



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



# KAPSARC Oil Market Outlook (KOMO)

Q4, 2021

## Summary

This quarter's highlights:

The drivers of this quarter's global demand outlook stem from multiple factors (i.e., a slower roll-out of vaccinations in developing countries, multiple continued lockdowns in several countries, rising inflation, including shipping costs, lagging delivery times, the usual seasonal behavior of declining road transportation following the peak summer season, etc.). Hence, the post COVID-19 recovery is expected to slow oil demand growth with an overall quarter-on-quarter (QoQ) stagnation in Q4 2021 of an estimated 10 thousand barrels per day (Kb/d).

With OECD countries seeing a faster economic recovery than most developing countries, we expect most OECD members to witness oil demand growth this quarter, apart from several members of OECD Europe and Japan. On the other hand, several non-OECD countries are expected to experience declines, particularly Eurasia and the Middle East, where Saudi Arabia is expected to see the strongest QoQ decline of around 570 Kb/d, in line with its usual seasonal winter behavior. However, emerging economies such as China and India will limit the declines with healthy recoveries of 300 Kb/d and 340 Kb/d, respectively.

On the supply side, no real changes are expected this quarter since the OPEC+ July statements and subsequent meetings. It is estimated that there will be a QoQ growth of 2.1 MMb/d. Almost all the growth will come from OPEC+ members as they ease into their scheduled cuts. If there is anything to highlight for supply this quarter, it would be the temporary nature of the energy crunch, and how best to manage it.

Furthermore, the current tightened market, the fact that volatility will be increased by sporadic episodes of supply chain issues and bottlenecks, and the current high oil prices are expected to encourage non-OPEC+ producers to produce more, which this report highlights.

Given the current changes in this year's historical production revisions, the KOMO team is more optimistic for an overall supply deficit for this year of around 550 Kb/d, despite the expectation of a surplus this quarter and moving forward. In contrast, the KOMO team assumes that as we enter 2022, a surplus will develop, resulting in OPEC+ members slowing their production growth throughout the year.

**Total global oil demand is expected to increase year-on-year (YoY) by 4.44 million barrels per day (MMb/d) in 2021 to 96.5 MMb/d. It is expected to grow by 3.47 MMb/d in 2022, returning to 2019 levels by Q3 2022. Compared with our last forecast, we expect global demand growth to be 200 Kb/d higher than our KOMO Q3 2021 report and 100 Kb/d higher than our previous expectations for 2022.**

### *Summary continued...*

The International Monetary Fund (IMF) predicts global economic growth of around 6% in 2021 and 4.9% in 2022, compared with a decline in real gross domestic product (GDP) of -3.3% in 2020. The OECD in its September outlook, “Keeping the recovery on track,” revised its decline in GDP to -3.4% for 2020 and also revised its forecast for 2021 growth upward to 5.7% (0.1% less than its May outlook). It expects 2022 to witness growth of 4.5%. The upward revisions to the IMF’s and OECD’s global forecasts reflect several new factors, including fiscal stimulus in a few major economies and the positive adaptation of economic activity to lockdowns. Changes to the 2021 forecast include an upward revision to the forecast for advanced economies, while the prospects for emerging economies have been marked down.

The KOMO team hinges its forecast on the fact that the ongoing COVID-19 shock (and related supply chain impacts, etc.) are a drag on the global economy. Thus, our view moving forward is that the economy will rely on continued stimulus packages and adjusted debt payments for developing countries. This will help countries focus on addressing the pandemic and creating a strong, yet even, economic recovery for 2022 and 2023. Furthermore, we also base our forecast on the possibility of new COVID-19 variants popping up, but we assume that the global community will find ways to adapt to the situation in a manner that does not impede an economic recovery.

We have revised some of the countries’ historical demand upward and have revised some production growth levels downward, particularly Iran and Nigeria. Although the supply forecast for this quarter has been straightforward, estimating demand is considerably more complex. An uneven recovery from COVID-19, declining inventories in the face of an economic recovery and lagged shipments have become more evident since the second half of this year. Supply chain disruptions and inflation are expected to rise this quarter, and the disruptions will not be limited to oil only. At the same time, the case of Evergrande becoming a new ‘Lehman moment’ is picking up, and people are questioning if the global economy is at risk of a financial crash such as that of 2008.

By considering all these factors, we can only forecast conservatively and hope that all these concerns will subside by the end of this year. Nevertheless, the global community should be encouraged by the remarkable recovery that has taken place this year. Our gaze must shift slowly to the aftermath of COVID-19, and we must focus on the world recovering sustainably. This entails continued economic cooperation, but most importantly, continued financial support nationally and internationally.

We emphasize the importance of economic and financial cooperation because the future course of government policy is uncertain and highly fragmented. There is some concern that a reduction in government spending and quantitative easing happening too soon after the COVID-19 crisis might trigger economic slowdowns like those that followed the 2008 financial crisis. The United States (U.S.) has recently stopped expanded unemployment benefits for those affected by COVID-19, the U.S. dollar has been relatively low for a prolonged period, and the U.S. Federal Reserve has been signaling a taper of bond purchases as well as an interest rate hike to limit inflation and return rates to more ‘normal’ levels. Bond markets in the U.S. and the United Kingdom (U.K.) are on track to realize

### *Summary continued...*

their worst month since January, sending yields higher in the U.S., the U.K. and Europe. Higher interest rates could help lower inflation risks, but this would also slow economic activity and mean a risk of divestment in several developing countries in favor of higher returns elsewhere. Most countries will adjust their interest rates to stabilize their economies, and some will seek to increase revenues by raising taxes, which will raise commodity prices. As the global community scrambles to adjust to a post-COVID-19 world that is also more climate conscious, we remain cautious that these fragmented actions might hinder future growth projections, with knock-on effects on oil demand as well. As little as three months ago, there was a consensus in favor of shutting the fossil fuel industry to reach net-zero emissions. As inventories tighten, we now find experts and other authorities pleading for increased production.

Hence, our base-case projections are contingent on the success of containment measures against the new COVID-19 variants and the continuation of economic stimulus packages. We assume that the pandemic (including any new COVID-19 variants) will largely be brought under local/regional control by the end of this year. We also considered the results of our biannual survey where participants assumed that over 50% of the global community would be vaccinated by the second half of 2022. Yet, surprisingly, approximately 46.9 % of the global population has now been vaccinated (one dose). Furthermore, the World Trade Organization (WTO) expects global merchandise trade to grow at levels as high as 10.8% this year, a considerable increase over the 8% expected in March. As a result, these numbers underpin our relatively optimistic demand outlook.

The total global oil supply is expected to grow by about 1.8 MMb/d in 2021, (about 300 Kb/d less than our Q3 2021 forecast) and by 6.1 MMb/d in 2022 (about 1 MMb/d higher than our Q3 2021 forecast). The downward revision in 2021 is due to supply disruptions such as Hurricane Ida. Current high prices predict a supply surge in 2022 from many players, including U.S. shale, in addition to OPEC+ increases.

While the current OPEC+ plans are for a steady release of 400 Kb/d per month (a plan endorsed at the most recent meeting on October 4), some in the market are calling for an accelerated schedule, with a larger intervention. Considering the drivers for this short-term crisis lay mostly outside the oil market, in soaring natural gas and coal prices, Brexit, supply chain bottlenecks and other temporary issues, whatever adjustments are made in the near term may need to be reversible as we see a supply surplus for next year based on the current OPEC+ plans. The surplus has the potential to begin as early as Q4 as winter demand may not meet expectations.

As we discussed last quarter, following the OPEC+ plan as stated would involve a steady release schedule while the group monitors the market. The KOMO team expects that there may need to be a pause or slowdown to production increases in Q1 2022 to prevent significant oversupply. OPEC+ members that gained a baseline adjustment, which will be implemented in May 2022, will gain a small increase, but otherwise production is expected to be mostly flat to manage inventory levels.

*Summary continued...*

U.S. shale is a key wildcard for the near future, as high prices should drive significant growth in drilling. So far, larger public firms have maintained their discipline, while smaller private firms are expanding quickly. Going forward, we believe a modest increase in drilling will be considered amid ongoing shareholder pressure. Recent supply growth has shale essentially flat on average for 2021, with a potential upside of 840 Kb/d in 2022 due to current prices driving production.

These base-case supply/demand trends suggest that the supply deficits seen so far this year will end in Q4 of 2021 and carry through 2022, with a surplus ranging between 0.6-2.6 MMB/d quarterly and averaging 2.1 MMB/d in 2022. This forecast is contingent upon an improved picture for the pandemic, with more vaccinations and control of the spread of new variants allowing for more economic growth, while OPEC+ manages supply conservatively.

As stated in our last outlook, we assume OPEC+ may face some challenges in 2022. Winter 2021/2022 risks an oil surplus due to seasonal demand declines and the beginnings of a non-OPEC+ supply recovery. In the first half of 2022, OPEC+ may be required to reintervene with modest temporary cuts if inventories build faster than desired.

While the fundamentals may change between now and spring 2022, OPEC+ must stay vigilant and only increase production as the market needs. The longer-term picture in our model is more optimistic, with a reduction of imbalances that would allow for crude draws in the second half of 2023. As always, we point out that group cohesion will be important in either high- or low-price scenarios to facilitate a balanced market.

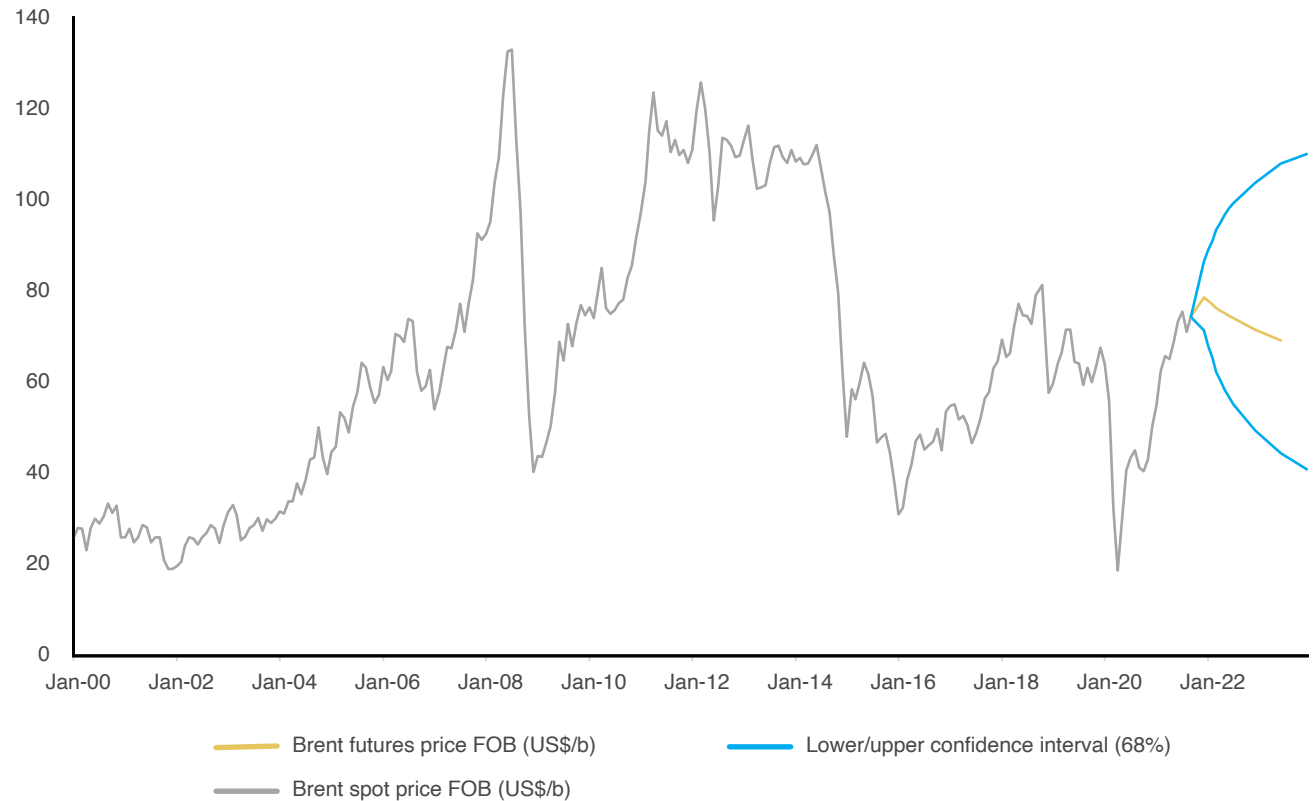
Under these assumptions, target inventory levels for the OECD are expected to rise by 36 MMb to 4,569 MMb in 2021 and increase by 36 MMb in 2022. Actual inventory levels are expected to overshoot the desired targets, reaching 4,627 MMb in 2021 and increasing by 259 MMb in 2022. Real inventory levels rising sharply above the desired capacity are expected to create the conditions for a more bearish price regime. We estimate prices to decline unless OPEC+ takes new actions.

	2019	2020	Growth	2021	Growth	2022	Growth	2023	Growth
<b>Demand</b>	99.7	92.1	(7.6)	96.5	4.4	100.0	3.5	102.0	2.0
<b>Supply</b>	100.6	94.2	(6.4)	96.0	1.8	102.1	6.1	102.6	0.5
<b>Δ</b>	0.9	2.1		(0.6)		2.1		0.6	

## Summary (prices)

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 producers, refiners, airlines, speculators, and others.

Brent crude oil price and 68% confidence intervals US\$/b



Source: KAPSARC calculations based on NYMEX data, CME Group, FINCAD, October 2021.

