europe. Italy's economic challenges reduced its demand by around 100 Kb/d in 2019, which also limited Europe's demand growth overall.

Demand growth in OECD Europe in 2019 is expected to be led by jet fuel/kerosene followed by motor gasoline, whereas demand for fuel oil and naphtha is expected to decrease.

Q4 2019

QoQ demand in the fourth quarter is expected to have decreased by 200 Kb/d. Demand for all fuels is expected to have decreased, except for gas/diesel oil, which should grow at 3%.

OECD Europe, MMb/d (L) and 19-20 growth Kb/d (R)



Source: KAPSARC, October 2019.

China

| | 2018 | Q1 | Q2 | Q3 | Q4 | 2019 | Q1 | Q2 | Q3 | Q4 | 2020 | Q1 | Q2 | 2021 |
|--------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| China | 12.9 | 13.2 | 13.4 | 13.3 | 13.6 | 13.4 | 13.6 | 13.8 | 13.6 | 13.8 | 13.7 | 13.8 | 14.1 | 14.0 |

Yearly

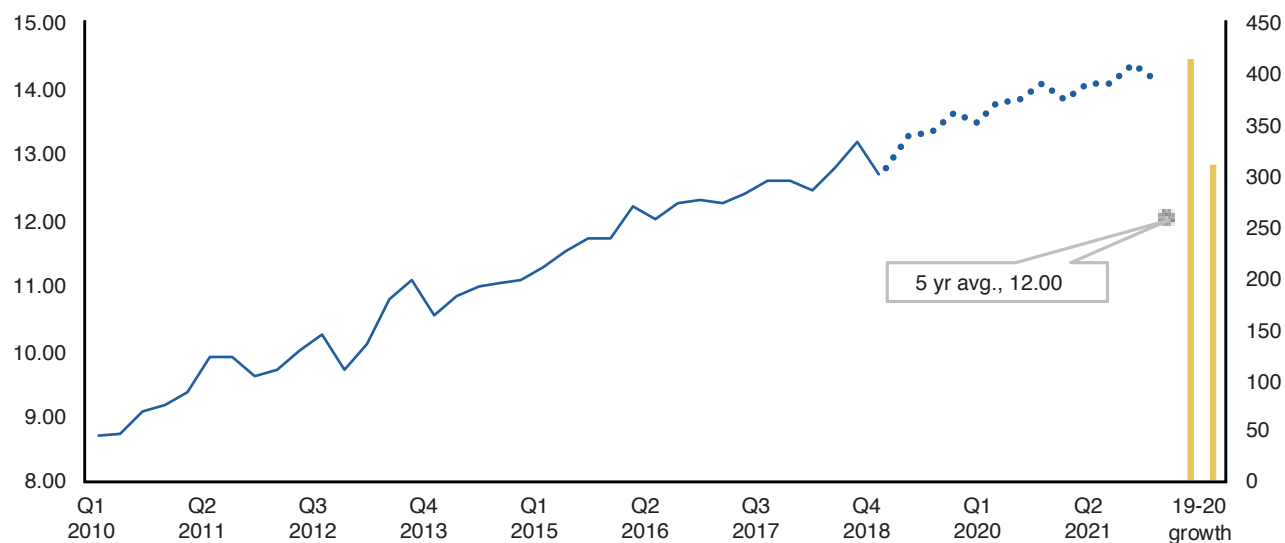
China's oil demand is expected to grow by 415 Kb/d in 2019, slightly below its 2018 growth level of 490 Kb/d. Although the IMF's GDP growth forecast for China fell from 6.3% to 6%, the opening of the Hengli (capable of processing 400 Kb/d) and Zhejiang petrochemical plants have helped the country maintain strong demand. However, China's demand growth is expected to slow in 2020 to 310 Kb/d, before falling another 30-70 Kb/d in 2021 due to economic weakness.

In 2019, LPG and gasoline are expected to account for most of the growth in China's oil demand, with a notable decrease in the demand for gas/diesel oil and fuel oil due to the upcoming IMO regulations and recent vehicle licensing regulations.

Q4 2019

QoQ consumption is expected to stagnate in the fourth quarter. Demand for fuel oil and heavier products, should be offset by yearly demand for heating fuels. Indeed, demand for LPG and gas/diesel oil for heating purposes is expected to increase by 100 Kb/d each over the winter season.

China, MMb/d (L) and 19-20 growth Kb/d (R)



Source: KAPSARC, October 2019.

India

| | 2018 | Q1 | Q2 | Q3 | Q4 | 2019 | Q1 | Q2 | Q3 | Q4 | 2020 | Q1 | Q2 | Q3 | 2021 |
|----------------------|------|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|------|
| India (MMb/d) | 4.8 | 5.1 | 5.1 | 4.8 | 5.1 | 5.0 | 5.3 | 5.3 | 5.0 | 5.2 | 5.2 | 5.4 | 5.4 | 5.2 | 5.4 |

Yearly

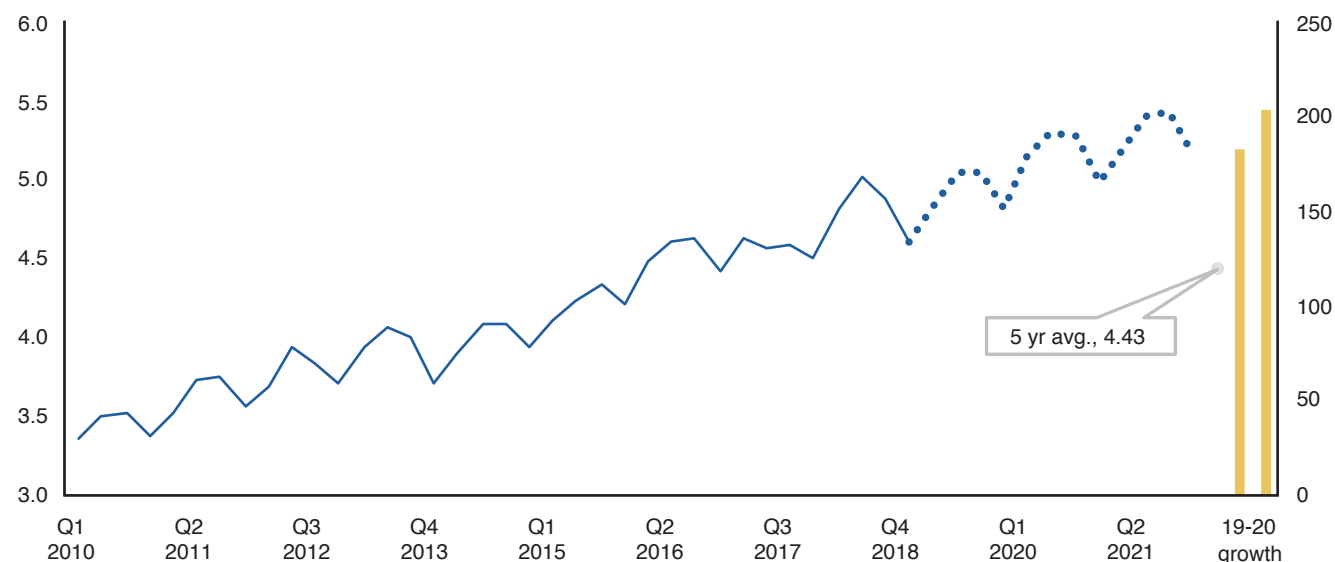
India's oil demand is expected to grow by 184 Kb/d in 2019, below its demand growth of 217 Kb/d in 2018. Its demand growth is expected to increase in 2020 to 205 Kb/d before falling again to 183 Kb/d in 2021 as GDP growth stagnates .

Heavier products are expected to account for most of the growth in India's oil demand in 2019. Petcoke and bitumen, alongside other heavy products, are expected to account for 44% of India's demand growth, followed by LPG and motor gasoline. However, the demand for aviation fuels and naphtha is expected to decrease.

Q4 2019

India's demand for fuel tends to peak in the fourth quarter. Gas/diesel oil, LPG and the heavier products are the main drivers for this quarter's demand, with a total QoQ increase of approximately 300-400 Kb/d.

India, MMb/d (L) and 19-20 growth Kb/d (R)



Source: KAPSARC, October 2019.

Saudi Arabia

| | 2018 | Q1 | Q2 | Q3 | Q4 | 2019 | Q1 | Q2 | Q3 | Q4 | 2020 | Q1 | Q2 | Q3 | 2021 |
|---------------------|------|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|------|
| Saudi Arabia | 3.1 | 2.6 | 3.3 | 3.6 | 2.9 | 3.1 | 2.6 | 3.2 | 3.5 | 2.9 | 3.1 | 2.6 | 3.2 | 3.6 | 3.1 |

Yearly

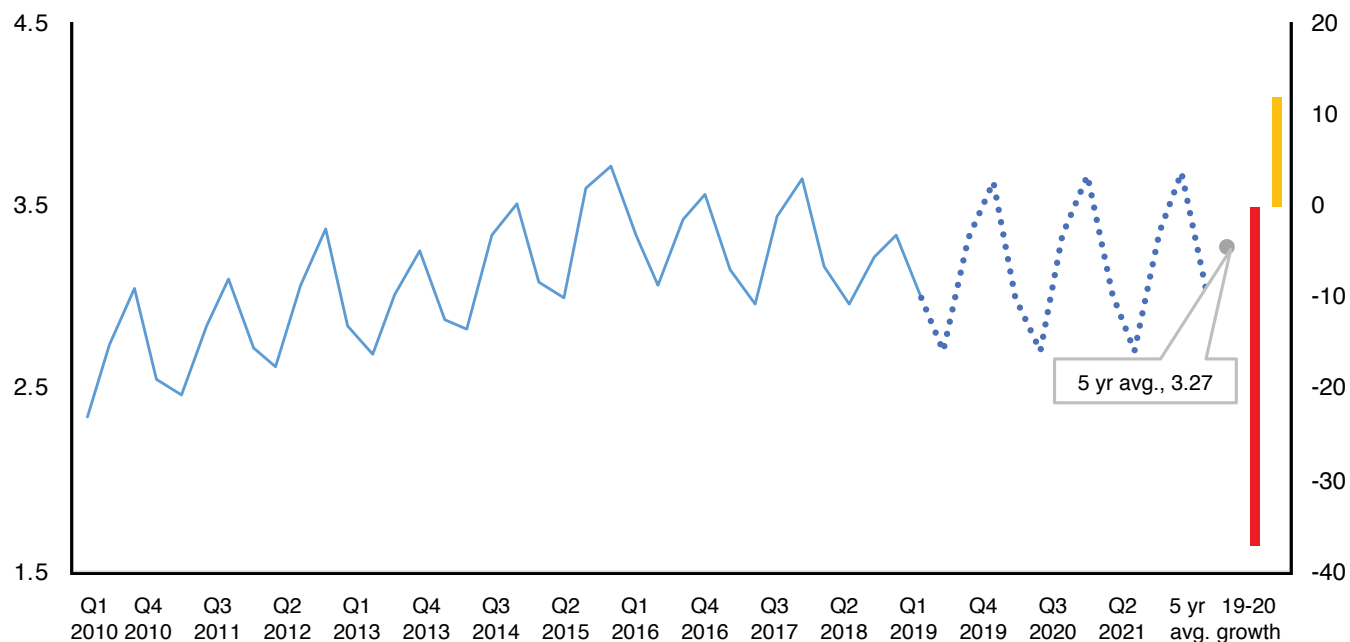
Saudi Arabia's oil demand is expected to continue decreasing by 40 Kb/d in 2019, albeit moderating its 2018 decline of 135 Kb/d. It is expected to return to positive demand growth in 2020 of 12 Kb/d and 15 Kb/d in 2021.