US\$/b	Q4 2021	Q1 2022	Q2 2022	Q3 2022	Q4 2022	Q1 2023	Q2 2023
Futures	\$78.31	\$76.78	\$74.85	\$73.75	\$71.31	\$68.88	\$66.18
50% CI	\$73 - \$83	\$68 - \$86	\$63 - \$88	\$60 - \$90	\$55 - \$91	\$50 - \$93	\$47 - \$93
68% CI	\$71 - \$86	\$64 - \$90	\$58 - \$96	\$54 - \$99	\$49 - \$103	\$44 - \$107	\$40 - \$109
95% CI	\$64 - \$94	\$55 - \$107	\$45 - \$123	\$41 - \$131	\$34 - \$148	\$28 - \$166	\$25 - \$177

Note: CI = confidence interval

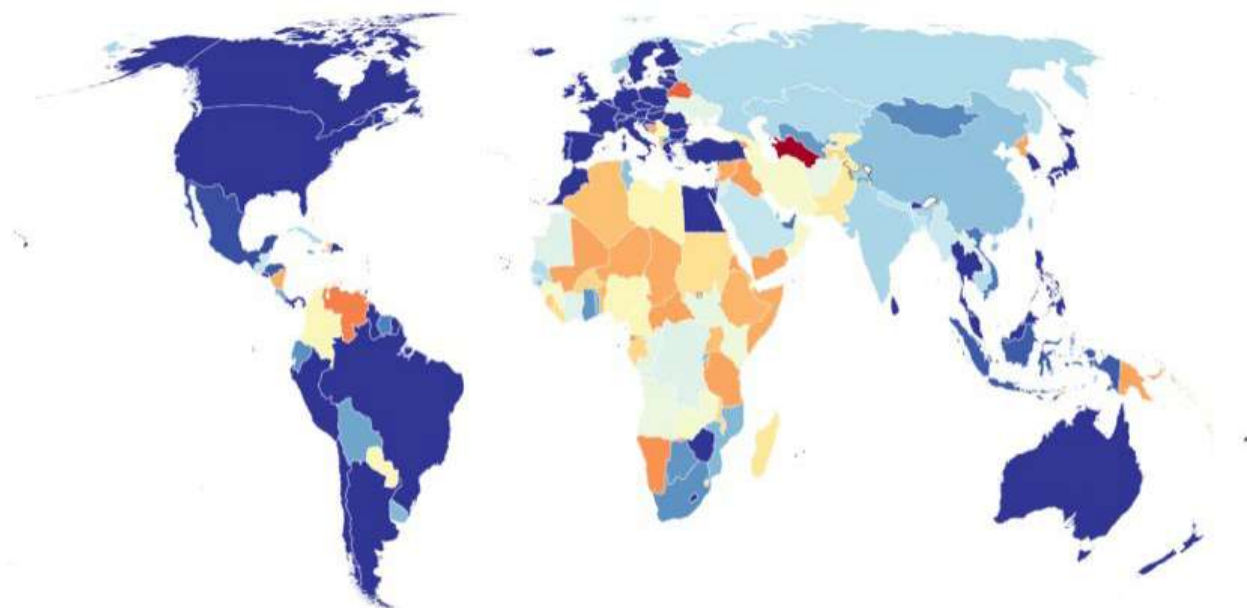
## Key issues for the oil market in 2021 and 2022

IMF-WHO Vaccine Supply Tracker, 21 September 2021

### SECURED VACCINES AND/OR EXPECTED VACCINE SUPPLY

(% OF TOTAL POPULATION)

0 10 20 30 40 50 60 70 80 90 100+



OFFICIAL BOUNDARIES SOURCE

To better understand what to expect for 2021 and 2022, KOMO requested the IMF's permission to publish the following map taken on September 21, 2021, from the IMF-WHO COVID-19 Vaccine Supply Tracker, which portrays secured vaccines and/or expected vaccine supplies. There is no doubt that there is a strong correlation between income levels and total vaccine supply, as well as a weaker but significant relationship between income levels and the proportions of vaccinated citizens. It is also evident that, along with disparities in vaccination rates between countries, there is an economic recovery disconnect between OECD and non-OECD countries, which will also seep into their oil demand projections.

The fundamentals of oil recovery in 2021-22 remain contingent on the roll-out of vaccinations followed by continued stimulus package support. Vaccines will help expedite herd immunity and protect healthcare institutions from being overwhelmed, allowing governments to focus on economic recovery. Stimulus packages and unemployment benefits will act as a safety net and a catalyst for economic revitalization until the adverse impacts of the pandemic (including supply chain disruptions) ease. This year has seen significant inflation in commodities and food prices on the back of elevated shipping costs and prolonged delivery times causing supply distortions. Other structural factors in 2021 include shortages in semiconductors, economic protectionism, and rising global tensions. Further supply chain disruptions associated with climate change and the great energy

### *Key issues for the oil market in 2021 and 2022...*

transition may result in prolonged inflation. However, as the global economy recovers, it is expected that supply will meet demand and inflation will ease. The same dynamic is expected in oil demand.

This quarterly report assumes that COVID-related stimulus packages will continue throughout the forecast period but will decline. Support packages are already being reduced in many developed and developing countries, and this seems to be accelerating. For example, the U.S. ended its pandemic-driven supplemental unemployment benefits on Labor Day (September 5). The issue of debt restructuring also remains contentious for developing countries. In fact, when KAPSARC chaired the T20 in 2020, this topic was one of the most prominent issues discussed. Will developing countries continue to have support for debt easing measures over the next two years?

As the global community (hopefully) moves beyond the COVID-19 disruptions toward its natural economic activity, a premature disruption of pandemic-related stimulus measures and rising interest rates have the potential to impede this transition. Developing countries, in particular, represent the larger part of oil demand growth and are at risk of growing at a slower pace than anticipated. Nevertheless, countries such as China, India and the U.S. have the potential for an upward revision in oil demand, counteracting the risks of low demand growth in other countries.

However, at the time of writing this report, the world is facing new variants of the COVID-19 virus as well as prolonged lockdown measures. COVID-19 will become endemic and our 'new flu,' with regular vaccinations required for the foreseeable future. The global economy is restarting, and we can only hope that these disruptions will fade away in the coming months as we adapt to the new normal.

As a result, we anticipate oil demand growth in 2021 to average 4.44 MMb/d, with OECD countries unusually leading the increase, representing 2.27 MMb/d. Non-OECD demand growth is expected to average 2.17 MMb/d in 2021. Next year is also expected to see meaningful global growth of around 3.47 MMb/d, returning to pre-pandemic levels by Q3. Yet, despite these promising projections, demand growth in Q4 will lag for all the reasons stated earlier, along with the normal seasonal cycle of demand falling during winter. The Kingdom of Saudi Arabia is expected to lead this quarterly slowdown with a seasonal QoQ decline of 570 Kb/d.

Global natural gas market dynamics also need to be considered. As gas prices rise and the global LNG market tightens, the need for heating fuels (and the substitution of oil for gas in power generation) will persist well into winter, which may lead to higher consumption of liquified petroleum gas (LPG) and gas/diesel liquids. Indeed, a longer, colder, or earlier winter could increase demand. See the accompanying

editorial at the end of this report for more details.

The challenge on the supply side is how best to steward a market that is trying to handle several indirectly related crises. The impact of Hurricane Ida on supply (and refining) has largely been overcome, but the production losses have been material. The petrol shortages in the U.K. that are attributed to Brexit have yet to be resolved, and energy shortages in the European and Asian gas markets continue to have a knock-on effect on oil supply. However, there is some doubt that there is as much fuel-switching capacity as some international bodies are making out, especially in Europe. Finally, Chinese power generation from coal continues to suffer from a reduction in Australian imports that have apparently dropped off for political reasons, adding to the potential upside for oil demand from generators. In short, the oil market is experiencing turbulence on all sides.

OPEC+ is following through with its original plan (as endorsed at the group's October 4 meeting) and weathering these short-term problems instead of massively increasing production. The probability of an overshoot in supply is high and would make balancing the market next year difficult if demand languishes. Compliance with OPEC+ production quotas has remained high so far, and, with some concessions on baseline figures, the group looks committed to cooperation going forward. While high prices may tempt some members to break away and



### Key issues for the oil market in 2021 and 2022...

increase production, the benefits of compliance have outweighed the benefits of non-compliance until now, with prices around \$80 a barrel.

Global supply growth for 2021 is estimated at 1.8 MMb/d, with the majority coming from existing sources like OPEC+. Next year could see 6.1 MMb/d of supply come online, with about half of this coming from OPEC+ and the remainder from the U.S., Canada, Brazil, and Norway. QoQ, Q4 2021 should see a bumper increase of 2.1 MMb/d, with the planned increases from OPEC+ driving most of this growth.

Negotiations with Iran on a potential nuclear deal are still stalled, with sanctions evasion making it difficult to bring them to the table. Iranian oil exports to various locations, including China, Lebanon, and condensate shipments to Venezuela continue. The U.S. has even requested that China reduce its purchases of Iranian crude, but this seems unlikely.

Shale production in Vaca Muerta, Argentina is growing fast, though incremental growth volumes remain small. U.S. drillers appear to be divided on production volumes, with private companies drilling at an impressive pace, while international oil companies (IOCs) and large independents have so far not increased drilling significantly. The larger firms, however, are buying up the acreage of European firms exiting the market due to shareholder pressure. Whether that discipline can be sustained is a key

uncertainty for 2022. Providing shareholder value in the form of dividends and buy-backs is important, but that must be supported by oil production. It may not be long before we return to substantial increases in shale production if the price stays high.

Canadian oilsands saw the opening of the Enbridge Line 3 pipeline, providing an additional 760 Kb/d of export capacity into the U.S. pipeline network. This should ease some difficulties for local producers. Still, operationally they may face some challenges with several major insurance firms exiting the market for the oilsands, dropping coverage of the Trans Mountain pipeline and driving up costs.

Lastly, November brings us the much anticipated 26th Conference of the Parties (COP26) in Glasgow, after having been delayed by a year by the pandemic. News coverage and opinion pieces on climate change are reaching a heightened pitch, detailing the actions being called for to solve it. As the major source of emissions, hydrocarbons will continue to be a large part of the debate. However, it is unclear how individual countries or the group as a whole plan to make the transition to clean energy without adversely affecting the global economy. Development plans may be on hold for many firms while they wait to see the results of the conference.

Adequate inventory and high spare capacity levels persisting well into 2021 should be sufficient to

mitigate any short-term 'negative' supply shocks. Prices could see additional downward pressure if efforts to limit the spread of the new variants fail or if OPEC+ members further relax their cuts (or if discipline erodes). Based on our forecast balances, this downside risk will be especially pronounced in 2022.

*KOMO's supply/demand forecast is an average for each quarter and does not consider short-term volatility. Actual changes to supply and demand will, of course, remain volatile, reflecting the responses to and the duration of the COVID-19 pandemic. Other challenges may include unexpected oil supply cuts due to hurricanes, OPEC+ compliance, and upheavals in developing countries, among others.*

## Demand forecast

Global oil demand is projected to grow by 4.4 MMb/d in 2021 and increase by an additional 3.5 MMb/d in 2022 YoY. However, global demand is expected to stagnate QoQ in Q4 2021, only growing by 10 Kb/d, after a record QoQ growth in Q3 2021 of around 3.4 MMb/d. The predicted pause comes from the natural seasonal decline in winter accompanied by continued lockdown measures in some countries/regions, as well as a slower deployment of vaccinations in some developing countries.

In our previous reports, we expected OECD countries to see similar oil demand growth to non-OECD countries this year. However, the gap has widened slightly between the two groups, with OECD members taking the lead at 2.27 MMb/d and non-OECD now standing at 2.17 MMb/d. China's demand is starting to rebound in Q4 after subdued growth in Q2 and Q3, and India's demand is now expected to recover strongly, with its harvest season starting September followed by its festive period in Q4 (i.e., Diwali, Navaratri, etc.). While we expected the spread of COVID-19 in Africa to limit the continent's economic growth, it seems to be rebounding this quarter, canceling the declines of Q3. Nevertheless, the total impact of the economic recovery remains stronger in OECD countries.

We estimate that the bulk of OECD growth will be carried by the U.S., which is expected to account for 82% of OECD Americas' growth and 53% of total OECD growth. Indeed, as the U.S. was the country most affected by the 2020 oil demand downturn, it is experiencing the strongest rebound in demand this year. We estimate demand to grow by around 1.5 MMb/d for OECD Americas (100 Kb/d more than our last outlook), followed by OECD Europe at 610 Kb/d (200 Kb/d more than our last outlook) and OECD Asia-Oceania by 190 Kb/d (60 Kb/d less than our last outlook). Asia will represent most of the non-OECD demand growth in 2021, followed by Latin America and Africa. Non-OECD Asia is expected to grow by around 1.9 MMb/d, followed by Latin America at around 320 Kb/d, and Africa by around 45 Kb/d. Growth in Eurasia is anticipated to stagnate as significant growth in Russia is subdued by the declines in the remaining countries of the region.

On the other hand, the Middle East is expected to witness a reduction in demand of 110 Kb/d in 2021. As discussed in previous publications, and following the IMF's outlook, we expect the hydrocarbon exporting countries to have weaker recoveries than other regions, as their economic growth remains proportional to their hydrocarbon export revenues. Although we presume that countries such as Saudi Arabia, the United Arab

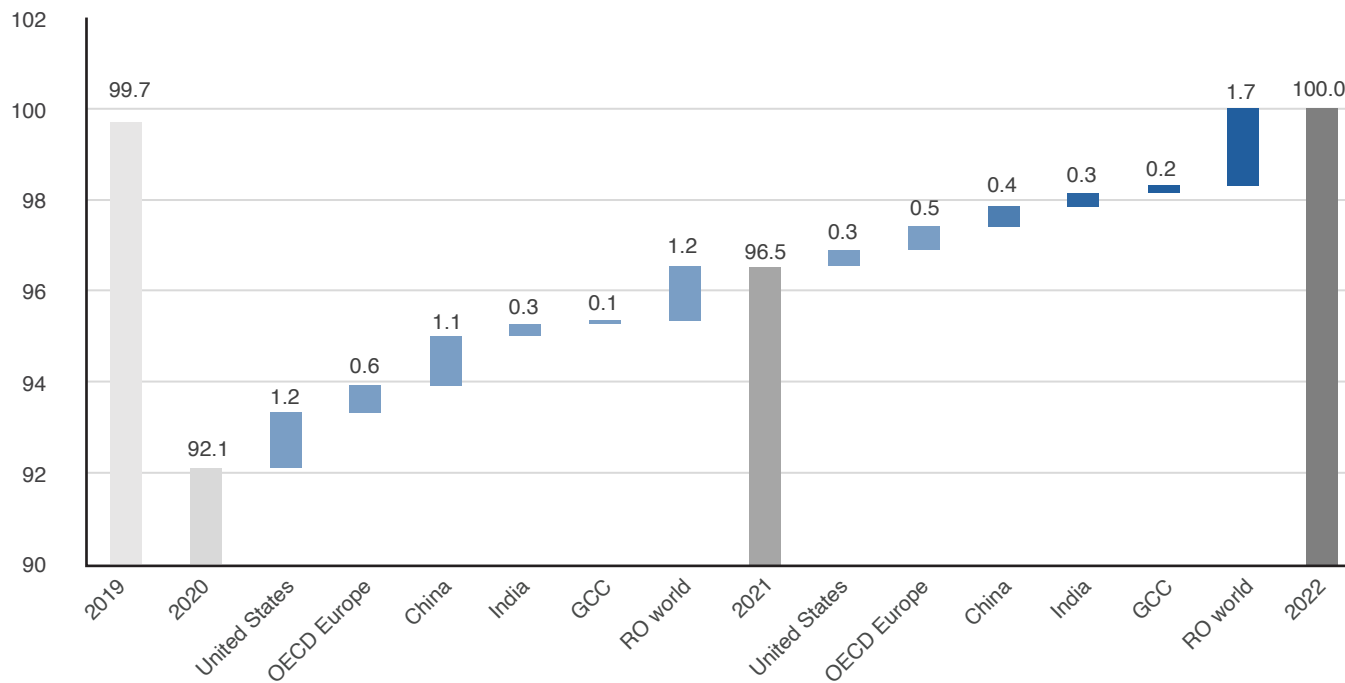
Emirates (UAE) and Qatar will drive oil demand growth for the region, of 48 Kb/d 27 Kb/d and 14 Kb/d, respectively, the remaining non-Gulf Cooperation Council (GCC) countries are expected to witness declines.

We anticipate that all OECD countries except New Zealand will see oil demand growth in 2022. Oil demand from OECD Americas is expected to reach 2019 levels by the second half of 2023, with OECD Asia Oceania reaching these levels by the end of 2022. Although we expect OECD Europe to have an overall demand growth of 920 Kb/d between 2022 and 2023, we do not expect it to return to its 2019 level of demand. This forecast reflects structural declines in the region following a movement to diversify away from fossil fuels and enhance efficiency standards.

We estimate that demand growth for non-OECD countries in 2022 will be faster than for OECD countries, at 2.1 MMb/d in 2022 (300 Kb/d more than our last outlook). This is because demand growth has slowed this year due to resumed lockdown measures in a few countries; hence a stronger comeback is expected next year. The underlying (pre-COVID-19) growth trend is also much stronger among non-OECD countries.

Demand forecast...

Annual global oil demand growth, MMb/d, 2019-2022



Source: KAPSARC, September 2021.

Note that the largest YoY oil demand growth ever recorded was 4.1 MMb/d in 1973, according to the BP Statistical Review of World Energy. We project growth for 2021 to be 4.4 MMb/d. However, global oil demand levels will remain below those of 2019.

## Demand levels, MMb/d

2020	Q1	Q2	Q3	Q4	2020
<b>OECD</b>	46.3	40.2	42.6	42.7	<b>42.9</b>
<b>Non-OECD</b>	48.6	46.0	49.6	52.5	<b>49.2</b>
<b>Global demand</b>	94.9	86.2	92.2	95.2	<b>92.1</b>

2021	Q1	Q2	Q3	Q4	2021
<b>OECD</b>	43.3	44.3	46.5	46.7	<b>45.2</b>
<b>Non-OECD</b>	50.2	51.0	52.2	52.0	<b>51.3</b>
<b>Global demand</b>	93.5	95.3	98.7	98.7	<b>96.5</b>

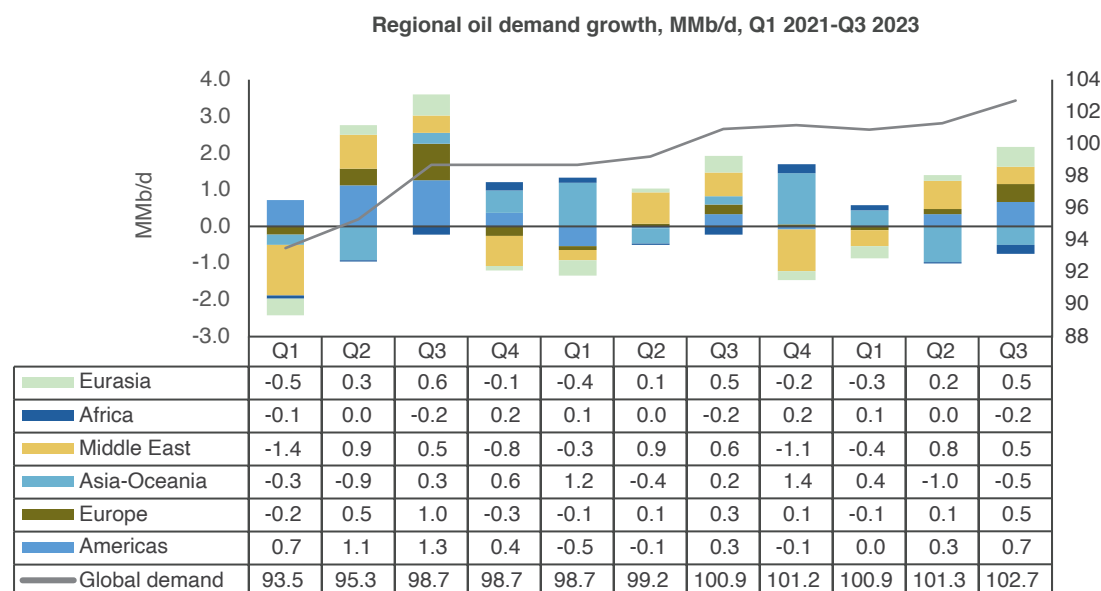
2022	Q1	Q2	Q3	Q4	2022
<b>OECD</b>	46.7	45.8	46.5	47.3	<b>46.6</b>
<b>Non-OECD</b>	52.0	53.4	54.4	53.9	<b>53.4</b>
<b>Global demand</b>	98.7	99.2	100.9	101.2	<b>100.0</b>

2023	Q1	Q2	Q3
<b>OECD</b>	47.5	46.8	48.0
<b>Non-OECD</b>	53.4	54.5	54.8
<b>Global demand</b>	100.9	101.3	102.7

Non-OECD countries are expected to retain a 53% share of global oil demand in 2021 and 2022. They will also account for 49% of demand growth in 2021. In 2022, these countries are expected to represent 61% of global demand growth since they will be facing a slower recovery this year, but their demand growth should pick up in 2022.

The largest seasonal changes this quarter are expected to come from the Middle East. As stated earlier, Saudi Arabia may see the largest QoQ decline in demand as part of its normal seasonal downturn. Asia-Oceania is expected to experience the largest upward change in demand, with China and India leading the growth, followed by South Korea.

**Our current demand assumptions are susceptible to significant changes, depending on the impact of the new COVID-19 variants, the development of vaccinations and the speed of their distribution, the recovery in economic activity and travel, supply chain bottlenecks, rising transportation costs, and future oil price movements. Further revisions to these assumptions will be needed as we progress through Q4 2021, particularly for the U.S. and China. The KOMO team remains conservative in its demand estimates when compared with other forecasts and highlights that GDP recovery could create further potential for oil demand growth.**



Source: KAPSARC, September 2021.

## United States

MMb/d	2020	Q1	Q2	Q3	Q4	2021	Q1	Q2	Q3	Q4	2022	Q1	Q2	Q3	Q4	2023
United States	19.0	19.3	19.9	20.8	20.9	20.2	20.6	20.5	20.6	20.6	20.6	20.7	20.9	21.3	21.4	21.0

### 2021-2022

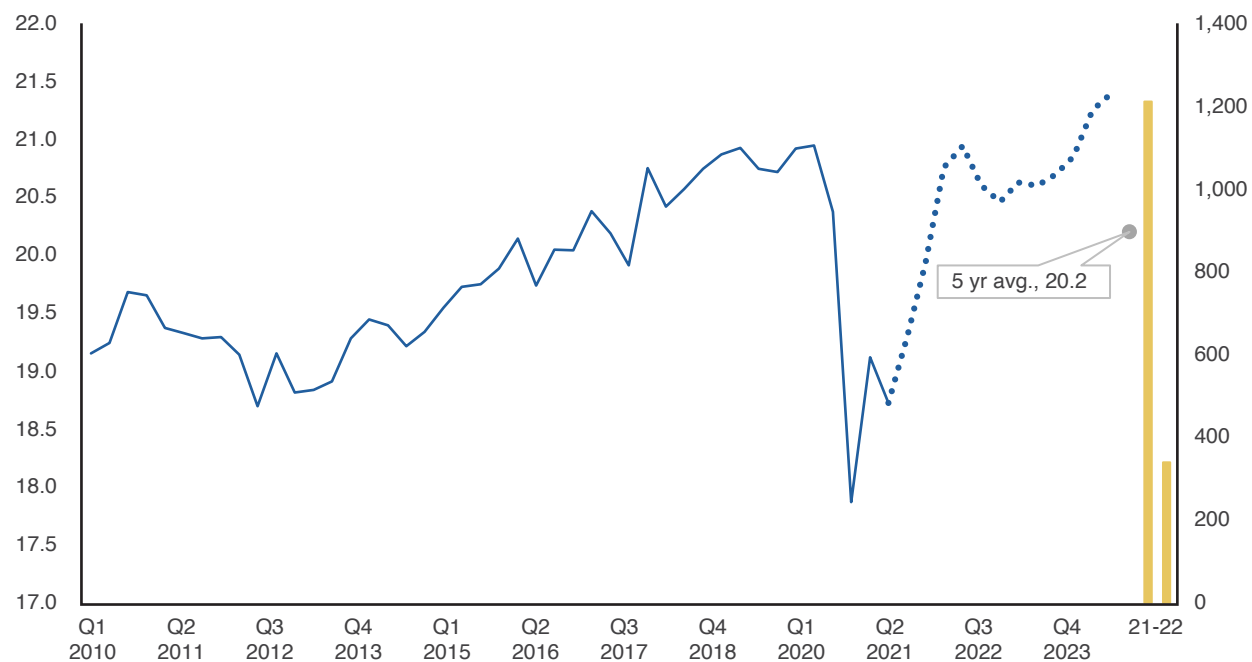
U.S. oil demand is expected to grow by around 1.21 MMb/d in 2021 and continue to grow by 340 Kb/d in 2022, yet remain below 2019 levels.

Just as transportation fuels were hit the hardest in 2020, they have recovered the fastest in 2021. U.S. gasoline demand in 2021 should see the strongest growth (560 Kb/d), followed by gas oil/diesel (240 Kb/d), LPG (150 Kb/d), and other heavy fuels. However, we expect the latter to stage only a limited recovery. Our expectations for jet fuel growth remain cautious in 2021 at around 110 Kb/d, but 2022 looks much more optimistic as international travel increases.

### Q4 2021

We expect the beginning of fall in the U.S. to result in QoQ demand growth of around 180 Kb/d, with an increase in heating fuels. As a result, we estimate both gas/diesel oil and LPG to grow by 300 Kb/d each, while other fuels stagnate or even decline, such as gasoline (with the end of the traditional summer driving season) and other heavier fuels (200 Kb/d declines each). Storms in the Gulf of Mexico and natural gas price increases have led a number of electricity producers to use fuel oil as feedstock, lending additional support to the distillate product market.

United States, MMb/d (L) and 21-23 Growth Kb/d (R)



Source: KAPSARC, September 2021.