Most of the decline in the country's demand growth in 2019 will come from reduced consumption of heavier products, gas/diesel oil, and LPG. This reduction is due to a slowdown in economic activity, but it is also a function of the positive effects of economic reform as well as new regulations and domestic pricing aimed at improving energy efficiency.

Q4 2019

The consumption of heavier products (i.e., gas/diesel oil, fuel oil, etc.) should decrease significantly by around 300 Kb/d in the fourth quarter, while demand for LPG, naphtha and gasoline should increase by around 150-200 Kb/d.

Saudi Arabia oil demand, MMb/d (L) and growth in 2019-2020, Kb/d (R)



Source: KAPSARC, October 2019.

Demand growth

| 2019 | Q1 2019 | Q2 2019 | Q3 2019 | Q4 2019 | Avg. |
|---------------|---------|---------|---------|---------|-------|
| OECD | 48.1 | 47.4 | 48.2 | 48.8 | 48.2 |
| Non-OECD | 51.2 | 52.3 | 52.5 | 52.2 | 52.1 |
| Global demand | 99.6 | 99.7 | 100.7 | 101 | 100.3 |

| 2020 | Q1 2020 | Q2 2020 | Q3 2020 | Q4 2020 | Avg. |
|---------------|---------|---------|---------|---------|-------|
| OECD | 48.8 | 47.7 | 48.6 | 48.9 | 48.5 |
| Non-OECD | 52.1 | 53.2 | 53.5 | 53.3 | 53 |
| Global demand | 100.8 | 100.9 | 102 | 102.2 | 101.5 |

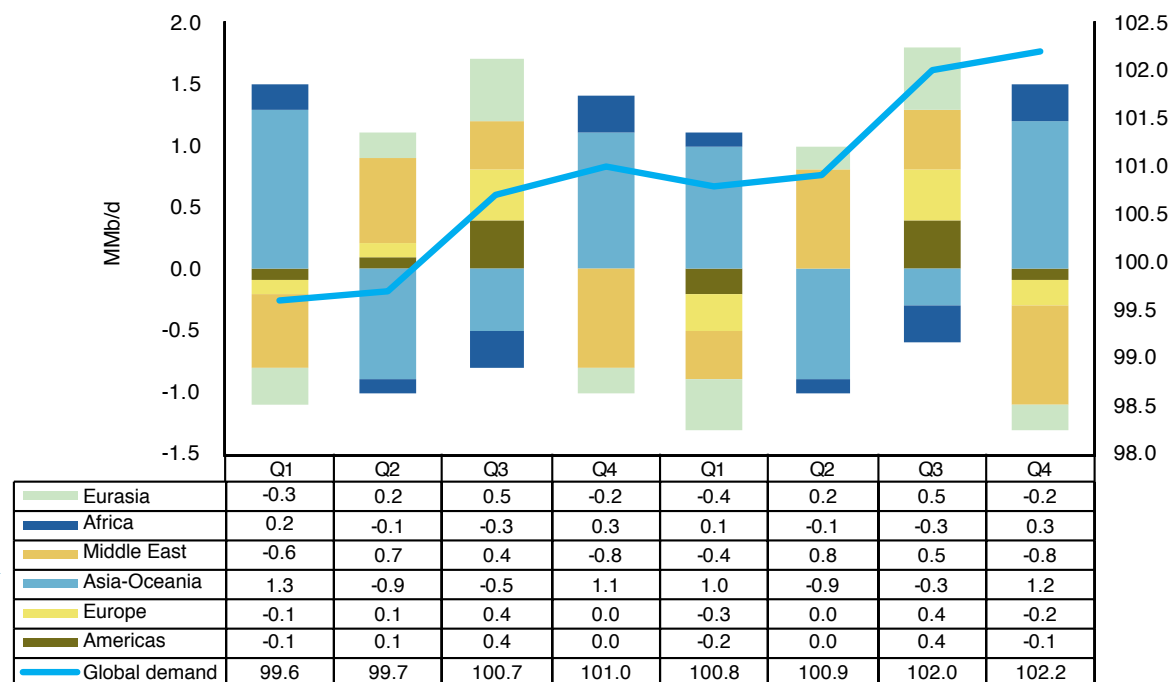
| 2021 | Q1 2021 | Q2 2021 | Q3 2021 | Avg. |
|---------------|---------|---------|---------|-------|
| OECD | 48.8 | 47.8 | 48.6 | 48.6 |
| Non-OECD | 53.1 | 54.2 | 54.5 | 54.1 |
| Global demand | 102 | 102 | 103.2 | 102.6 |

The non-OECD is expected to retain its 52% share of global oil demand in 2019 and 2020. However, in 2019, non-OECD demand growth will represent about 90% of total oil demand growth and will decline to 75% in 2020.

This decline in non-OECD demand growth is due to a combination of slower demand growth from emerging markets, particularly Asia, and a rebound in demand from OECD Oceania in 2020. It is expected that total OECD demand will increase by between 100 Kb/d and 300 Kb/d in 2020.

Fears over looming trade tensions are expected to increase volatility and lower oil demand growth.

Regional oil demand growth, MMb/d, 2019-2020



The strongest quarter-on-quarter fluctuations come from Asia-Oceania followed by the Middle East and Eurasia.

Supply

Global liquids supply is expected to grow by only 40 Kb/d in 2019 to reach 100.7 MMb/d, as OPEC+ cuts largely offset continued U.S. demand growth. Global growth in liquids supply is expected to rebound in 2020 by 1,150 Kb/d to reach 101.8 MMb/d on the back of continued tight oil growth.

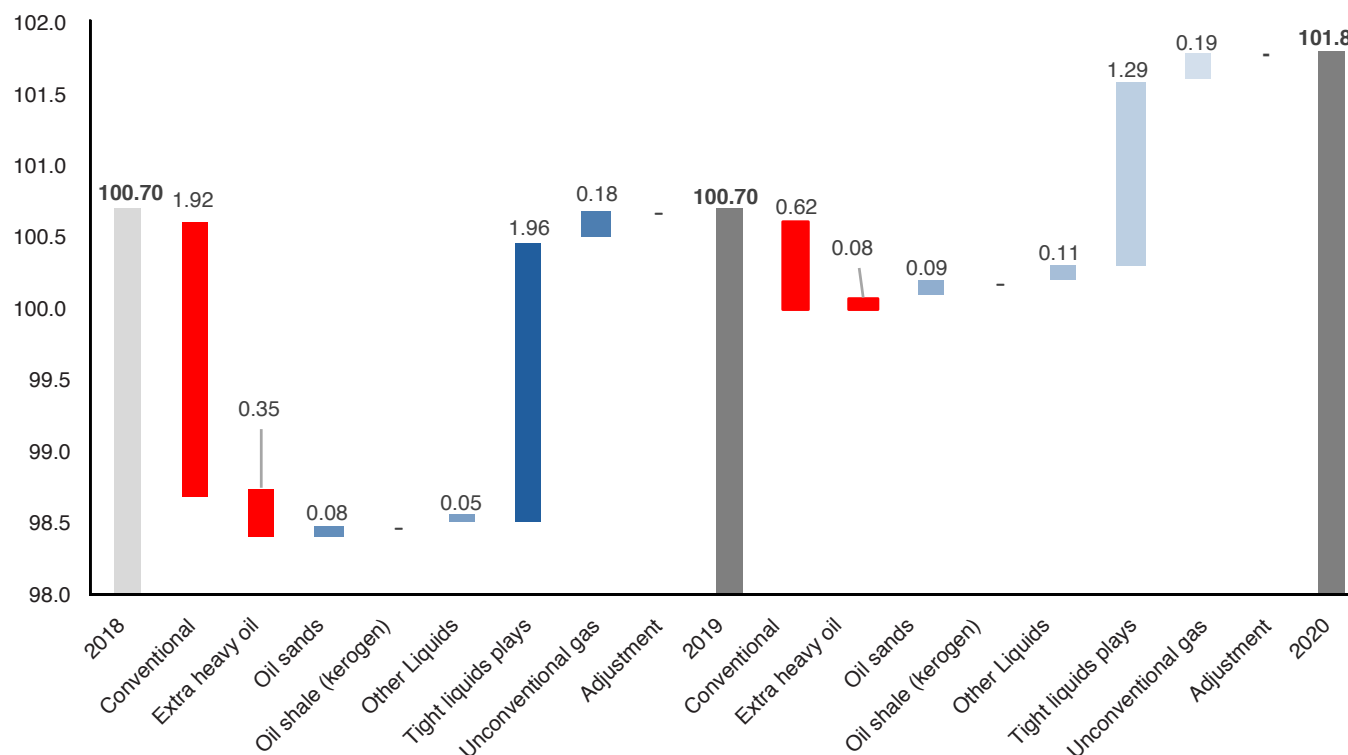
The 1.2 MMb/d cuts to OPEC+ production in the past two years have focused on conventional crudes from OPEC members and total liquids from its partners. In addition, Iran and Venezuela have seen large reductions in their production due to sanctions. The largest declines for 2019 come from Iran, Venezuela and Saudi Arabia.

Tight oil (largely in the U.S. but with small contributions from Canada and Argentina) is expected to add 1.96 MMb/d in 2019 and 1.29 MMb/d in 2020. In addition, we expect to see growth in Brazil and Norway. We will continue to see an overall decline in conventional crude for 2020 of 620 Kb/d due to the low price environment and OPEC cuts.

Compliance with U.S. sanctions on Iran represents an upside risk to supply (see discussion below).

In these circumstances, we assume that OPEC+ production restraint continues throughout 2020. OPEC is expected to reduce its supply year-on-year (YoY) by 2.1 MMb/d in 2019 and 540 Kb/d in 2020, and its partners by approximately 150 Kb/d in 2019 and 240 Kb/d in 2020, continuing to exceed 100% compliance.

Annual global liquid supply, MMb/d, 2019-2020



Source: Rystad; KAPSARC, October 2019.

While OPEC+ cuts are intentional and designed to stabilize prices, KOMO includes several production declines as a result of low investment, sanctions, and economic turmoil in certain regions. Other countries have also seen production fall due to maturity and low investments, such as Mexico, Kazakhstan and Sudan.

OPEC and partners

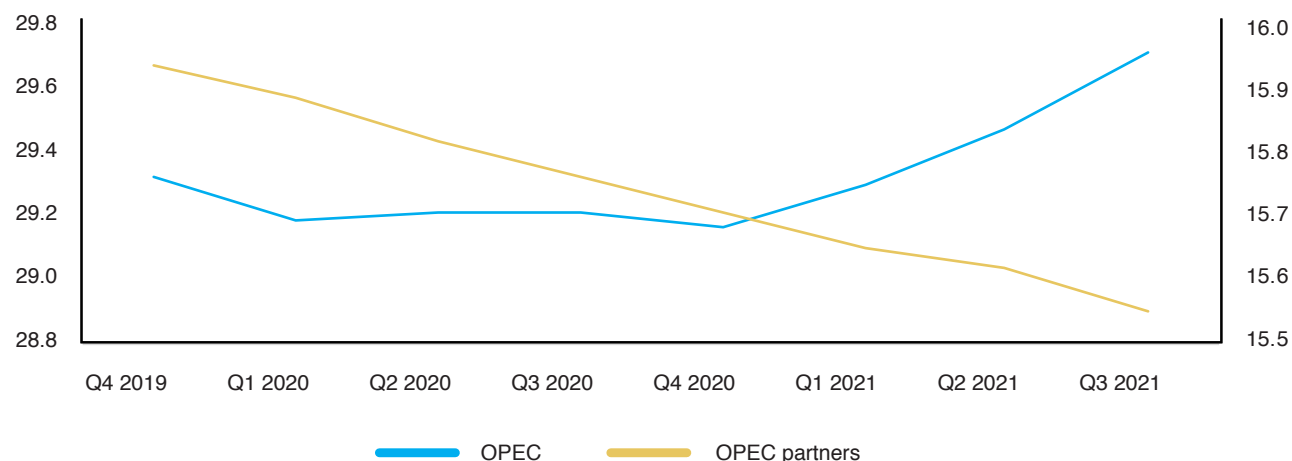
Given KOMO's estimates for demand and non-OPEC supply, OPEC and its partners are assumed to over comply with their agreed cuts for 2019 (-2.24 MMb/d). A further reductions of 780 Kb/d in 2020 may be necessary.