## OECD Europe

MMb/d	2020	Q1	Q2	Q3	Q4	2021	Q1	Q2	Q3	Q4	2022	Q1	Q2	Q3	Q4	2023
OECD Europe	12.5	12.3	12.8	13.8	13.5	13.1	13.4	13.5	13.8	13.8	13.6	13.7	13.9	14.3	14.2	14.0

### 2021-2022

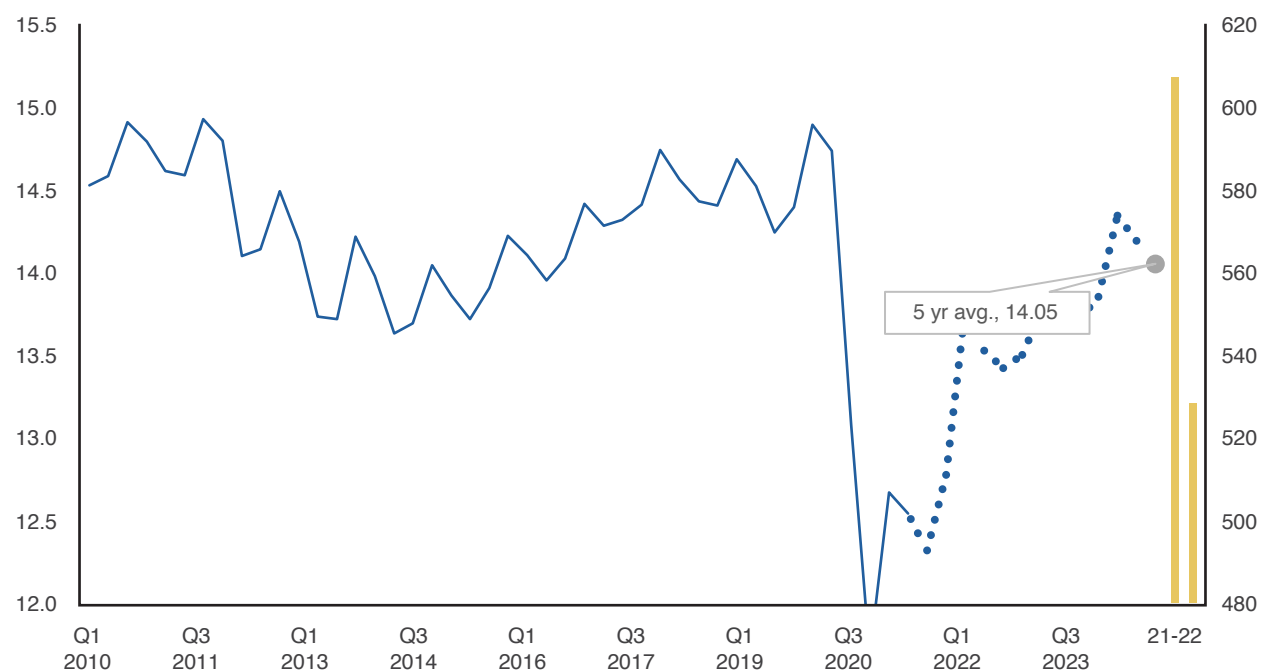
OECD Europe's oil demand is expected to grow by 570 Kb/d in 2021 and another 390 Kb/d in 2022. Like the U.S., OECD Europe is expected to recover much, but not all, of its lost demand from 2020. However, unlike the oil demand estimates for other OECD nations, KOMO presumes demand from this region has peaked and expects a stagnating or declining trend for OECD Europe post-2023.

We expect a resumption of transportation activities in 2021 to drive diesel up by 260 Kb/d (45% of total growth) because much of the European fleet relies on this fuel. Gasoline demand is expected to rise by 70 Kb/d, followed by aviation and heavier fuels at around 60 Kb/d each.

### Q4 2021

OECD European demand is expected to stagnate and, in some cases, even decline as it usually does in the fourth quarter. Earlier projections indicated that the region would decline by 200-400 Kb/d. Still, like the U.S., we expect OECD Europe to capitalize on heating fuels given soaring natural gas prices, with gas/diesel oil demand growing by 210 Kb/d and LPG by 200 Kb/d. All other fuels will either stagnate or decline, but gasoline demand is expected to witness the strongest decline at around 170 Kb/d.

OECD Europe, MMb/d (L) and 21-23 Growth Kb/d (R)



Source: KAPSARC, September 2021.

## China

MMb/d	2020	Q1	Q2	Q3	Q4	2021	Q1	Q2	Q3	Q4	2022	Q1	Q2	Q3	Q4	2023
China	13.6	14.9	14.5	14.5	14.8	14.7	14.9	15.2	15.0	15.4	15.1	15.3	15.5	15.1	15.3	15.3

### 2021-2022

China's oil demand is expected to grow by around 1 MMb/d in 2021 and around 440 Kb/d in 2022. China's oil demand was somewhat stagnant in Q2 and Q3 of this year due to regional lockdowns, increased oil prices and national fuel prices, and lower than usual investments in national markets due to the government's new "Common Prosperity" campaign. Q4, however, seems to be looking good and pushing demand slightly higher than our last forecast by 200 Kb/d.

China's growth for this year is expected to come from transportation fuels. We expect diesel growth to reach 280 Kb/d and gasoline around 250 Kb/d. Heavier fuels are also expected to be in demand this year, with an estimated growth of 180 Kb/d. LPG, for now, is expected to grow by 130 Kb/d. However, this number is subject to revision depending on the gas market dynamics.

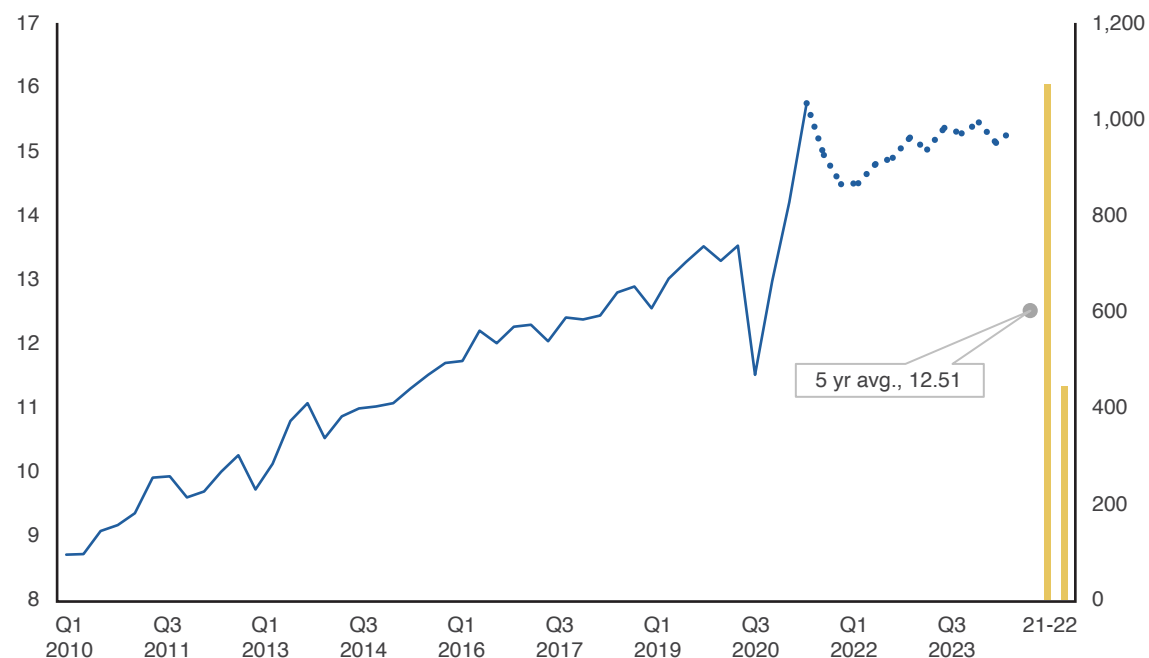
### Q4 2021

China's QoQ demand is expected to grow by 290 Kb/d. Gas/diesel oil demand is expected to lead this growth with an estimated 380 Kb/d increase, followed by LPG at 200 Kb/d and naphtha at around 150 Kb/d. These increments will be limited with seasonal declines in

demand for all other fuels, particularly heavy fuels, which are estimated to decline by 230 Kb/d, followed by

gasoline demand and jet fuel at 90 Kb/d and 80 Kb/d, respectively.

China, MMb/d (L) and 21-23 Growth Kb/d (R)



Source: KAPSARC, September 2021.

## India

MMb/d	2020	Q1	Q2	Q3	Q4	2021	Q1	Q2	Q3	Q4	2022	Q1	Q2	Q3	Q4	2023
India	4.5	4.9	4.7	4.6	4.9	4.8	5.1	5.1	4.8	5.2	5.1	5.3	5.3	5.0	5.4	5.3

### 2021-2022

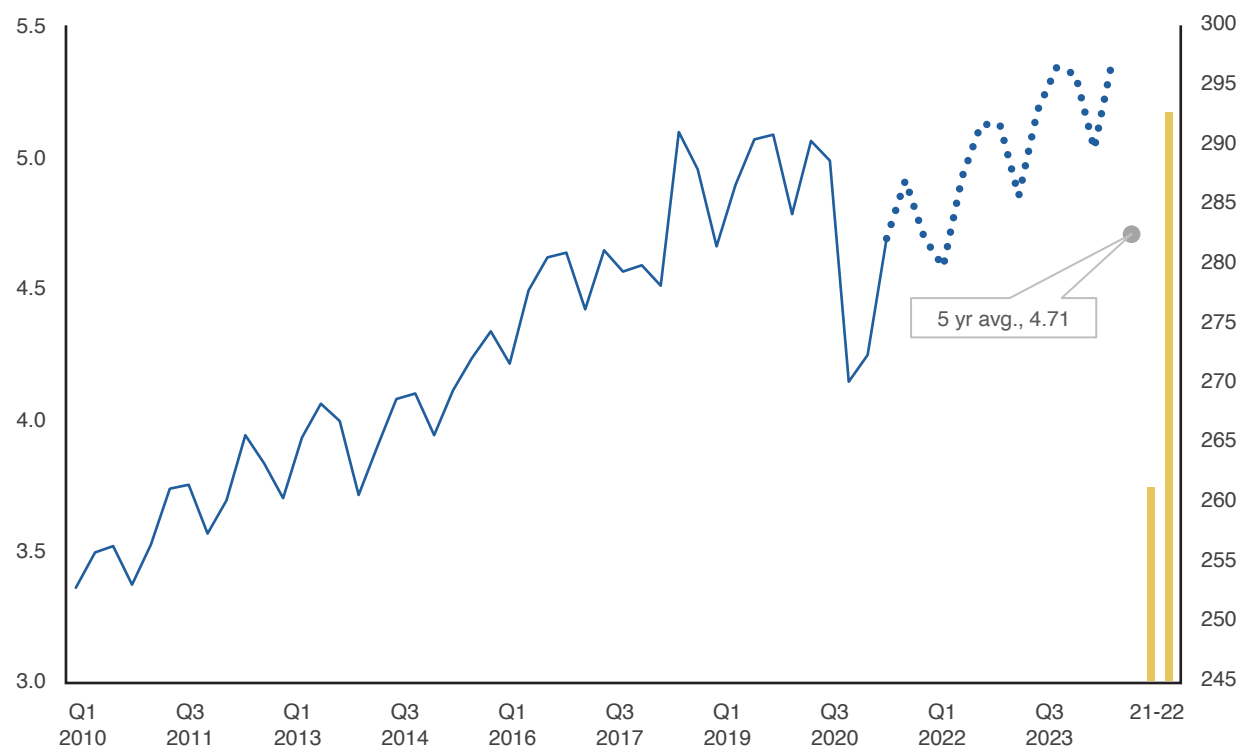
India's oil demand is expected to grow by around 260 Kb/d in 2021 and 290 Kb/d in 2022, returning to healthy growth after being below its yearly average growth this year. This was expected considering the soaring cases of COVID-19 in 2021 and the social unrest following the farm bill proposed by the Indian government earlier this year, among other phenomena. As a result of this, Q2 and Q3 saw declining demand. However, it is expected to pick up as we enter Q4.

We expect diesel demand to grow by 100 Kb/d, followed by gasoline and LPG at 40 Kb/d each. All other fuels are expected to grow but at a slower pace.

### Q4 2021

QoQ India is expected to witness demand growth of 340 Kb/d. Indeed, September and October correlate with the harvest season and early November will bring us Diwali. As a result, we expect growth across all fuels except for fuel oil. Diesel demand should lead the growth with an expected increase of 180 K/d, followed by heavier fuels at around 80 Kb/d. The demand for gasoline in India, although not projected in this report, could well hit record highs in fiscal 2021 as COVID-19 curbs are eased and business and leisure travel accelerate.

India, MMb/d (L) and 21-23 Growth Kb/d (R)



Source: KAPSARC, September 2021.



## Saudi Arabia

MMb/d	2020	Q1	Q2	Q3	Q4	2021	Q1	Q2	Q3	Q4	2022	Q1	Q2	Q3	Q4	2023
Saudi Arabia	2.8	2.5	3.0	3.3	2.7	2.9	2.5	3.1	3.4	2.8	2.9	2.5	3.1	3.4	2.8	3.0

### 2021-2022

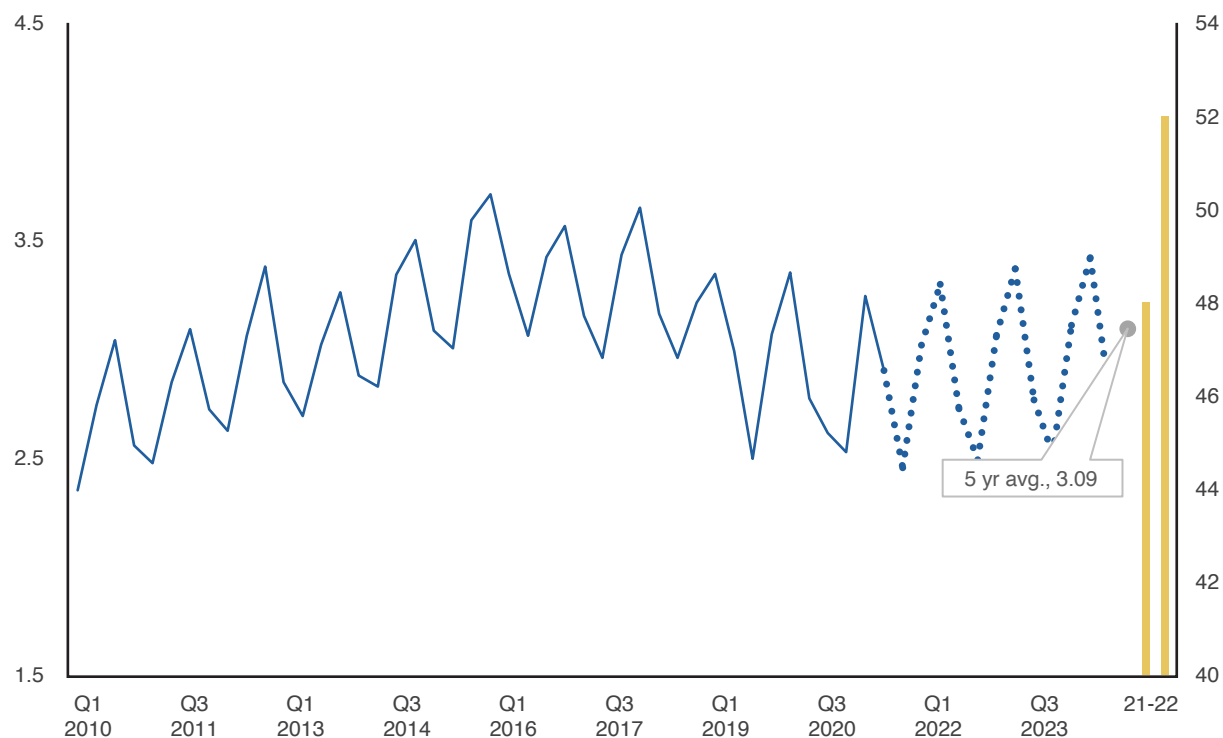
Saudi Arabia's oil demand should rebound by 48 Kb/d in 2021 and continue rising by a further 52 Kb/d in 2022 (10% higher for both years than our previous outlook).

Overall, Saudi Arabia will see small demand increments for 2021 for all fuels, but not exceeding 10 Kb/d per fuel. Part of this limited demand growth comes from continued restraint in oil exports, resulting in a slightly slower economic recovery, and the fuel price reforms that are encouraging efficient use. As we move forward, fuel switching and energy efficiency policies will become more prominent, resulting in Saudi Arabia's modest growth in oil demand for the foreseeable future.

### Q4 2021

QoQ, Saudi Arabia is expected to witness the strongest decline in total oil demand of all the countries, with an expected decline of 570 Kb/d. Although this number may seem significant, it is in line with the Kingdom's seasonal consumption pattern as temperatures (and electricity demand) drop. Hence, all fuels are expected to witness demand declines, except for LPG and naphtha. Diesel and heavier fuels will witness the strongest declines at 210 Kb/d and 190 Kb/d, respectively. They will be followed by fuel oil at 180 Kb/d then gasoline at 45 Kb/d.

Saudi Arabia, MMb/d (L) and 21-22 Growth Kb/d (R)



Source: KAPSARC, September 2021.

## Discussion

Forecasting the oil market is not like forecasting the weather. The clouds do not care if you think it will rain. The oil market, however, is filled with people who look at forecasts (and the news) and act upon that information, changing the outcome. The current energy and supply-chain crunch in the markets, particularly in gas, is alarming, and there are accompanying forecasts calling for significantly higher oil prices for the coming year (the trade in options with strikes above \$200/b for December 2022 has increased).

The problem with overly pessimistic forecasts is not just that it increases the problem today with panic-buying at both the petrol pump and by state-owned energy suppliers (e.g., China), but it also sets the market up for a fall. Current inflated prices, along with talk of further increases, will push some producers to do as asked and increase production (while high prices also slow demand growth). The oil market has an inherent tendency toward boom and bust, and we may be seeing some form of that now.

Where could this call for increased production come from? The first (and generally cheapest) option is from OPEC+, as some members are still carrying significant spare capacity. For immediate increases, the other major option is to use inventories (including SPRs) as virtual producers by releasing crude back onto the market. Beyond this, the other options have slight delays that may not be useful for the current situation.

Within OPEC+, there are the members exempt from production quotas due to sanctions (Iran and Venezuela) that have demonstrated they can still find buyers and would likely increase those shipments accordingly if prices kept rising and their discounted crude became more attractive. In a tight supply environment, even the conflicted parties in Libya might be tempted to seek a resolution, given the potential for large lost profits. Outside of OPEC+, there are some projects/countries already working on additional supply, like Brazil, that could possibly accelerate their production plans. Lastly, and perhaps most importantly

for non-OPEC+ countries, U.S. shale could increase production at a relatively fast pace from private firms, or even more so from public ones if expanded drilling was construed as creating shareholder value.

The message this quarter is to not get too excited. The current crunch can be eased if nobody panics. However, the coverage from COP26 is unlikely to calm energy markets.

Highlights from this edition are:

- OPEC+ is still in the driver's seat
- Iranian negotiations are still stalled, but its exports continue to rise
- The outlook for shale producers is directly related to their exposure to shareholders
- Oilsands open a key pipeline, but difficulties loom on the horizon

## Supply forecast

Global liquids supply is expected to grow by about 1.8 MMb/d in 2021 to reach an average of 95.9 MMb/d for the year. We expect 2022 to see a 6.1 MMb/d increase in supply, with an average supply of 102.1 MMb/d for the year, reaching pre-pandemic levels of over 100 MMb/d before mid-2022. This represents a downward revision for 2021 of 500Kb/d and an upward revision of 1.1 MMb/d for 2022 due to supply disruptions such as Hurricane Ida and increased pricing driving more production.

Almost all the growth this year and about half of the growth in 2022 comes from OPEC+ members. We have YoY growth increments remaining relatively stable throughout 2022, not including an assumed adjustment in May for some OPEC+ members. For non-OPEC+ members, improved pricing should drive growth, but they will be competing with spare capacity and, in the case of U.S. shale, potentially wrestling with commitments to shareholders and responsible spending.

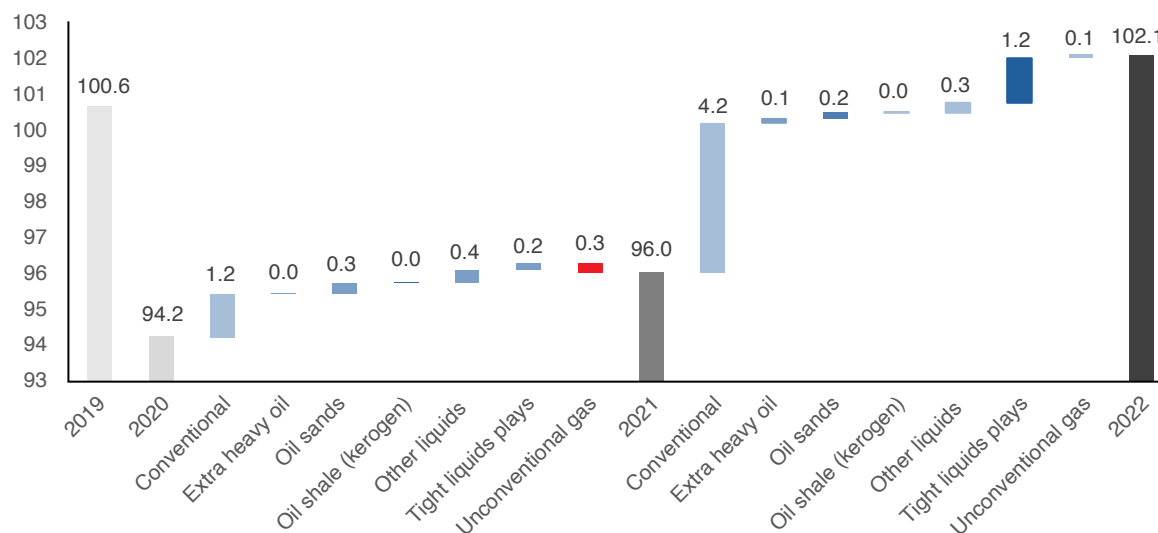
The most important topic in the oil market currently is the short-term supply crunch we are experiencing and the global energy industry's ability to solve it. OPEC+ is at the center stage of the oil market, while much of the turmoil is occurring in the gas and coal markets and crossing over to impact all energy prices. The forecast surplus in 2022 makes it difficult to justify a massive increase in supplies if it worsens the market balance beyond this winter. The decision of the OPEC+ group to maintain an orderly return to production is prudent if the

current imbalance is truly short-lived. Time will tell if this was the right move.

Outside of OPEC+, companies are responding to market conditions with improved pricing as a major determinant, but not the only consideration. October hit highs not seen since 2018, above \$80/b, but KOMO forecasts that the backwardation in the forward curve suggests that this may prove to be a short-lived bump if a large surplus emerges in 2022, as our balance

suggests. In 2021, the usual suspects Norway, Brazil, and Canada will all increase production by over 100 Kb/d, with similar gains in 2022. U.S. shale, in particular, is going to be an interesting segment to watch in the coming few quarters, with their commitments to shareholder value, declining inventory of drilled but uncompleted (DUC) wells, and high prices testing their loyalties and pushing them toward an expansion of drilling.

Annual global liquid supply, MMb/d, 2019-2022



Source: KAPSARC, September 2021.

## OPEC+

In an anxious market, all eyes are on OPEC+. Recent disruptions such as Hurricane Ida, global LNG and coal shortages, power cuts in China, and the (somewhat unrelated) U.K. supply chain issues – combined with large inventory withdrawals – are creating pressure on the group to increase their production at a faster rate than currently planned. The question is whether the problems we have now are temporary or indicate a larger trend in which the market is sharply tightening. As discussed in our demand section, the current problems appear to be short-lived and may give way to more downward or flattening pressures this winter that risk causing a surplus relatively quickly.

The higher the price goes, the more difficult it may become to hold the members together in maintaining cuts at a steady release rate. There are also other complicating factors that could lead to supply uncertainties.

Iran's exports have generally been increasing, with refined products (though limited by refining capacity) not subject to sanctions and crude shipments to Asia evading sanctions entirely. The U.S. has formally requested that China stop purchasing Iranian crude so that pressure can be applied in the nuclear talks effectively. However, it seems doubtful that the petition will be heeded. In addition to Asia, shipments to other locations, such as Lebanon, are on the rise, and condensate is being sent to Venezuela to help with blending for their sanctioned production.

Other than the assistance coming from Iran, faith in Venezuela appears to be waning. International players, at one point interested in helping restart Venezuela's oil industry, have begun to pull back. Some reasons for this are environmental (Total stated they were more interested in low-carbon sources), while other investors appear to be de-risking their portfolios. The one potential partner Venezuela could hope for is China, but heavy sour crude has additional taxes and restrictive quotas, which could make setting a price attractive to both parties difficult.

Libya's problems are ongoing, with a struggle between its Ministry of Oil and Gas and the National Oil Corporation (NOC) for control of the industry. There have been protests threatening production, and the (attempted) resignation of Deputy Oil Minister Refaat al-Abbar signaled deeper tensions between factions in the government. Despite this, official statements claim the country will increase its production to around 1.6 MMb/d in 2022. However, KOMO sees that most of these gains have already materialized, with a forward estimate of around 1.3 MMb/d while these tensions continue.

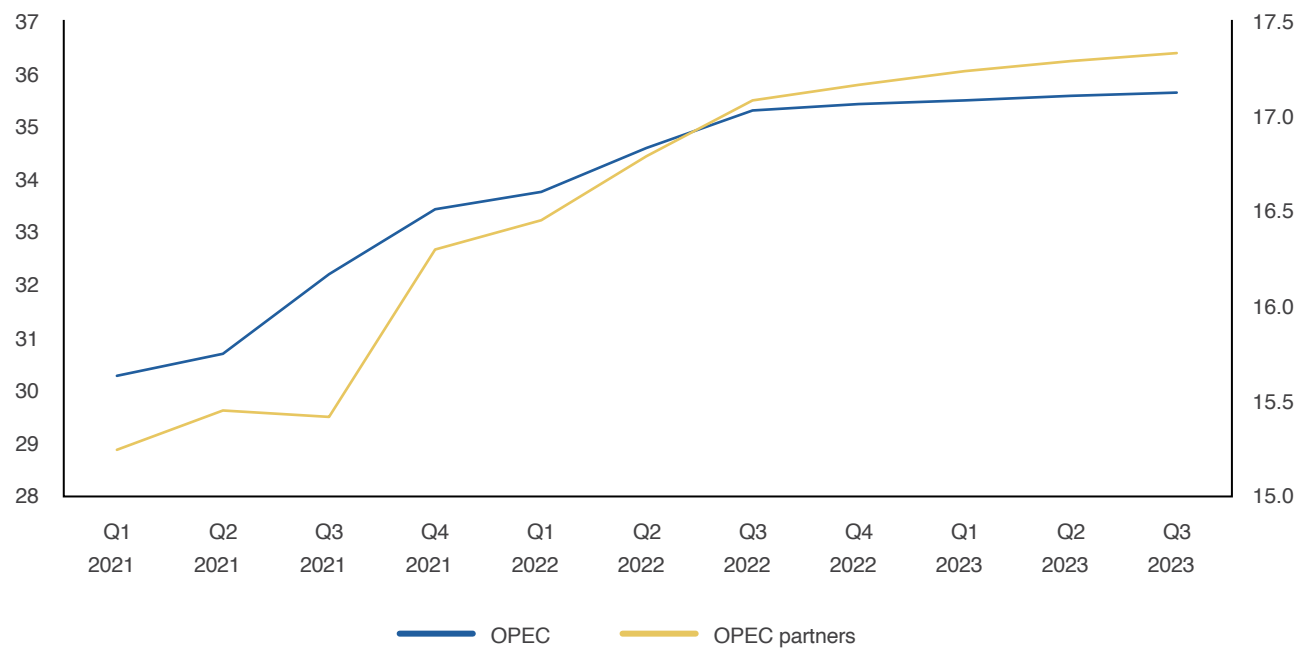
Among the non-exempt members, there are some minor tensions but nothing significant. Iraq broke away from their usual mirroring of Saudi Arabian crude prices to offer a discount and boost sales. Nigeria and others are quietly petitioning for increased baselines like those agreed in July for other members. Neither of these issues should cause a rift that would endanger the agreement.

Lastly, Russia's role in the European gas market deserves a minor note, as it is having an impact on the oil market. Some analysts believe the shortage of gas from Russia is intentional to pressure European regulators to speed up their approval of the controversial Nord Stream 2 pipeline. More discussion of the current gas market is available in the editorials in this report.