Iran will be responsible for around 1.1 MMb/d of cuts in 2019, with Saudi Arabia cutting by 680 Kb/d (this includes the impact of the recent attacks on its oil facilities as well as voluntary cuts) and Venezuela cutting by 570 Kb/d. Most of the cuts from OPEC partners will come from a natural decline in production from Mexico of 190 Kb/d, followed by declines in Malaysia of 50 Kb/d and 20 Kb/d in Kazakhstan.

Although OPEC is expected to keep its production cuts in place, Libya and Venezuela are expected to increase production slightly. Iraq and the United Arab Emirates (UAE) are expected to exceed their quotas in 2019, before complying in 2020.

The world is witnessing a gradual decline in conventional crudes in most OPEC member counties due to limited investment in the supply chain. This may result in Gulf Cooperation Council (GCC) members eventually being able to increase production, but KOMO estimates that it will happen gradually in order to balance the market in 2021.

OPEC production (L) and OPEC partners production (R) MMb/d



Source: KAPSARC, October 2019.

OPEC's partners are expected to reduce production by 150 Kb/d in 2019 and by 240 Kb/d in 2020. It is estimated that these countries will remain well below their target levels due to involuntary declines in Mexico and elsewhere, despite their strong cuts. We estimate that Russian production remains broadly flat in 2020.

OPEC(+)¹ spare capacity

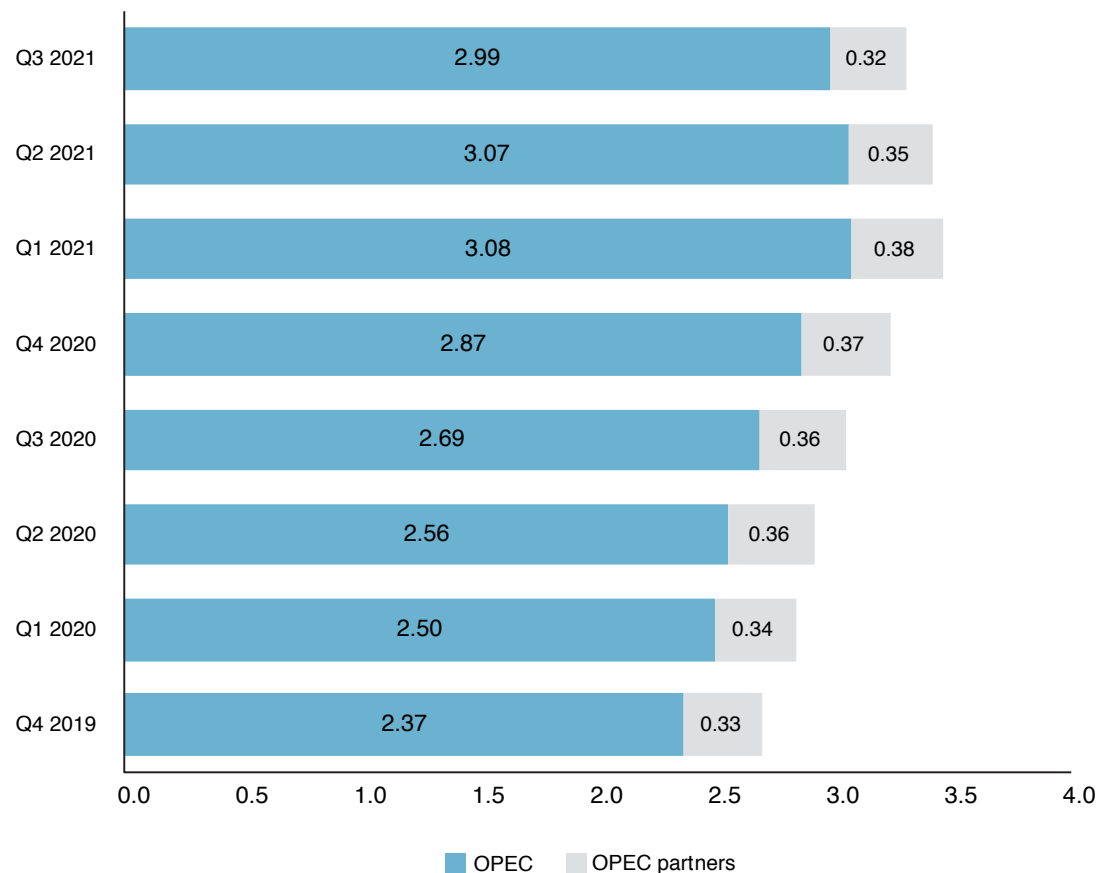
OPEC spare capacity – a key element in ensuring market stability – is expected to increase gradually alongside lower average output, from 2.37 MMb/d to 2.99 MMb/d over the next two years.

OPEC's partners, however, are expected to increase their spare capacity by 50 Kb/d over the next year to 380 Kb/d, before reducing it to 320 Kb/d by Q3 2021.

Some OPEC members, such as Saudi Arabia and Russia, normally produce at a much higher rate, while other members naturally produce at the current lower rates due to the maturity of their resource bases.

NOTE: OPEC members set targets on crude output, partners target total liquids output.

OPEC and partners spare capacity, MMb/d



Source: Rystad; KAPSARC, October 2019.

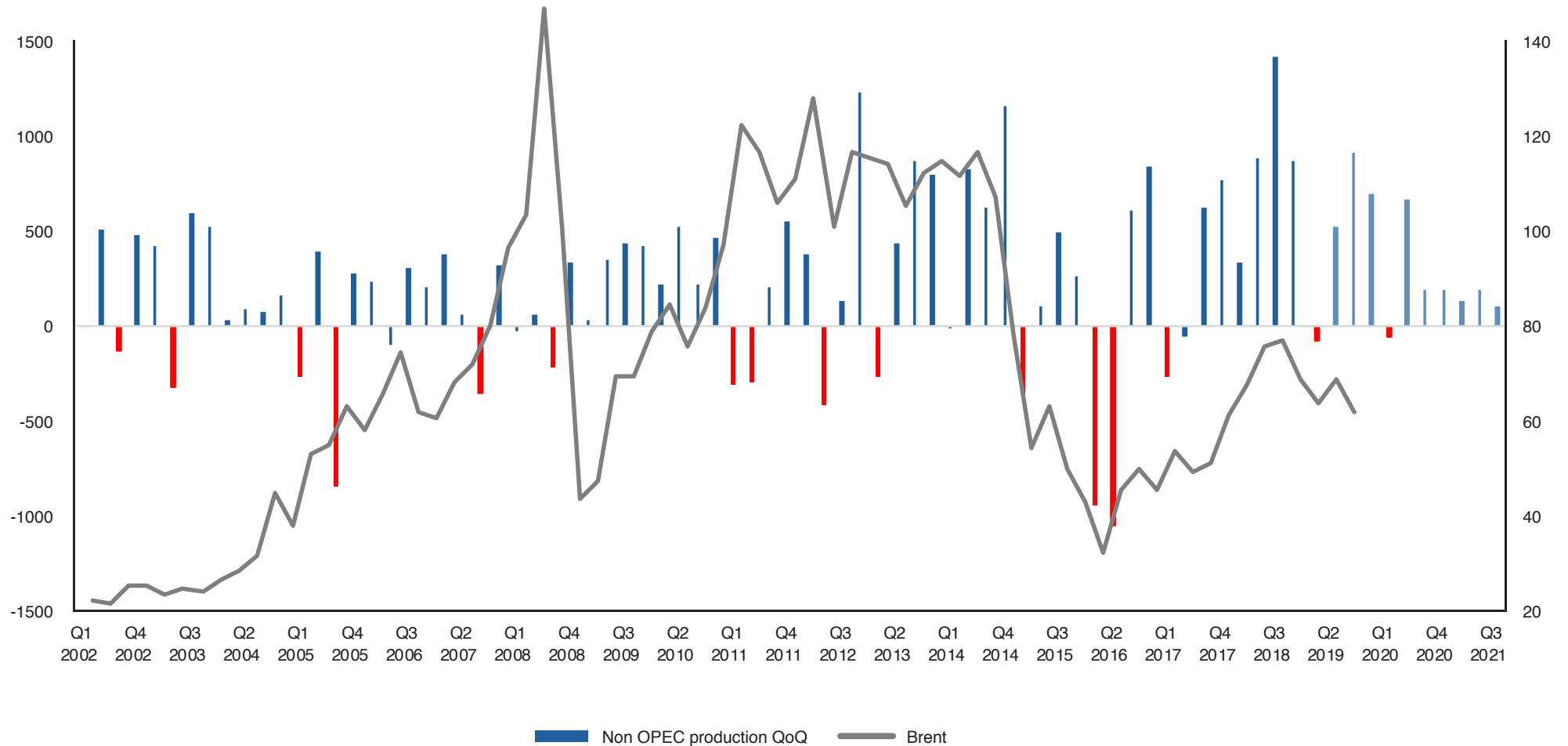
OPEC and partners supply changes for 2019 and 2020

| | 2019 | 2020 |
|-------------------|--------|------|
| UAE | 162 | -13 |
| Iraq | 132 | -6 |
| Libya | 122 | 31 |
| Russia | 75 | -19 |
| South Sudan | 53 | 3 |
| Nigeria | 38 | -74 |
| Bahrain | 15 | 4 |
| Ecuador | 12 | -20 |
| Brunei | 1 | -13 |
| Gabon | 1 | -21 |
| Kuwait | 1 | -18 |
| Congo | -4 | -2 |
| Oman | -9 | 6 |
| Sudan | -11 | -9 |
| Azerbaijan | -15 | -11 |
| Kazakhstan | -17 | -29 |
| Equatorial Guinea | -22 | -3 |
| Malaysia | -48 | -37 |
| Algeria | -53 | -69 |
| Angola | -126 | -94 |
| TOTAL PARTNER | -146 | -238 |
| Mexico | -191 | -133 |
| Venezuela | -570 | 102 |
| Saudi Arabia | -677 | -266 |
| Iran | -1,110 | -89 |
| TOTAL OPEC | -2,094 | -543 |
| TOTAL OPEC+ | -2,240 | -781 |

| | Kb/d |
|--|------|
| | 50 |
| | 0 |
| | -50 |
| | -100 |
| | -400 |

Non-OPEC

Non-OPEC production and Brent crude oil prices



Non-OPEC growth:

- In 2019, the supply of tight oil grows by 1.96 MMb/d, while the supply of unconventional gas liquids and oil sands grow by 180 Kb/d and 80 Kb/d, respectively.
- In 2020, the supply of tight oil grows by 1.29 MMb/d, while the supply of unconventional gas liquids and oil sands grow by 190 Kb/d and 90 Kb/d, respectively.

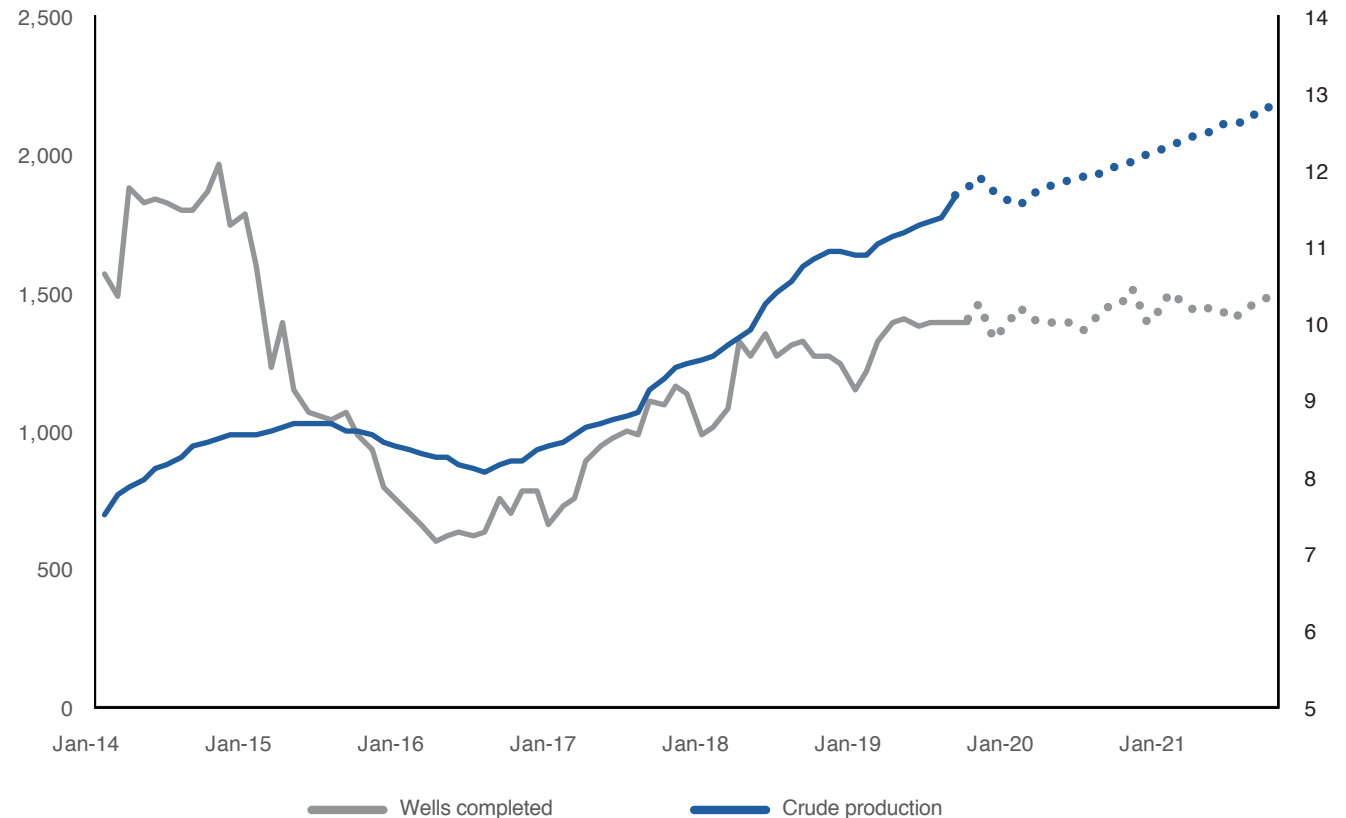
Non-OPEC (tight oil)

Most growth in non-OPEC production in 2019 is expected to come from tight oil. The growth in tight oil is estimated to reach 1.96 MMb/d in 2019 and 1.29 in 2020 (1.1 MMb/d for the U.S. and 150 Kb/d from Argentina and Canada), whereas unconventional gas will continue to provide associated liquids at around 160 kb/d in 2019 and 180 Kb/d in 2020.

Completed drilling projects are expected to average 1,375 wells per month in 2019 and increase by 45 wells in 2020. Although drilling project numbers may not be an 'official' indicator of production in the U.S, they serve as a good indicator.

However, the existing infrastructure may not be able to cope with such rapid expansion in the near term. This could create bottlenecks and increase the risk of localized price volatility, which could be detrimental to many small and medium-sized enterprises (SMEs) in the field. Reports indicate that nearly 200 companies have filed for bankruptcy since 2015. Investors are also demanding higher returns, creating an added risk to increased drilling and production. As such, KOMO has reduced its forecast for completed drilling projects by more than half by 2020 and perhaps part of 2021.

U.S. drilling activity per month (L) vs. U.S. total liquids production (MMb/d) (R)



Productivity Report, EIA, October, 16, 2019.

2019 – 2020 KAPSARC, October 2019.

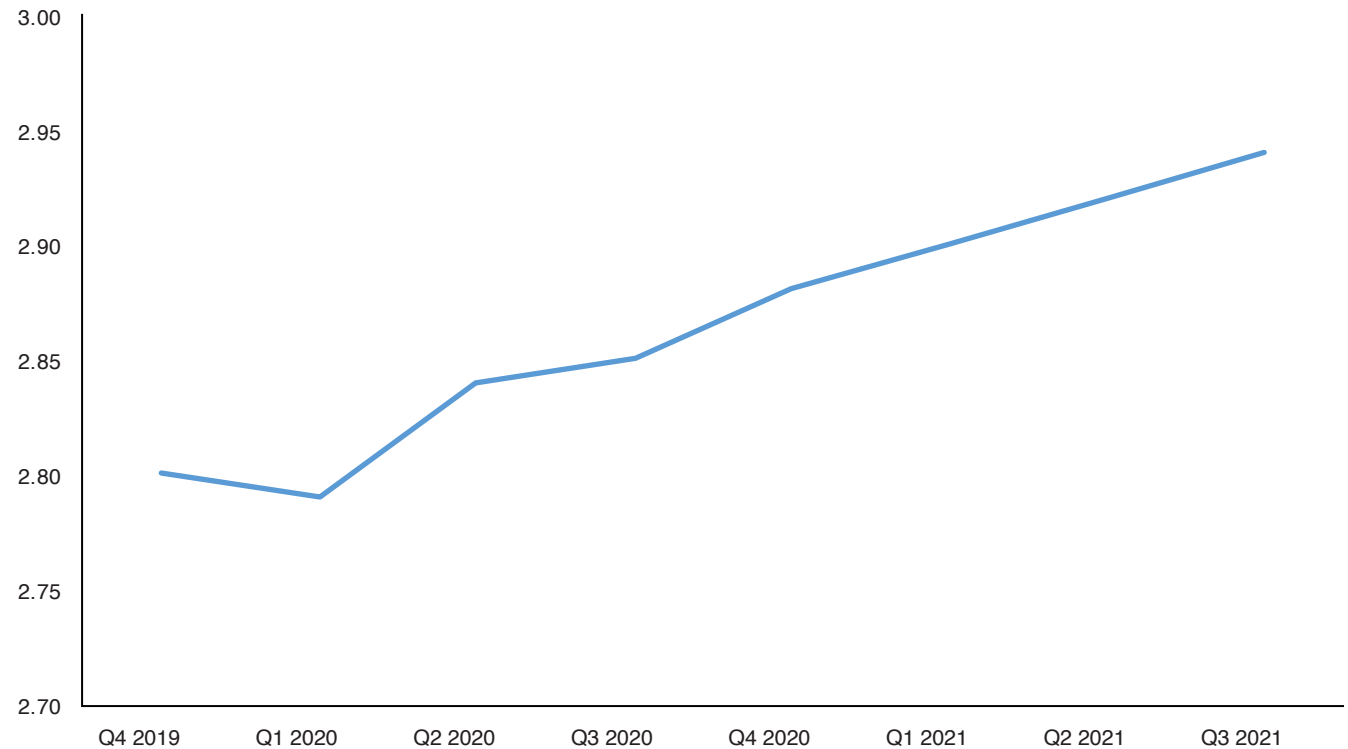
Non-OPEC (oil sands)

KOMO estimates that oil sands supply will grow by 80 Kb/d in 2019 and 90 Kb/d in 2020.

Canadian oil sands have the potential to grow at a faster pace. However, their growth is limited and reaching saturation point due to transport, political, and technical challenges, including the temporary restrictions by the Albertan government and the Canadian Senate's recent approval of the controversial Bill C-69, dubbed the 'no pipeline bill.'

There have been a number of new railway deals in Canada which will expand mobility. There are also plans for a local refinery. However, none of these are projected to materialize in the short-term, resulting in constrained growth.

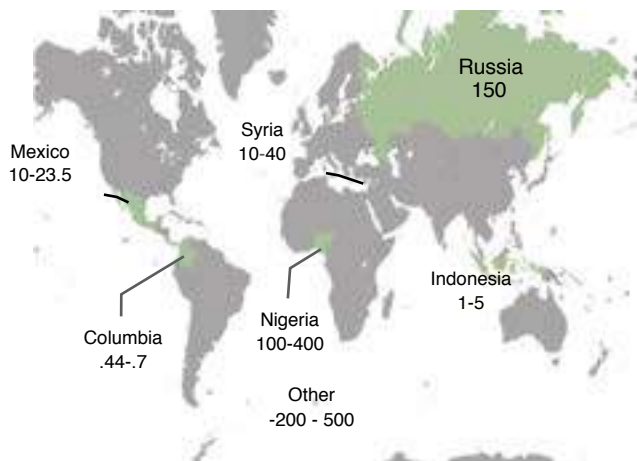
Oil sands, MMb/d, Q4 2019-Q3 2021



Source: KOMO, October 2019.

Adjustment factors

KOMO integrates into its supply forecasts unaccounted supply from a number of factors such as bunkering oil, disruptions and disputes. It also takes seasonality into account and adjusts its forecasts accordingly.



Global Financial Integrity, March 2017. [Link](#).

Iran

Iran is expected to lose 1.1 MMb/d of production in 2019 and continue in 2020 by reducing an extra 90 Kb/d.

Although the U.S. has reinstated sanctions against Iran, China has signaled that it is likely to continue to import Iranian oil. However, press reports in October showed that China might be reducing its investments in Iran. It is still unclear if this means that China will also reduce its oil purchases from Iran. Chinese (and other countries') imports of Iranian oil is a key uncertainty.

While the European Union has developed a new mechanism, Instrument In Support of Trade Exchanges (INSTEX), to facilitate non-US\$ and non-SWIFT (the main international payment system) transactions to avoid breaking U.S. sanctions, KOMO expects that the deal will have a limited impact on European purchases of Iranian oil.

Venezuela

Falling oil revenues have heavily impacted Venezuela, and the country is facing national turmoil as a result. The lack of public funding for oil production has resulted in its continuous decline. As a result, our field-by-field assessment suggests Venezuela's oil supply is expected to decline by 570 Kb/d in 2019, regaining momentum in 2020 with growth of 100 Kb/d. This uptake is dependent on new investment, especially from China and Russia. If these anticipated investments are cancelled, Venezuela would be expected to suffer further falls in its oil production.

In the short term, Venezuela's production is expected to continue to decline, despite its expected rebound in 2020. It is expected that the MPE3, Dobokubi, and Boscan fields will witness the strongest production declines.