In summary, there is spare capacity available from OPEC+ to calm the markets, but it is unclear how temporary the current problem is. The planned rate of relaxation for the cuts was already quite fast, and we highlighted that demand might falter and lead to an overshoot next year. If this is a temporary problem, OPEC could offer a temporary bump, but it needs to prepare for a re-cut if demand does not materialize.

OPEC+...

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



Source: KAPSARC, September 2021.

## OPEC and partners supply changes for 2021 and 2022, Kb/d

	2021	2022		Kb/d
Mexico	(33.9)	(11.9)		50
South Sudan	0.7	3.5		0
Equatorial Guinea	(3.5)	(16.5)		-50
Brunei	15.5	4.8		-100
Sudan	(0.0)	13.7		-400
Bahrain	(27.0)	(3.8)		
Oman	23.7	59.2		
Gabon	(2.6)	(3.5)		
Congo	(13.4)	(18.1)		
Malaysia	(26.3)	38.2		
Azerbaijan	21.0	10.4		
Kazakhstan	(36.3)	79.3		
Algeria	1.5	49.2		
Nigeria	(239.4)	151.8		
Kuwait	(30.0)	204.7		
Iran	482.3	456.1		
Venezuela	36.9	150.5		
UAE	(85.2)	329.4		
Saudi Arabia	(39.2)	1,194.8		
Iraq	(9.6)	279.7		
Libya	823.4	(5.2)		
Russia	338.2	956.3		
OPEC	784.4	2,782.2		
<b>OPEC partners</b>	275.5	1,149.7		
<b>OPEC+ TOTAL</b>	1,059.8	3,931.9		

Source: KAPSARC, September 2021.

## OPEC+ spare capacity

The current market conditions are causing some oil analysts to ask uncomfortable questions about how much spare capacity OPEC+ has. The reasoning behind these questions is that maintenance and care for offline capacity might not have been conducted, or that ongoing investment needed to offset decline rates may not have been made, limiting the ability to bring it online (quickly, at least). These are fair questions but may be somewhat overblown.

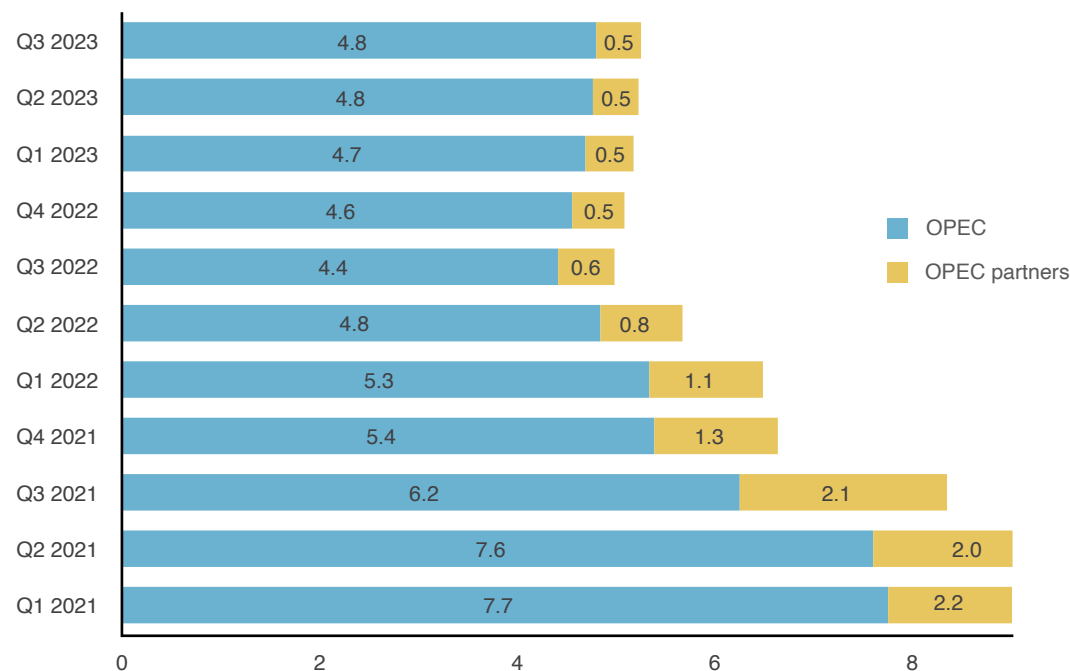
There was an increase in the baseline values for five members (Saudi Arabia, Russia, Kuwait, Iraq, and the UAE) in July, with the UAE and Iraq originally asking for even larger values. In addition to this, some of the mid-tier members of OPEC+, such as Nigeria, are petitioning for baseline adjustments of their own and presumably have evidence to support their claims. For the smallest members, their production is notoriously difficult to monitor; they have had lower compliance rates on average, and frankly qualify as rounding errors compared with the largest producers.

As such, we cannot know if there is a significant deficit in spare capacity until we reach a market balance where the members of OPEC+ are free to produce close to their maximum capacities. While there may be one or two members that have difficulties returning to their pre-pandemic levels, many members of the group have plans in place to significantly increase production (either ongoing or in the immediate future) that could outweigh these limitations.

Our forecast for spare capacity this quarter is largely unchanged from our last. We expect the plan for OPEC+ to continue as stated, with the first significant release to occur in Q4 2021. After this (once the markets have calmed), there will likely need to be a

slowing down of planned releases to match or moderate the market. This is in the spirit of OPEC's commitment in the monthly meetings to respond and react to market conditions in a fast and direct manner.

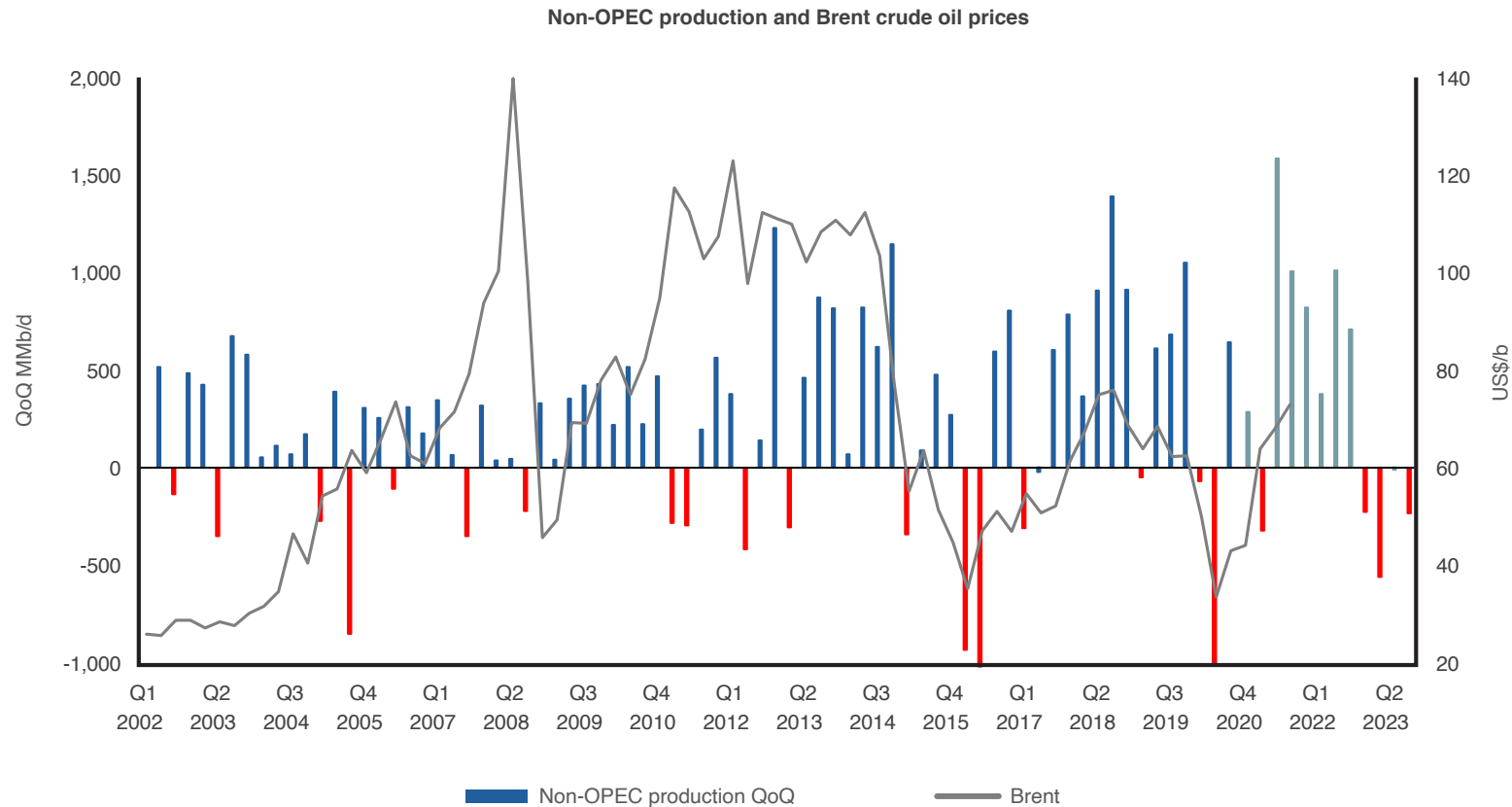
OPEC and partners spare capacity, MMB/d  
Technical base



Source: Rystad; KAPSARC, September 2021.

Note: This updated definition of spare capacity is based on the technical ability of each member to produce at the current price and their stated benchmarks versus their forecast production under the OPEC target cuts, including Saudi Arabia's stated additional spare capacity of 1.5 MMB/d.

## Non-OPEC+



Sources: IEA, September 2021; KAPSARC, September 2021.

### Non-OPEC+ growth:

- In 2021, the supply of U.S. tight oil is expected to rise by 25 Kb/d, with world unconventional gas liquids declining by 270 Kb/d and oil sands reclaiming 310 Kb/d.
- In 2022, the outlook for U.S. tight oil is a rebound of 840 Kb/d, with world unconventional gas liquids growing by 130 Kb/d, and oil sands picking up an additional 162 Kb/d of growth.
- A key feature of the non-OPEC+ production story for the next eight quarters is the ongoing anxiety around supply chains, not necessarily supply.



## Non-OPEC (tight oil and oil sands)

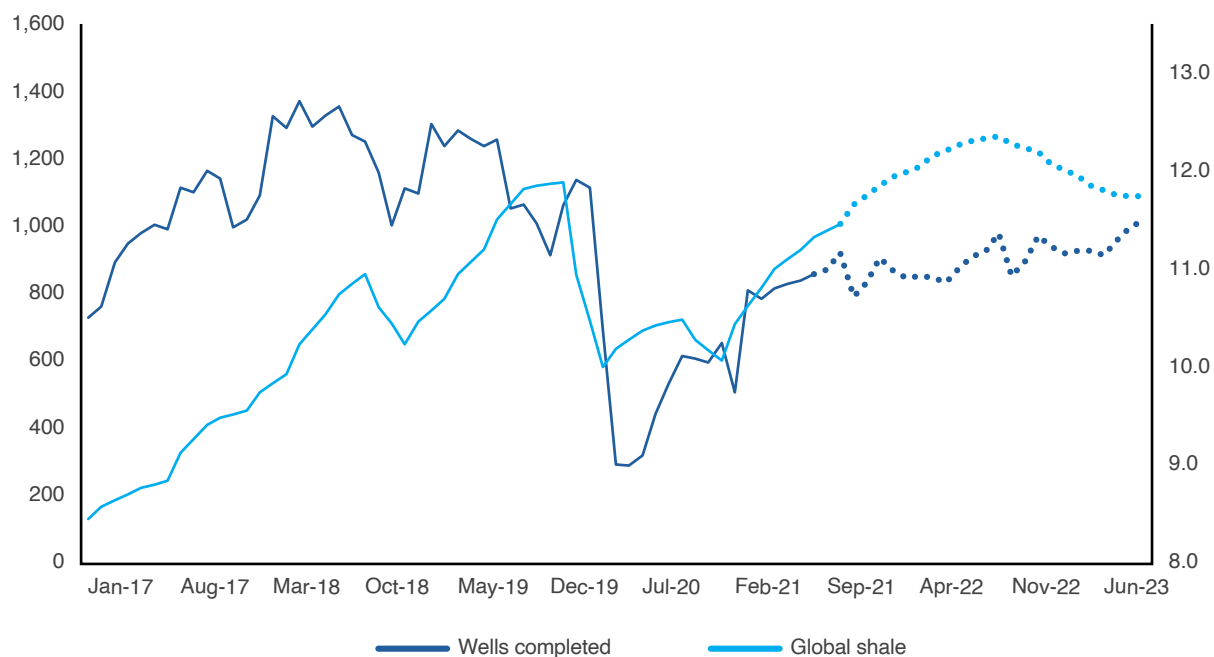
Vaca Muerta in Argentina is the fastest growing shale development on Earth now, showing that there could really be a future for shale outside the U.S. The Vaca Muerta development is orderly with support from the government and shows what can be accomplished with proper backing. The U.S. shale industry, on the other hand, started with many companies and individual land rights that allow for almost anyone to drill, causing explosive growth. But U.S. shale companies have recently been consolidating their assets. Shale development is starting to look closer to how a mature industry is run, with more focus on returns and less on growth.

The taming of the shale patch has also meant companies have had to be more sensitive to shareholders who have long tolerated breakneck growth but are now insisting on returns, constraining reinvestment rates and production growth. Now, higher prices are tempting many companies toward their former wildcat ways. The private firms (i.e., no shareholders) are driving growth, while the industry overall is starting to run low on its drilled-but-uncompleted (DUC) leftovers to maintain production. Pledges to stay conservative may become harder to maintain with continued high prices, and the argument “how can we create shareholder value if we don’t drill?” is gaining relevance. American international oil companies (IOCs) and large independents are buying the acreage of their European counterparts as the latter quietly exit the market. Therefore American IOCs must be optimistic that shale remains a viable investment.