A period of surplus and fluctuations...

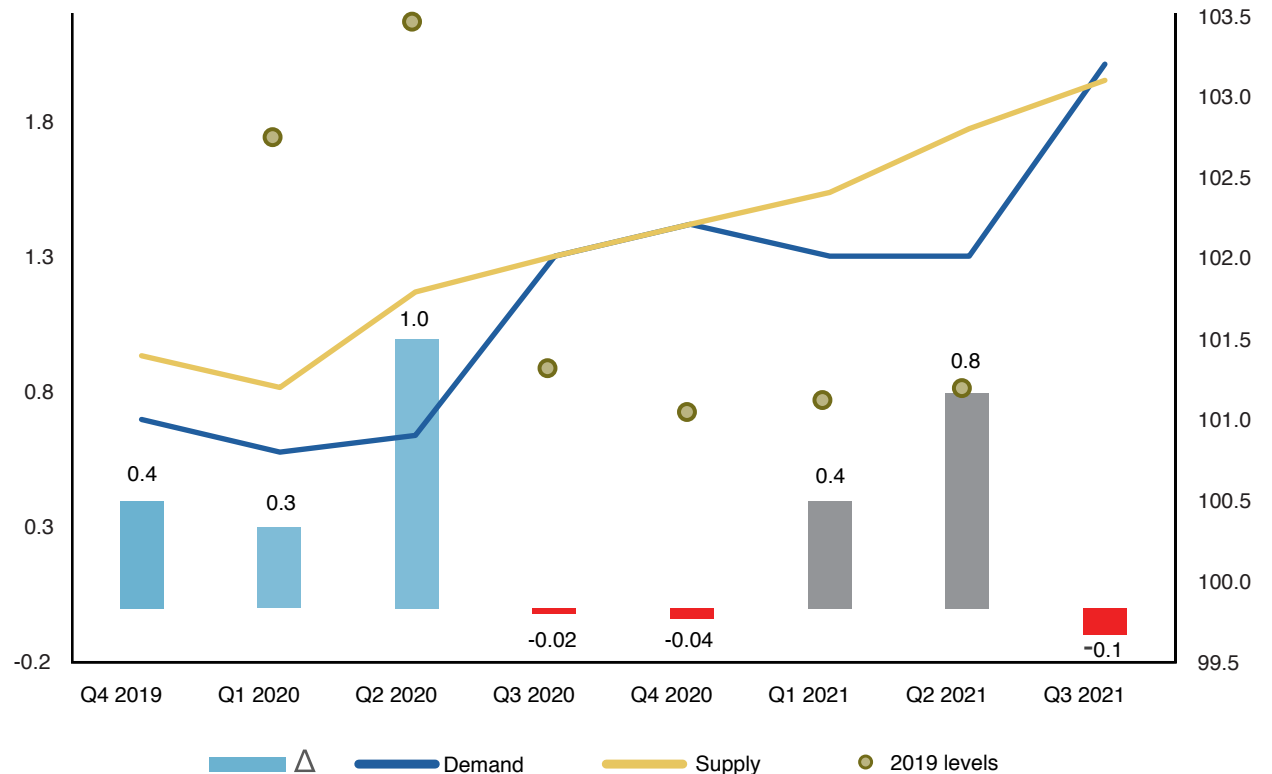
Our assessment shows that, over the next eight quarters, the market is likely to alternate between periods of surplus and tightening. KOMO predicts an average global surplus of 400 Kb/d in 2019 and 310 Kb/d in 2020.

Tight oil production will have the greatest impact on global supply in 2020, with U.S. shale expected to grow by 1.1 MMb/d. If current trends continue, OPEC and OPEC partner cuts will require modifications in order to temper the effects of this excess capacity.

Indeed, if OPEC+ members agree to keep production levels similar to those of 2019, there is a risk of a market surplus re-emerging in 2020. However, it is expected that supply growth in 2021 will be limited due to the lack of investment since 2015. Though there will still be a surplus, KOMO estimates that the environmental fundamentals will become favorable to producers around the third or fourth quarters of 2020.

The market surplus is estimated to peak by Q2 2020 at 980 Kb/d, before dropping to meet demand in the second half of 2020. This would result in a drop in inventories and, as a result, bullish prices. Another cycle could tempt shale producers to boost investment and OPEC to reverse its cuts, resulting in a surplus in 2021 of between 400 Kb/d-800 Kb/d, concentrated in the early part of the year.

Quarterly supply demand balance, MMb/d, Q4 2019 - Q3 2021



Source: KOMO, October 2019.

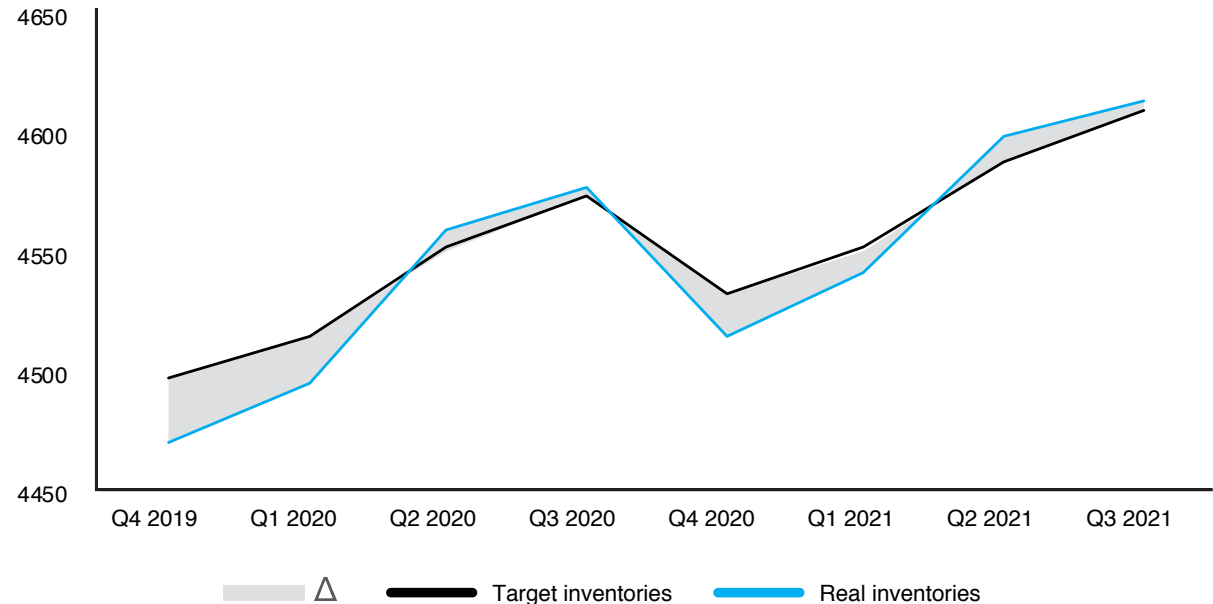
Price fundamentals (inventories)

Inventory behavior will indicate the direction of price movements. Preliminary data for October 2019 shows continued growth in real OECD inventories in 2020. Target inventories in the KOMO model are higher due to several risk factors, including fears of a prolonged trade dispute between China and the U.S., a reduction in investment, and a significant increase in geopolitical tensions in the Strait of Hormuz and the Red Sea. These factors have put significant upward pressure on demand for crude oil inventories.

In this outlook, inventories are expected to continue to tighten, and even surpass target inventories until the end of Q2 2020. At this point, we expect real inventories to fall back below the level of target inventories until the end of the year. A low inventory environment is bullish for prices. Consequently, KOMO expects that production should increase at the start of 2021, leading to a production surplus by the first half of 2021 and a tightening in inventories.

The KOMO model estimates that real OECD inventories will grow by an average of 72 MMb per year in 2019-2020, (91 MMb in 2019 and 53 MMb in 2020). Target inventories are expected to grow at a slower pace of 2 MMb in 2020, due to the relaxation of a number of market stress factors.

Target inventories vs. real inventories



Source: EIA; KOMO, October 2019.

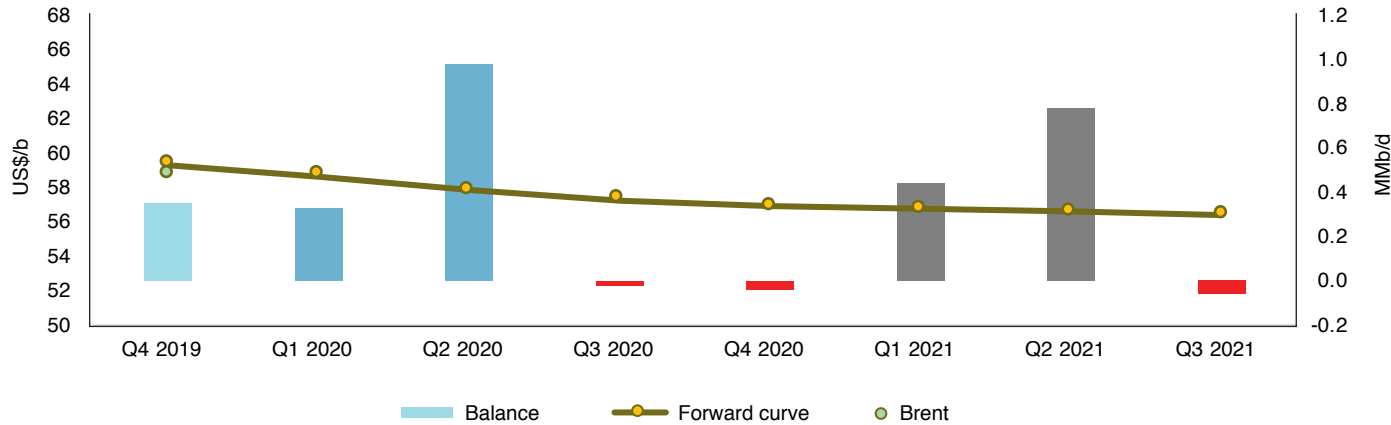
Price fundamentals (Brent)

| | Q4 2019 | Q1 2020 | Q2 2020 | Q3 2020 | Q4 2020 | Q1 2021 | Q2 2021 | Q3 2021 | | 2019 | 2020 | 2021 |
|------------------|---------|---------|---------|---------|---------|---------|---------|---------|------------------|-------|-------|------|
| Bloomberg | 62.66 | 61.57 | 61.71 | 61.83 | 63.12 | 66.16 | | | | | | |
| Market sentiment | 67.4 | 64.0 | 63.3 | 62.7 | 62.2 | 61.7 | 61.7 | 61.7 | Market sentiment | 68.02 | 69.55 | |

Source: Bloomberg, October 15, 2019.

*Market sentiment is based on publicly available forecast data.

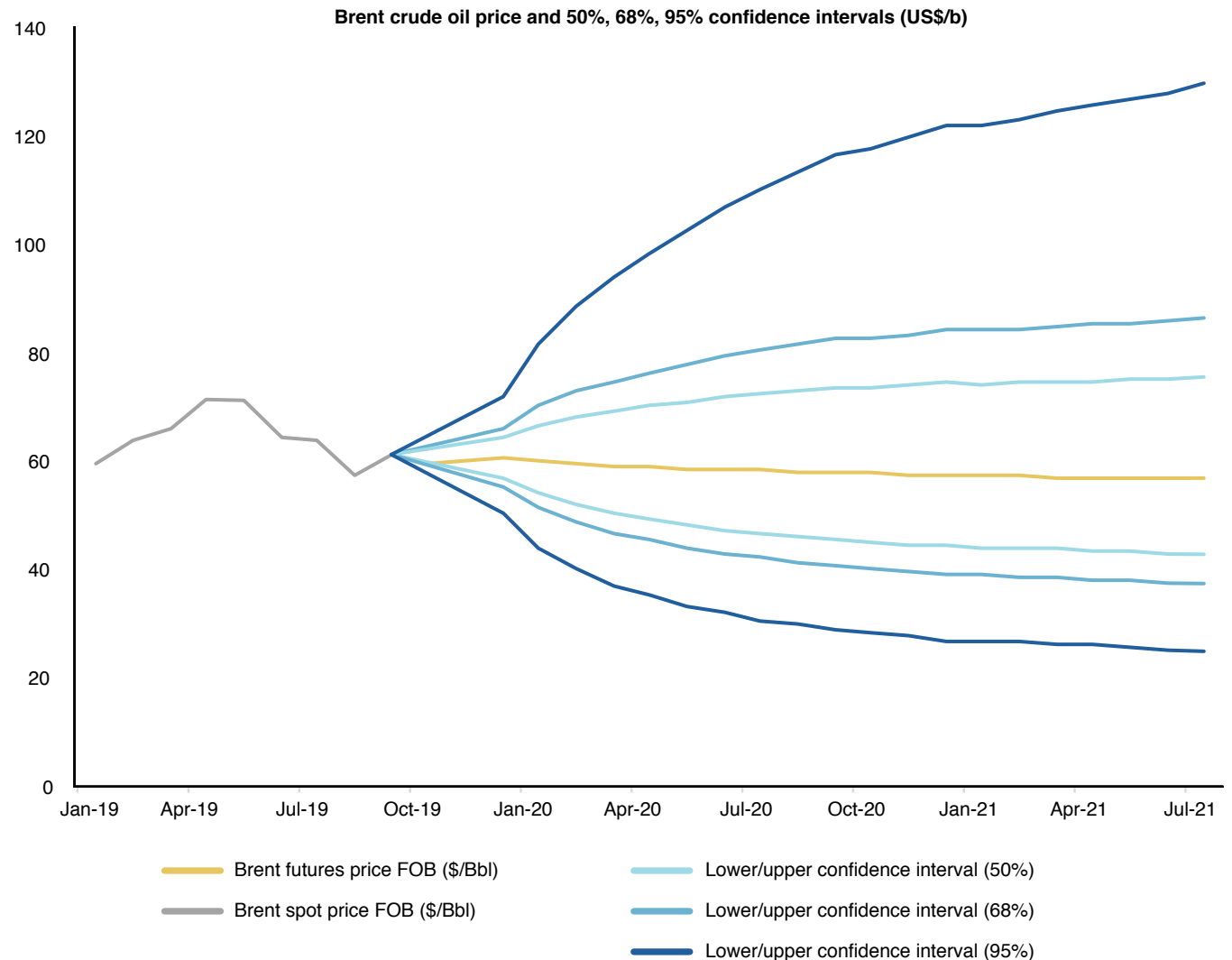
Brent forward curve (L) vs. balances (R)



Price fundamentals (forward and future curves)

This graphic depicts confidence intervals derived from options market information for at-the-money options contracts.

The graphs represent boundaries calculated at 50%, 68% and 95% confidence intervals.



Source: KAPSARC calculations based on NYMEX data, CME Group, FINCAD, October 2019.

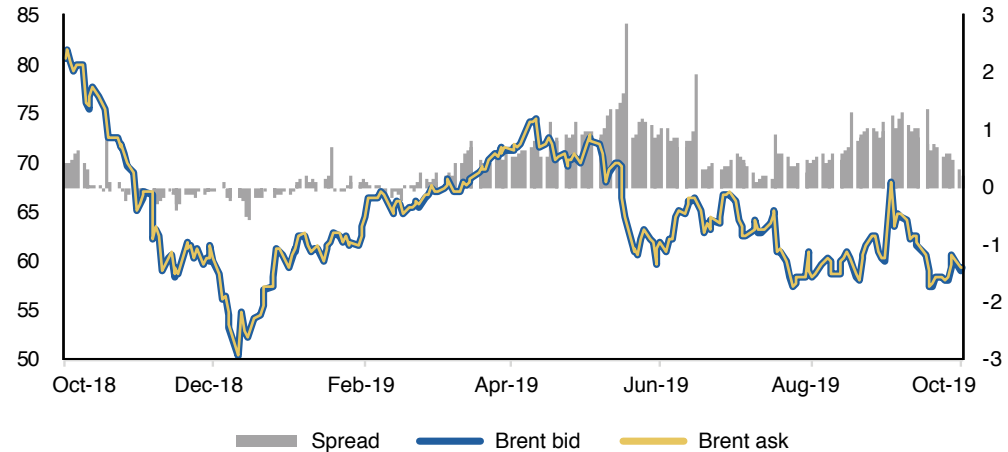
Price fundamentals (markets)

Market volatility: The Brent bid/ask spreads have been fluctuating more than usual since April 2019, with the difference as high as US\$ 2.78 per barrel. The divergence between the spreads has become more visible in the last quarter, suggesting that the market lacks the confidence to narrow the price range due to both heightened geopolitical risk and the impending IMO regulations.

Three factors contributing to open interest:

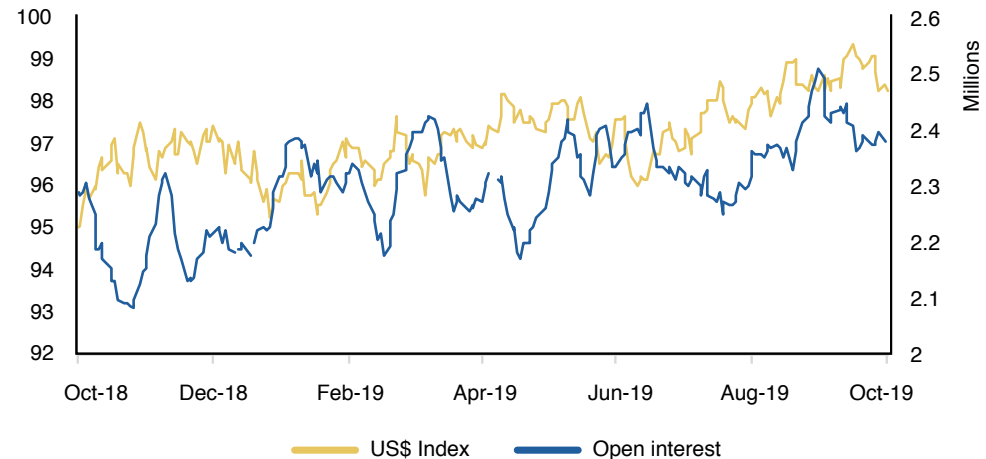
- Backwardation of the Brent futures curve.
- The industry’s perception of market price risk going forward.
- The increase in the U.S. Dollar Index, which has an inverse relationship with many commodity prices, including the oil price, suggests a possible loss of interest in oil. As the dollar keeps gaining momentum, oil commodities become more expensive to countries whose currencies are not pegged to the dollar. As a result, the demand for oil falls, which is followed in turn by the expectation of lower oil prices and a decrease in open interest contracts.

Ask/bid Brent prices (L) and spreads (R)



Source: Bloomberg, October 15, 2019.

US\$ Index (L) Vs. Brent open interest (R)

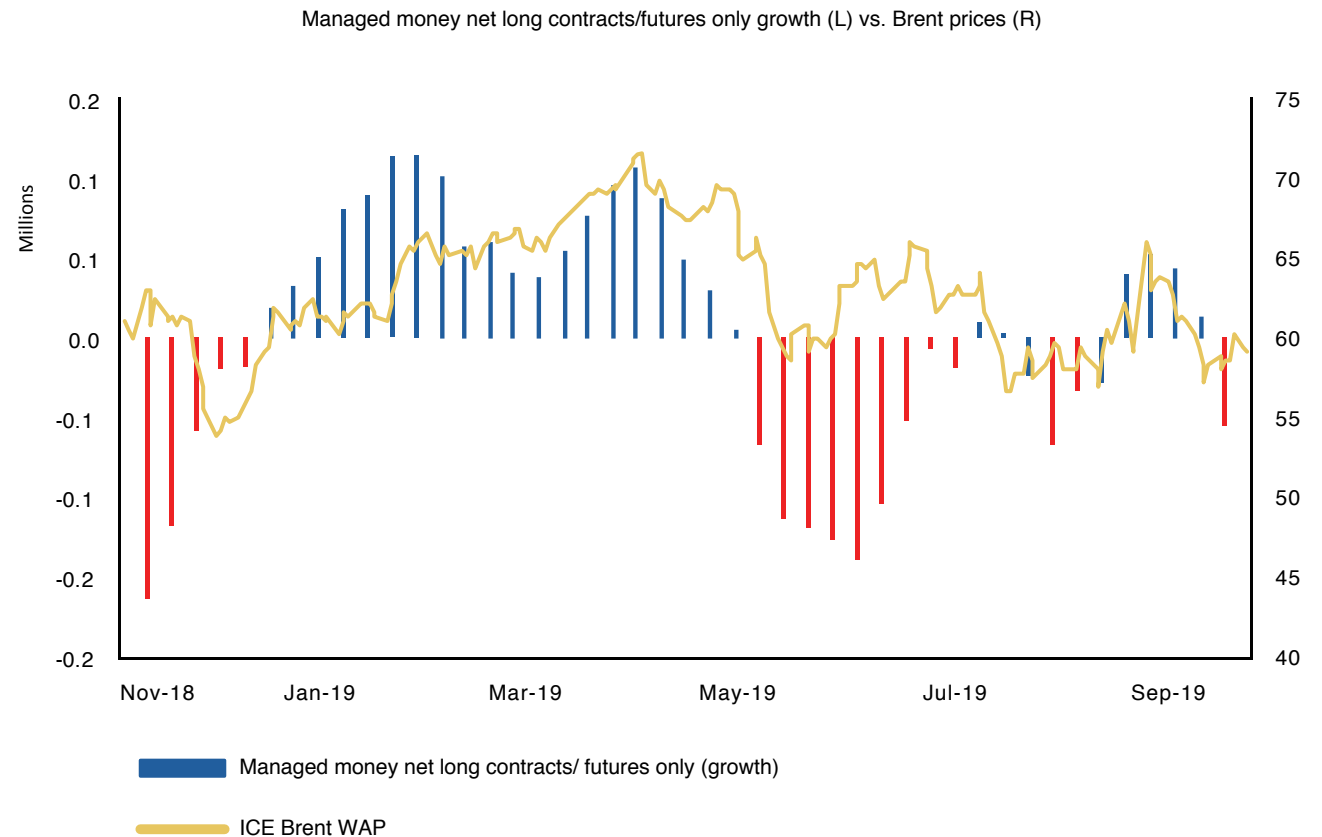


Source: Bloomberg, October 15, 2019.

Price fundamentals (markets)

Money managers have been reducing their long positions in oil since early May. This is primarily as a result of volatile prices, increasing U.S production and a decline in demand fueled by geopolitical events, trade tariffs, and fears of a growing trade war.

The net position might indicate bearish market sentiment, but it is not out of line with seasonal ebbs and flows in annual trading activity.



Source: Bloomberg, October 15, 2019.

World economy

The world economy faces two main challenges that could impact global oil markets. The first is China/U.S. trade relations, and the second is the fear of another global economic crisis, which is giving way to a general consensus of an economic slowdown.