This quarter, the KOMO report estimates that U.S. shale oil production will climb in 2021 by only 25 Kb/d and grow by a robust 840 Kb/d in 2022. The improvement for 2021 is partly from edits to historical data, along with a stronger performance this year. The 2022 increase is driven by current pricing trends and what *should* happen in response, even with our risk factors (especially investor caution) attempting to tamp them down.

As mentioned in many prior editions of the KOMO, there is a nervous energy in the industry now. Conflicting messaging from the White House, evolving regulations, public pressure, increased costs of labor and inputs are making it difficult to plan. Because shale has a shorter development cycle than conventional oil, shale companies might be more indecisive because they can always catch up later. For now, those that can drill will, while the bigger players might proceed cautiously until more clarity is available.

Monthly U.S. drilling activity (L) vs. global shale production (MMb/d) (R)



Source: KAPSARC, September 2021.

## Non-OPEC (tight oil and oil sands)

A bright spot for oilsands is the opening of the Enbridge Line 3 pipeline on October 1, which will allow 760 Kb/d to flow from Alberta into the U.S. pipeline system, replacing and expanding some existing export capacity. This is a welcome respite for oilsands producers, who are constantly worried about transportation problems. However, there is still a need for more and better pipelines to offset the use of expensive rail options to the U.S. and the Pacific. The Trans-Mountain Pipeline Extension to the Pacific would be of great help in expanding the market for oilsands, but there have been delays and protests, with the most recent blow coming in the form of the pipeline extension losing its insurer. Chubb Insurance exited the oilsands market after public pressure, along with many other insurance providers over the last year, making running and operating projects more difficult and/or expensive.

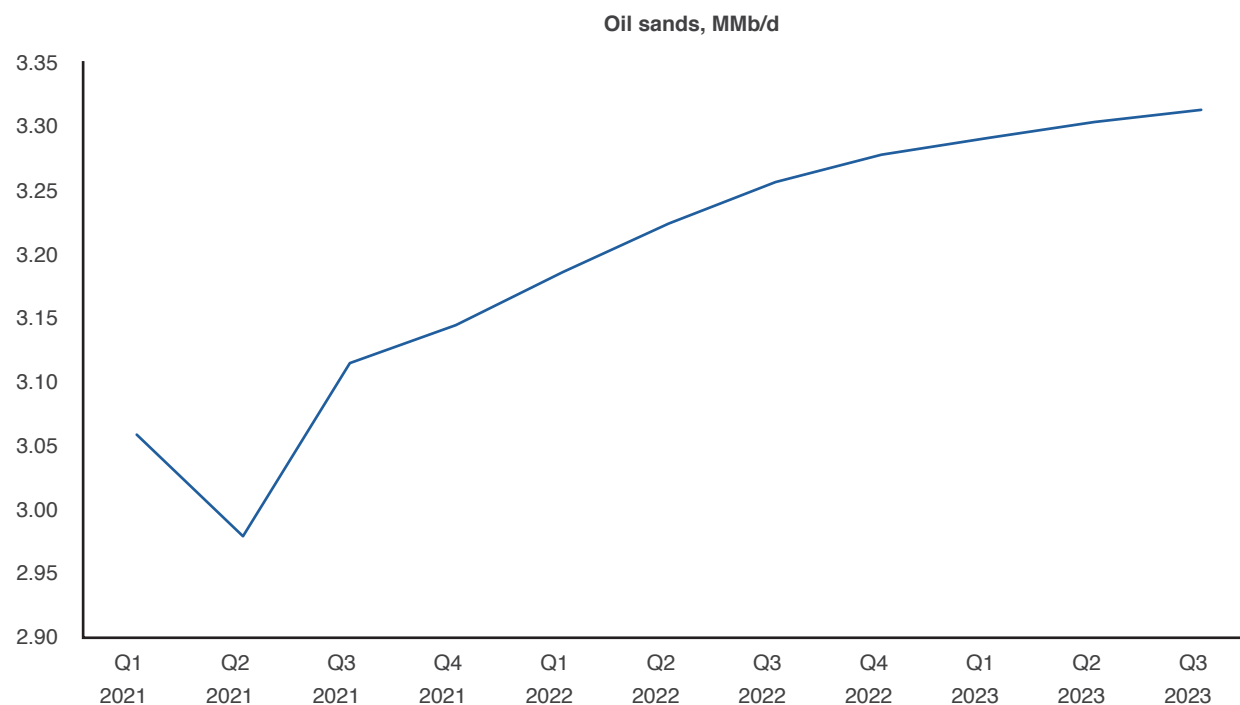
Environmental concerns around oilsands are nothing new, but the upcoming COP26 meeting may prove a particular challenge for the oilsands industry. There is a stark contrast between the industry's outwardly progressive and socially conscious image and the extremely heavy and carbon-intensive products it produces. Therefore, how the Canadian delegation proceeds will be interesting to watch. Environmentally sensitive European IOCs reduced their exposure to oilsands well before they began to do so with U.S. shale.

On a final positive note, bitumen exports to China could be the beginning of a growing option for Canadian

producers. Since this product is not considered crude, it falls outside any import quotas and evades some import taxes. While it is used primarily for producing asphalt, there could be a shift toward this option if Chinese quotas begin to bite.

Oil sands output in 2021 is expected to rise by about 300 Kb/d, helped by a recovery from shut-ins following

the COVID-19-related price collapse of 2020, and moderate to a slower 150 Kb/d in 2022. Compared with last quarter's forecast, this is slightly up for 2021, as Q3 showed a significant improvement over Q2. Going forward, reduced investment and logistics are the real limiting factors, so there is little change to the near-term upside for oilsands growth.



Source: KAPSARC, September 2021.

## Risk scenarios July 2021

\*The KOMO survey is conducted on a semi-annual basis in Q1 and Q3, with results holding over to the subsequent quarter.

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 gross domestic product (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.

Risk category	Item	Supply/ demand	Impact (Kb/d)	2021	2022	2023
Producer supply risks	OPEC releasing more than 1 MMb/d per quarter	Supply	↑ 200 - 400			
	Libya remains exempt	Supply	↓ 10 - 50			
	Shale rebound	Supply	↑ 0 - 100			
	Lifting Iran sanctions	Supply	↑ 20 - 140			
	Biden's stringent fossil fuel policies	Supply	↓ 100 - 220			
	Major conflict	Supply	↓ *			
	Brazil's production growth	Supply	↑ 10 - 30			
	Venezuela's production rebound	Supply	↑ 20 - 80			
	Oil investment growth	Supply	↑ **			
Demand risks	Prolonged economic crisis	Demand	↓ 250 - 1,500			
	50% of global population vaccinated	Demand	↑ 220 - 1,000			
	Asia recovering from Delta strain	Demand	↓ 180 - 500			
	Public transport changes	Demand	↓ 270 - 500			

OPEC return to pre-COVID-19 production levels	No	79%
Stimulus packages continue through 2022	Yes	71%
Strengthening U.S. dollar	No	71%
U.S./China trade war settlement	No	100%
Oil prices averaging 70 \$US/bbl in 2021 - 2022	Yes	57%

The results are based on a survey conducted biannually

\* Spare capacity held by OPEC+ is sufficient to cover all but the largest conflict-based oil disruptions

\*\* Used for market insight/sentiment considerations

## 2021 and 2022 balances

Given the recent changes to KOMO's supply/demand balances, as well as the recent price levels, we expect a deficit of 550 Kb/d in 2021 and a surplus in 2022 like that of 2020, of around 2.1 MMb/d.

The KOMO forecast is based on areas of agreement regarding OPEC+ production as well as the need for the group to act in a manner that minimizes a return to deeper cuts by its members. As a result, we have assumed that OPEC+ members will stick to their agreed plan from July and collectively increase production by 400 Kb/d per month through December. We assume they will then slow their production increases for 2022 while adjusting their baseline targets in May. If significant inventory increases happen and prices begin to weaken materially, the call for OPEC to moderate the market with a pause on production increases could move forward into Q4 2021 and well into 2022. However, we do not see that happening for at least the next two months.

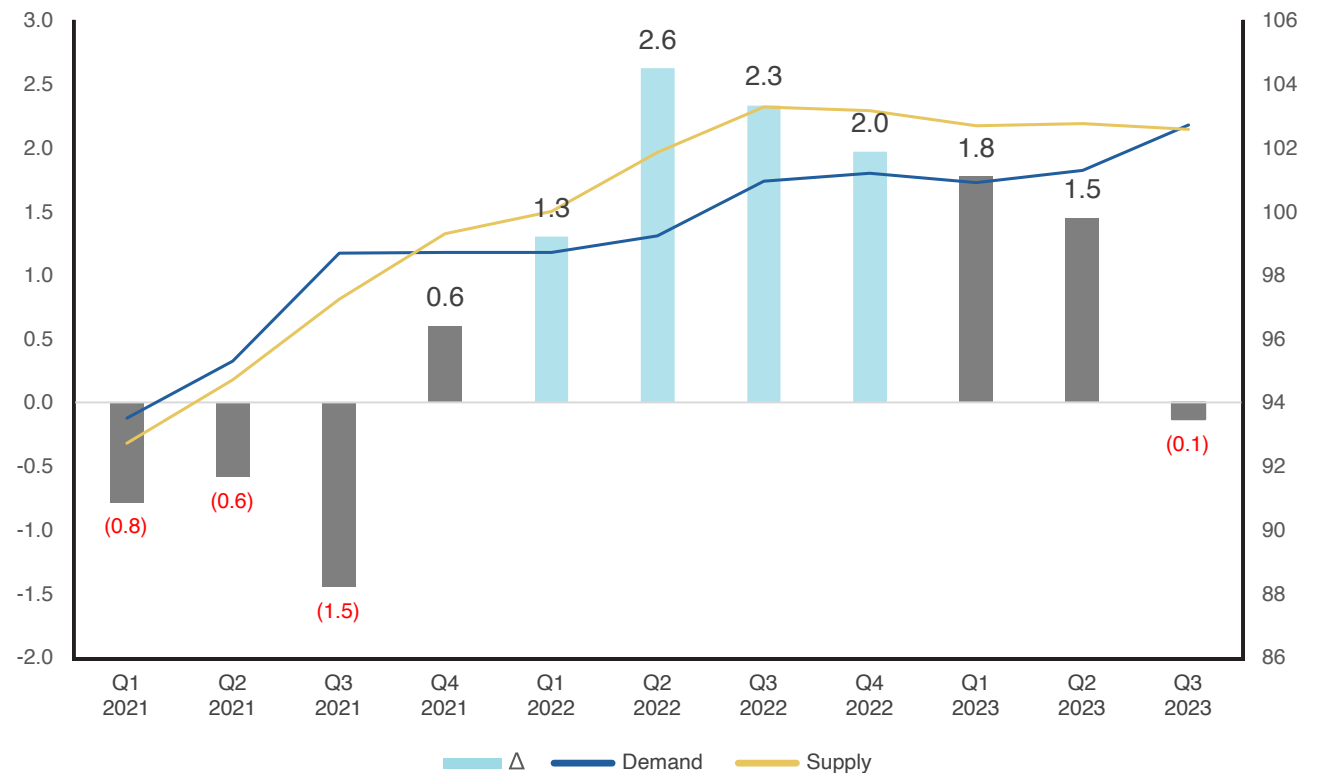
Furthermore, we assume that OPEC+ members comply with their stated cuts. This scenario is also highly contingent on the success of virus containment measures, continued economic stimulus packages, and a determination that new variants do not pose the significant risk of major future waves.

Since our outlook assumes continued high levels of spare capacity throughout the forecast interval, OPEC+

compliance rates are a known risk if pricing remains elevated, and/or if fiscal realities test the resolve of some members. While the group can preemptively

increase production from Q4 2021 to gain market share, such a strategy would further increase the already large inventory increases projected for 2022.

Quarterly supply demand balance, MMb/d, Q1 2021-Q3 2023



Source: KAPSARC, September 2021.

## Price fundamentals (inventories)

Price movements for the foreseeable future will continue to be mainly influenced by evolving inventory levels and demand growth. In this outlook we expect real inventory levels to remain above target inventories. Indeed, if the proposed adjustments by OPEC+ to increase production by 400 Kb/d a month is sustained to December 2021, we would expect inventories to return to saturation levels. Continued increases would create the need for OPEC+ to reverse course and reinstate some cuts later in 2022. However, seeing the unease of some members, it may be challenging to reinstate cuts once again. Hence, we assume that OPEC+ effectively pauses production in 2022 after baseline adjustments in May 2022.

Indeed, our assumptions lead to an excess of liquids throughout the next eight quarters. However, it is manageable and does not risk overflow levels. Changes in inventory levels for the remainder of this year are relatively balanced. Hence, we expect prices to remain rangebound this coming year, but they could come under pressure if large inventories materialize as we would expect under our OPEC+ behavioral assumptions, particularly in Q2 2022.

The KOMO model estimates that target OECD inventories will rise by 36 MMb in 2021 and by 36 MMb in 2022 as the market returns to more normal conditions. Real inventories, on the other hand, are expected to decline by 94 MMb in 2021 before rebounding by 259 MMb in 2022 as supply continues to exceed demand.

Target inventories vs. real inventories



Sources: EIA; KAPSARC, September 2021.