The global community remains undecided about the prospect of a China/U.S. trade deal and the outcome of U.S.-driven trade. Recession fears continue. KOMO assumes a modest economic slowdown in 2020 and a slight rebound in 2021.

Demand risks

Factors such as responses to weather events, fuel regulations and legislation tend to nudge global demand.

In Latin America, Brazil recently exited its economic slump, which helped buoy the region. Its growth will be slow and countered by Venezuela's turmoil and Argentina's challenging growth. However, KOMO expects a net positive demand within the region.

Weather disparities, on the other hand, play an important role, and the summer of 2019 has witnessed significant incremental weather variations, resulting in greater demand for cooling fuels.

Finally, fuel standards reduced demand from business as usual (BAU) by over 150 Kb/d in Europe last year alone (Germany's new vehicle regulations). However, KOMO estimates that this is an isolated event that will not carry over.

Technical supply risks

U.S. upstream production has seen bottlenecks and pipeline capacity challenges recently. A few of these problems are expected to be addressed in the coming six months, especially the challenges in the Permian basin. However, a fundamental change has occurred in 2019, with drilling activity decreasing since Q2 2019. This could be due to the lack of investment, the low price environment, or limited availability of sweet spots. Many recent shale bankruptcies have had their assets consumed by larger companies. These larger producers will not be able to react as quickly as the smaller producers whose assets they have acquired. However, they will be better placed to sustain price falls.

Political supply risks

There are many geopolitical tensions in 2019 that could significantly impact oil supply, including the potential for violence or political changes in Middle Eastern, South Asian and Latin American countries.

Other political risks, such as those in Venezuela, and OPEC and OPEC partner reactions to geopolitical risks, have already been addressed and embedded into KOMO. However, the impact of these risks on oil supply could be greater than anticipated, as shown in the risk scenarios table. Nevertheless, there also seems to be room for potential upside risks in supply if the U.S. sanctions on Iran are lifted or if OPEC+ compliance weakens, for example.

Saudi Aramco – Oil resilience

The September 14, 2019 attacks on the Saudi Aramco production and processing facilities sent shock waves across the industry and around the world, with fears of a 5% cut in global production. However, the price impacts appear to have been significantly moderated relative to what may have been expected and, indeed, were suggested by many. This was likely in large part due to the quick restoration of lost production, and Saudi reassurances that consumer commitments would be fully met. Tracking volatility was reduced by the fact that the attacks occurred early on a Saturday morning when markets were closed for the weekend

The KOMO model estimated a price rise of between US\$3.8 and US\$14.7 per barrel during the week following the attacks and a rise of US\$2 per barrel over the quarter if repairs took longer. However, oil prices rose by less than 15%, rather than the 60%-plus that some had expected and that some models, such as Smith (2009), would indicate. Trading activity rose significantly on the Monday and Tuesday following the attacks, once markets reopened. This allowed market participants to process and internalize expectations that had been significantly altered from the market close on Friday. However, the time over the weekend allowed for in-depth analyses, a fuller consideration of the impact the attacks would have on global balances and the prospect of Saudi Aramco effecting repairs rapidly. The ability of Aramco to repair the damage to its facilities rapidly mitigated the potential for significant production and supply disruptions, even in the relatively near delivery months.

Saudi Aramco was also able to cushion the impact by:

- Using its spare capacity
- Swapping and blending cargos
- Repairing the facility quickly
- Decreasing national refinery throughput
- Assuring international clients receiving products, whether produced nationally or stored in other countries

In less than a week prices moderated. This included both the intraday high-low ranges and the complete forward curve representing the next year's contract maturities. And, while total open interest fell slightly on both exchanges, there was no significant change in the distribution of contracts across trader classifications.

Risk scenarios

KOMO's risk categories are based on current events impacting the oil industry. KOMO uses the risk table to estimate potential impacts, taking two components into account: probability and impact.

Probability: A shaded chart at the top right of this slide shows the probability of a risk occurring (the darker the shade, the more likely it is to happen).

Impact: The impact is calculated as a percentage of exports (as domestic supply is often protected), or estimated into the demand model through a multiplier or a change in GDP.

For supply risks, we multiply the probability by the potential impact.

For demand risks, the model either (i) examines historical incidents as multipliers then applies a similar response to future demand, or (ii) estimates the potential impact on GDP and channels it through the model, via changes in the exogenous variables, to determine the implications for future oil demand.

Highly likely
Likely
Probable
Unlikely
Highly unlikely

| Risk category | Item | Impact (Kb/d) | | | | |
|----------------------|------------------|---------------|------|------|------|--|
| | | | 2019 | 2020 | 2021 | |
| Global economy risks | Recession | ↓ 750 - 1250 | | | | |
| | U.S./China trade | ↓ 120 - 220 | | | | |

| Risk category | Item | Impact (Kb/d) | | | | |
|-----------------------|-------------------|---------------------|------|------|------|--|
| | | | 2019 | 2020 | 2021 | |
| Producer supply risks | Angola | ↓ 87 - 132 | | | | |
| | Canada | ↓ 455 - 615 | | | | |
| | China | ↓ 497 - 612 | | | | |
| | Iran | ↓ 1203 - 1648 | | | | |
| | Iraq | ↓ 309 - 369 | | | | |
| | Kuwait | ↓ 211 - 241 | | | | |
| | Libya | ↓ 463 - 502 | | | | |
| | Nigeria | ↓ 405 - 486 | | | | |
| | Russia | ↓ 1156 - 1232 | | | | |
| | Saudi Arabia | ↓ 1400 - 1561 | | | | |
| | UAE | ↓ 254 - 395 | | | | |
| | United States | ↓ 574 - 899 | | | | |
| | Venezuela | ↓ 407 - 459 | | | | |
| | OPEC+ cuts | ↓ 1200- 1800 | | | | |

| Risk category | Item | Impact (Kb/d) | | | | |
|-----------------------|-----------------------------|---------------|------|------|------|--|
| | | | 2019 | 2020 | 2021 | |
| Specific demand risks | Brazil's economy | ↑ 45 - 80 | | | | |
| | Latin America | ↑ 50 - 68 | | | | |
| | Extreme weather | ↑ 50 - 130 | | | | |
| | EVs and vehicle regulations | ↓ 20 - 165 | | | | |
| | Vehicle automation | ↑ 0 - 10 | | | | |
| | IMO | ↓ 40 - 220 | | | | |

All risks have been integrated into KOMO's model, except for the recession risk

Additional explanations of any risks are available on request

The results are based on a survey conducted biannually

KOMO's sensitivity estimates for Q4, 2019 (exogenous changes)

- ± .1% change in GDP growth, results in ± 170 - 120 Kb/d change in total liquids demand.
- ± .5% change in GDP growth, results in ± 1200 - 700 Kb/d change in total liquids demand.
- ± 100 Kb/d change in supply/demand, results in ± 0.6 - US\$1.4/b change in Brent prices.
- ± 500 Kb/d change in supply/demand, results in ± 5 to US\$ 6/b change in Brent prices.

KOMO's sensitivity estimates for Q4, 2019 (endogenous changes)

- ± US\$ 1/b change in Brent, results in ± 10 - 60 Kb/d change in total liquids demand.
- ± US\$ 5/b change in Brent, results in ± 100 - 200 Kb/d change in total liquids demand.
- ± US\$ 1/b change in Brent, results in ± 100 - 150 Kb/d change in total liquids supply.
- ± US\$ 5/b change in Brent, results in ± 600 - 900 Kb/d change in total liquids supply.

Note: Endogenous changes have an impact on all of the variables that would eventually balance the algorithm. Whereas exogenous changes hold all independent variables constant and consider the shocks as external.



Appendix

World oil demand, 2019-2020 (MMb/d)

| | | | 2018 | Q1 | Q2 | Q3 | Q4 | 2019 | Q1 | Q2 | Q3 | Q4 | 2020 | Q1 | Q2 | Q3 |
|-----------------------|--------------------------|-------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Americas | OECD | United States | 20.8 | 20.9 | 20.8 | 21.1 | 21.1 | 21.0 | 21.0 | 21.0 | 21.2 | 21.2 | 21.1 | 21.1 | 21.0 | 21.3 |
| | | Canada | 2.5 | 2.5 | 2.4 | 2.5 | 2.4 | 2.4 | 2.5 | 2.4 | 2.5 | 2.4 | 2.5 | 2.5 | 2.5 | 2.6 |
| | | Mexico | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| | | Chile | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 |
| | | Total | 25.6 | 25.6 | 25.5 | 25.9 | 25.9 | 25.7 | 25.9 | 25.7 | 26.0 | 26.0 | 25.9 | 26.0 | 25.9 | 26.3 |
| | Non-OECD | Argentina | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 |
| | | Brazil | 3.0 | 3.0 | 3.1 | 3.2 | 3.2 | 3.1 | 3.1 | 3.1 | 3.2 | 3.2 | 3.2 | 3.1 | 3.2 | 3.3 |
| | | Venezuela | 0.4 | 0.4 | 0.4 | 0.3 | 0.3 | 0.4 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.2 | 0.2 | 0.2 |
| | | RO Latin America | 2.2 | 2.2 | 2.3 | 2.3 | 2.3 | 2.3 | 2.2 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.4 |
| | | Total | 6.4 | 6.3 | 6.4 | 6.5 | 6.5 | 6.4 | 6.3 | 6.4 | 6.5 | 6.5 | 6.4 | 6.3 | 6.5 | 6.6 |
| Total Americas | | | 32.0 | 31.9 | 32.0 | 32.4 | 32.4 | 32.2 | 32.2 | 32.2 | 32.6 | 32.5 | 32.4 | 32.4 | 32.8 | |
| Europe | OECD | Germany | 2.4 | 2.4 | 2.4 | 2.5 | 2.4 | 2.4 | 2.3 | 2.3 | 2.4 | 2.4 | 2.4 | 2.3 | 2.3 | 2.4 |
| | | France | 1.7 | 1.8 | 1.7 | 1.8 | 1.7 | 1.7 | 1.8 | 1.7 | 1.7 | 1.7 | 1.7 | 1.8 | 1.7 | 1.7 |
| | | United Kingdom | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 |
| | | Poland | 0.7 | 0.6 | 0.7 | 0.8 | 0.7 | 0.7 | 0.7 | 0.7 | 0.8 | 0.7 | 0.7 | 0.7 | 0.7 | 0.8 |
| | | Turkey | 1.0 | 0.8 | 0.9 | 1.0 | 1.0 | 0.9 | 0.8 | 0.9 | 1.0 | 0.9 | 0.9 | 0.8 | 0.9 | 1.0 |
| | | RO OECD Europe | 7.0 | 7.0 | 7.0 | 7.1 | 7.1 | 7.1 | 7.1 | 7.1 | 7.1 | 7.2 | 7.2 | 7.2 | 7.2 | 7.1 |
| | Total OECD Europe | 14.4 | 14.2 | 14.3 | 14.8 | 14.6 | 14.5 | 14.3 | 14.3 | 14.3 | 14.8 | 14.5 | 14.5 | 14.3 | 14.3 | 14.7 |
| Asia-Oceania | OECD | Australia | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 |
| | | Japan | 3.8 | 4.2 | 3.4 | 3.5 | 3.9 | 3.8 | 4.2 | 3.5 | 3.6 | 4.0 | 3.8 | 4.2 | 3.4 | 3.5 |
| | | Republic of Korea | 2.6 | 2.7 | 2.5 | 2.4 | 2.7 | 2.5 | 2.7 | 2.5 | 2.5 | 2.7 | 2.6 | 2.7 | 2.5 | 2.5 |
| | | New Zealand | 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 |
| | | Total | 7.8 | 8.2 | 7.2 | 7.3 | 8.0 | 7.7 | 8.2 | 7.3 | 7.4 | 8.1 | 7.8 | 8.2 | 7.2 | 7.3 |
| | Non-OECD | China | 12.8 | 13.1 | 13.3 | 13.1 | 13.2 | 13.2 | 13.3 | 13.6 | 13.4 | 13.7 | 13.5 | 13.7 | 13.9 | 13.7 |
| | | India | 4.8 | 5.1 | 5.1 | 4.8 | 5.1 | 5.0 | 5.3 | 5.3 | 5.0 | 5.3 | 5.2 | 5.5 | 5.5 | 5.2 |
| | | Indonesia | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.9 | 1.9 | 1.8 | 1.8 | 1.9 | 1.9 |
| | | RO Asia | 7.3 | 7.6 | 7.4 | 7.4 | 7.3 | 7.4 | 7.8 | 7.5 | 7.5 | 7.5 | 7.6 | 7.9 | 7.7 | 7.6 |
| | | Total | 26.7 | 27.6 | 27.6 | 27.1 | 27.5 | 27.5 | 28.2 | 28.3 | 27.8 | 28.3 | 28.1 | 28.9 | 28.9 | 28.4 |
| Total Asia | | | 34.5 | 35.8 | 34.9 | 34.4 | 35.1 | 36.4 | 35.5 | 35.2 | 36.4 | 35.9 | 37.1 | 36.1 | 35.7 | |
| Middle East | OECD | Israel | 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 | |
| | Non-OECD | Bahrain | 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 | |
| | | Iraq* | 0.9 | 0.8 | 0.8 | 0.9 | 0.9 | 0.8 | 0.8 | 0.8 | 0.9 | 0.9 | 0.9 | 0.8 | 0.8 | |
| | | Kuwait | 0.4 | 0.3 | 0.4 | 0.4 | 0.4 | 0.4 | 0.3 | 0.4 | 0.5 | 0.4 | 0.4 | 0.3 | 0.4 | |
| | | Oman | 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 | |
| | | Saudi Arabia | 3.1 | 2.6 | 3.3 | 3.6 | 2.9 | 3.1 | 2.6 | 3.2 | 3.5 | 2.9 | 3.1 | 2.6 | 3.2 | |
| | | Qatar | 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 | |
| | | UAE | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 1.0 | 0.9 | 1.0 | 0.9 | 0.9 | 1.0 | |
| | | Total GCC | 5.7 | 5.1 | 5.9 | 6.3 | 5.5 | 5.7 | 5.1 | 5.9 | 6.3 | 5.6 | 5.7 | 5.2 | 5.9 | 6.4 |
| | | Iran | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | |
| | | RO Middle East | 0.5 | 0.5 | 0.5 | 0.6 | 0.5 | 0.5 | 0.5 | 0.5 | 0.6 | 0.5 | 0.5 | 0.5 | 0.6 | |
| | Total | 7.9 | 7.3 | 8.0 | 8.4 | 7.7 | 7.8 | 7.3 | 8.0 | 8.5 | 7.7 | 7.9 | 7.3 | 8.1 | 8.6 | |
| | Total Middle East | | | 8.2 | 7.6 | 8.3 | 8.7 | 8.0 | 7.6 | 8.3 | 8.8 | 8.0 | 8.2 | 7.6 | 8.4 | 8.9 |
| Africa | Non-OECD | Egypt | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | |
| | | South Africa | 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 | |
| | | Other Africa | 3.1 | 3.4 | 3.3 | 3.0 | 3.3 | 3.3 | 3.5 | 3.4 | 3.1 | 3.4 | 3.4 | 3.6 | 3.5 | |
| | Total Africa | | | 4.5 | 4.7 | 4.7 | 4.4 | 4.7 | 4.6 | 4.8 | 4.8 | 4.5 | 4.8 | 4.9 | 4.9 | 4.5 |
| Eurasia | Non-OECD | Russia | 3.6 | 3.5 | 3.5 | 3.9 | 3.8 | 3.7 | 3.6 | 3.6 | 3.9 | 3.8 | 3.7 | 3.7 | 4.0 | |
| | | RO Eurasia | 2.1 | 1.9 | 2.0 | 2.2 | 2.1 | 2.1 | 1.9 | 2.1 | 2.3 | 2.2 | 2.1 | 2.1 | 2.2 | |
| | Total Eurasia | | | 5.7 | 5.4 | 5.6 | 6.1 | 5.9 | 5.7 | 5.5 | 5.7 | 6.2 | 6.0 | 5.9 | 5.7 | 6.5 |

* Although not an official GCC member, Iraq is included in this data due to its location.

World oil supply, 2019-2020 (MMb/d)

| | Q1 2019 | Q2 2019 | Q3 2019 | Q4 2019 | Q1 2020 | Q2 2020 | Q3 2020 | Q4 2020 | Q1 2021 | Q2 2021 | Q3 2021 |
|---------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Conventional | 74.97 | 74.48 | 74.11 | 74.00 | 73.72 | 73.71 | 73.57 | 73.37 | 73.24 | 73.20 | 73.15 |
| Extra heavy oil | 4.07 | 3.98 | 3.99 | 4.01 | 4.04 | 4.10 | 4.11 | 4.11 | 4.11 | 4.11 | 4.11 |
| Oil sands | 2.71 | 2.72 | 2.76 | 2.80 | 2.79 | 2.84 | 2.85 | 2.88 | 2.90 | 2.92 | 2.94 |
| Oil shale (kerogen) | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 |
| Other liquids | 5.56 | 5.71 | 5.79 | 5.78 | 5.76 | 5.81 | 5.84 | 5.87 | 5.90 | 5.93 | 5.96 |
| Tight liquids plays | 10.23 | 10.72 | 11.07 | 11.83 | 11.92 | 12.35 | 12.61 | 12.87 | 13.17 | 13.48 | 13.77 |
| Unconventional gas | 2.71 | 2.77 | 2.80 | 2.93 | 2.92 | 2.99 | 3.02 | 3.04 | 3.08 | 3.12 | 3.17 |
| Adjustment | - | - | - | - | - | - | - | - | - | - | - |
| Total | 100.27 | 100.41 | 100.55 | 101.38 | 101.17 | 101.84 | 102.03 | 102.17 | 102.43 | 102.79 | 103.13 |

| | Q1 2019 | Q2 2019 | Q3 2019 | Q4 2019 | Q1 2020 | Q2 2020 | Q3 2020 | Q4 2020 | Q1 2021 | Q2 2021 | Q3 2021 |
|----------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Algeria | 1.01 | 1.02 | 1.02 | 1.00 | 0.98 | 0.97 | 0.97 | 0.97 | 0.96 | 0.96 | 0.95 |
| Angola | 1.50 | 1.43 | 1.40 | 1.39 | 1.39 | 1.37 | 1.31 | 1.29 | 1.26 | 1.25 | 1.22 |
| Congo | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 |
| Ecuador | 0.53 | 0.53 | 0.54 | 0.52 | 0.52 | 0.51 | 0.51 | 0.50 | 0.49 | 0.48 | 0.48 |
| Equatorial Guinea | 0.11 | 0.11 | 0.13 | 0.13 | 0.13 | 0.13 | 0.12 | 0.11 | 0.09 | 0.08 | 0.08 |
| Gabon | 0.20 | 0.20 | 0.20 | 0.19 | 0.18 | 0.17 | 0.17 | 0.17 | 0.17 | 0.17 | 0.17 |
| Iran | 2.63 | 2.33 | 2.10 | 2.18 | 2.15 | 2.15 | 2.19 | 2.19 | 2.32 | 2.32 | 2.35 |
| Iraq | 4.75 | 4.73 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.70 | 4.78 | 4.88 |
| Kuwait | 2.74 | 2.72 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.72 | 2.73 |
| Libya | 0.93 | 1.14 | 1.13 | 1.11 | 1.09 | 1.09 | 1.12 | 1.13 | 1.15 | 1.16 | 1.17 |
| Nigeria | 1.58 | 1.65 | 1.72 | 1.69 | 1.64 | 1.63 | 1.60 | 1.58 | 1.57 | 1.56 | 1.56 |
| Saudi Arabia | 10.00 | 9.92 | 9.38 | 9.38 | 9.38 | 9.38 | 9.38 | 9.38 | 9.38 | 9.47 | 9.55 |
| UAE | 3.12 | 3.12 | 3.13 | 3.11 | 3.07 | 3.08 | 3.13 | 3.13 | 3.13 | 3.14 | 3.15 |
| Venezuela | 1.05 | 0.79 | 0.73 | 0.89 | 0.92 | 0.97 | 0.98 | 0.99 | 1.02 | 1.02 | 1.05 |
| Oil field production | 30.48 | 30.02 | 29.21 | 29.31 | 29.18 | 29.20 | 29.21 | 29.16 | 29.29 | 29.45 | 29.67 |
| Other production | 5.36 | 5.44 | 5.47 | 5.50 | 5.49 | 5.46 | 5.46 | 5.46 | 5.46 | 5.48 | 5.49 |
| OPEC | 35.84 | 35.46 | 34.68 | 34.81 | 34.66 | 34.67 | 34.67 | 34.62 | 34.75 | 34.93 | 35.16 |

| | Q1 2019 | Q2 2019 | Q3 2019 | Q4 2019 | Q1 2020 | Q2 2020 | Q3 2020 | Q4 2020 | Q1 2021 | Q2 2021 | Q3 2021 |
|--------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Call on OPEC | 35.13 | 34.74 | 34.88 | 34.46 | 33.75 | 33.67 | 33.50 | 34.51 | 34.30 | 34.14 | 35.22 |
| OPEC | 35.84 | 35.46 | 34.68 | 34.81 | 34.66 | 34.67 | 34.67 | 34.62 | 34.75 | 34.93 | 35.16 |
| Non-OPEC | 64.43 | 64.95 | 65.87 | 66.56 | 66.51 | 67.17 | 67.36 | 67.54 | 67.68 | 67.87 | 67.97 |
| Total | 100.27 | 100.41 | 100.55 | 101.38 | 101.17 | 101.84 | 102.03 | 102.17 | 102.43 | 102.79 | 103.13 |



Glossary

| | |
|---------------------------|---|
| MMb/d | One million barrels of oil per day |
| Kb/d | One thousand barrels of oil per day |
| Target inventories | A theoretical construct reflecting the aggregated ‘normal’ level of inventories desired by the oil industry to meet contractual obligations, provide a cushion for the complex supply chain that tends to deliver the product in ‘batches,’ and buffer unanticipated changes in the supply of and demand for crude oil. It is derived from OECD inventory data using a trend component reflecting long-term economic growth, and a seasonal component reflecting phenomena such as the winter heating season, and summer driving and cooling seasons. |
| Real inventories | Represents the real inventory levels based on KOMO’s forecast of supply/demand and inventory surplus/deficit balances. |
| Bill C69 | A bill recently passed by the Canadian government that changes the approval process for major infrastructure projects to include environmental and health impacts. |
| INSTEX | “Instrument in Support of Trade Exchanges.” Established as an alternative payment mechanism by the European Union (EU) to maintain trade with Iran without falling under the United States’ (U.S.) trade sanctions. |
| OPEC partners | Azerbaijan, Bahrain, Brunei, Kazakhstan, Malaysia, Mexico, Oman, Russia, South Sudan and Sudan |

For further information about KOMO, please refer to the [methodology paper](#).

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