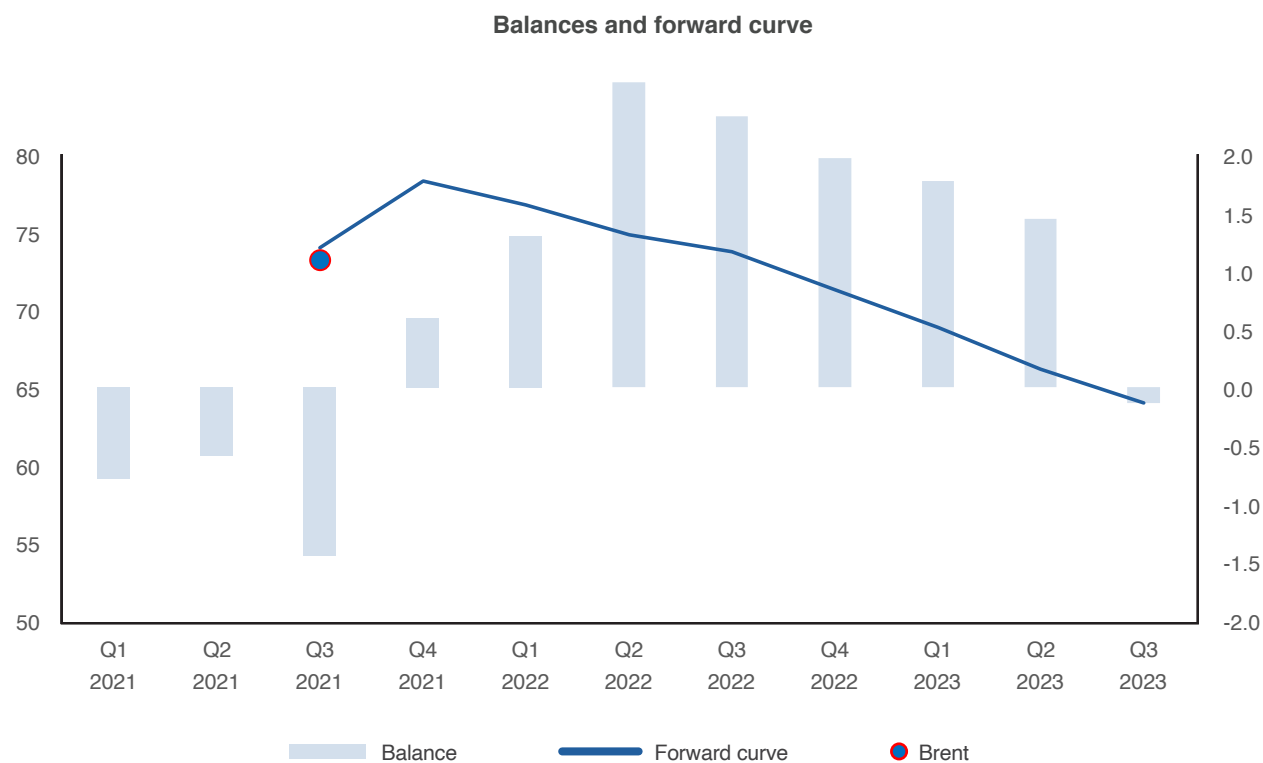
## Price fundamentals (Brent)

	Q4 2021	Q1 2022	Q2 2022	Q3 2022	Q4 2022	Q1 2023
<b>Bloomberg</b>	71.69	71.02	68.99	69.10	68.66	70.70
<b>Market sentiment</b>	67.17	66.50	67.50	69.00	67.00	65.00

	2021	2022	2023
<b>Bloomberg</b>	67.08	69.06	68.57
<b>Market sentiment</b>	67.39	67.00	

Source: Bloomberg, September 30, 2021.

\*Market sentiment is based on publicly available forecast data.



## Price fundamentals (forward and future curves)

The graph below depicts confidence intervals at 50%, 68%, and 95% levels derived from options market information for at-the-money options contracts.



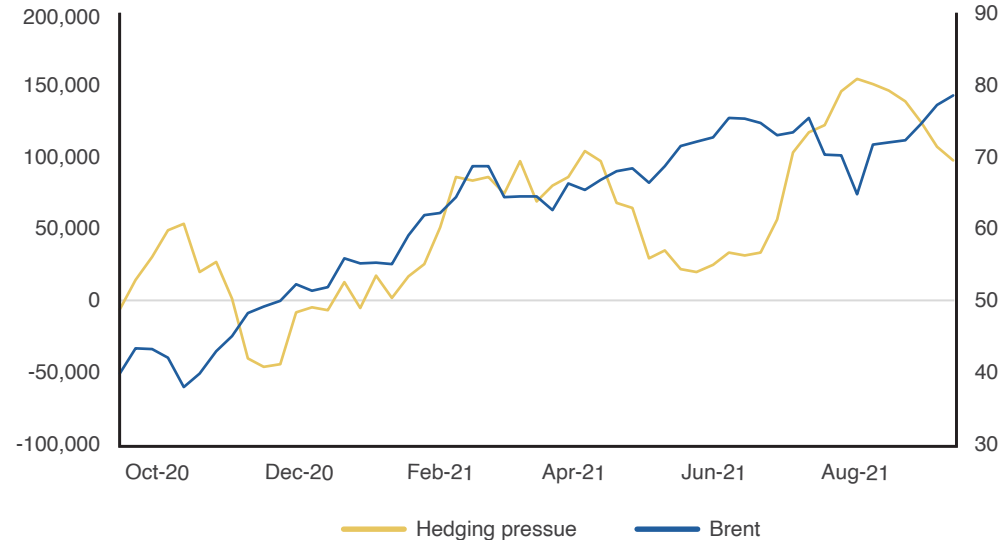
Sources: KAPSARC calculations based on NYMEX data, CME Group, FINCAD, October 2021.

## Price fundamentals (markets)

**Hedging pressure (HP):** The graph below shows the settlement price for Brent against hedging pressure. Hedging pressure is a measure of physical commercial (producers/merchants/processors/users) net short positions relative to net managed money long positions. It indicates a negative relationship between Brent prices and market hedgers. Given the recent Q3 spike in oil demand, which is expected to last for a few more weeks throughout Q4 of this year, and OPEC implementing gradual increases, it is easy to explain the current HP downward trajectory. However, we expect global demand to stagnate this quarter, and the risk of a surplus balance is expected to push HP upward.

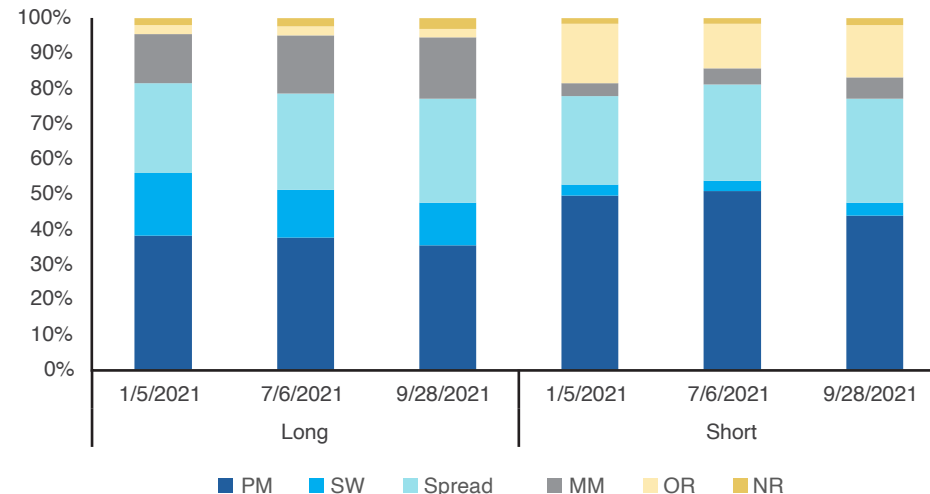
**Trader class shares:** Despite rising oil prices throughout the year, reaching \$80/b, trader shares have been declining (≈13%) since the beginning of the year. However, money managers (MM) have increased their short positions by around 132% compared with January (59,179 January 5, 2021 – 137,758 September 28, 2021). This suggests that MM are cognizant about the short-term bump in prices and expect them to eventually fall.

Weekly - hedging pressure (L) vs. ICE Brent price (R)



Source: Bloomberg, October 3, 2021.

Traders class shares of longs and shorts



Note: Refer to the glossary for abbreviations.  
Source: Bloomberg, October 3, 2021.



## Price fundamentals (markets)

**U.S. Dollar Index:** Although the U.S. Dollar Index (DXY) sometimes has a negative relationship with commodity prices, Brent and the U.S. dollar have both been trending upward recently. This has partly been fueled by an improved economic outlook for the U.S. alongside increased oil demand, which occur hand in hand. Indeed, the U.S. economy is improving relatively quickly compared with other parts of the world, and the expectation that the Federal Reserve will tighten interest rates sooner than other central banks supports the current index levels. Furthermore, and as stated in the summary of this report, inflation has been playing a role in this trend. Thus, both producers and the Fed have been signaling their intentions to increase both oil production and interest rates, respectively, to lessen the impact of anticipated continued inflation.

Daily - US \$ index and Bloomberg Index (L) vs. ICE Brent (R)



Source: Bloomberg, October 3, 2021.

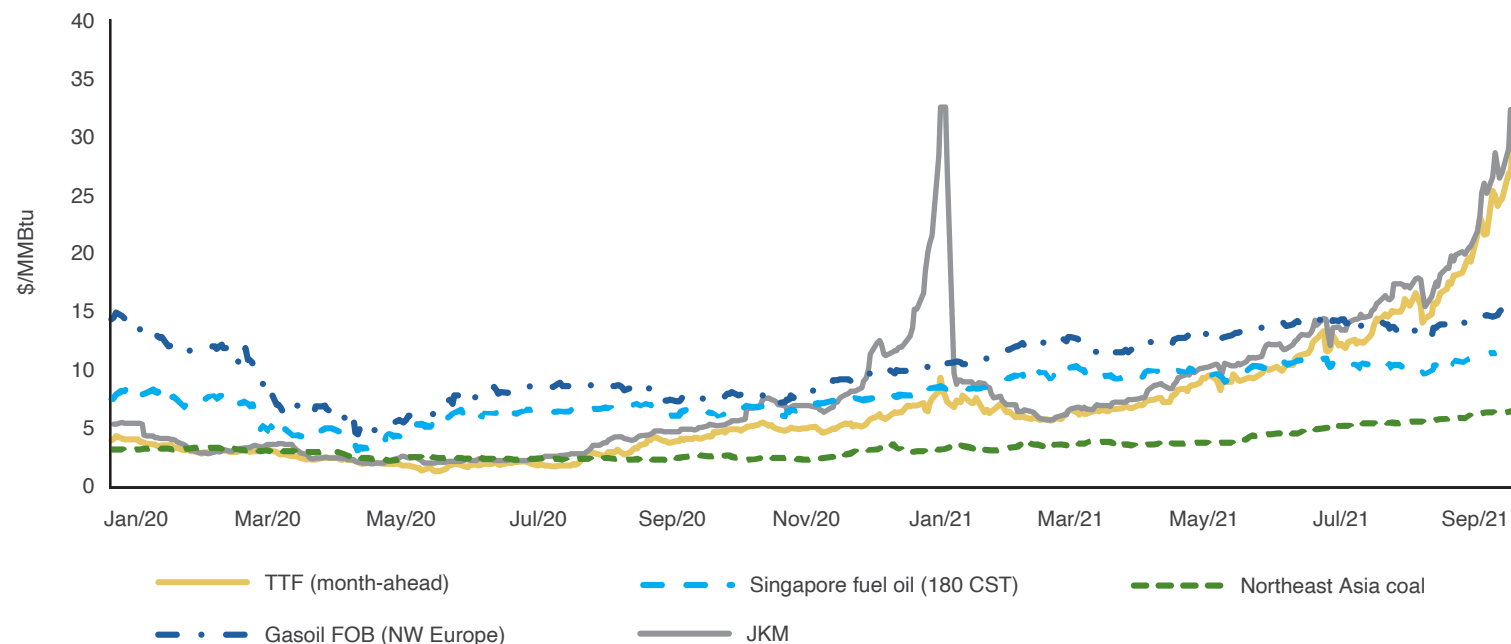
## Editorial: A cold winter season and the upside risk to energy prices

Contributed by Rami Shabaneh, KAPSARC

Tight supplies have stirred global gas markets into a frenzy in the run-up to winter, with both political and economic repercussions. In Europe, gas supplies during the storage injection season were insufficient to replenish inventories after a prolonged winter. Stronger summer demand on the back of coal-to-gas switching and a rebound in industrial activity exacerbated the gas shortage. As of the end of September, gas storage levels in Europe were about 18% lower than their five-year average.

Europe depends heavily on imported piped gas and LNG to balance its gas market. However, lower levels of gas flows from Russia and Norway resulted in Europe trying to outbid Asia for the marginal LNG cargo, driving prices upward. Prices for the month-ahead October contract at the Dutch Title Transfer Facility (TTF), a key gas trading hub in Europe, reached a daily high of over \$30 per million British thermal units (MMBtu), while the spot LNG Japan-Korea Marker (JKM) breached the \$33/MMBtu mark.

Energy prices of various fuels, January 2020 - September 2021



Sources: Bloomberg, S&P Global Platts, September 2021.

*Editorial: A cold winter season and the upside risk to energy prices...*

TTF and JKM prices jumped 92% and 86%, respectively, QoQ. U.S. gas prices also surged by 45% during the third quarter. Front-month gas prices at Henry Hub reached \$5.87/MMBtu on September 30, 2021 – their highest levels since February 2014. Despite the steady increase in Henry Hub prices, they are unlikely to rise to the current European and Asian prices as they are exporting close to their maximum potential of 10.5 billion cubic feet per day. The increase in gas prices has added upward pressure on the other energy commodities as fuel switching becomes an option. As electric heating is more dominant in Asia, demand for coal is expected to rise to substitute for higher-priced gas and meet any energy shortfall. The Platts Northeast Asia Thermal Coal Index showed a surge in the third quarter to \$5.4455/MMBtu, rising 43% QoQ and more than doubling in price YoY. In China, tight supplies of gas and coal during the winter could force power rationing, with the government diverting electric power use from the industrial to the residential sectors (Chen et al. 2021). Liquid fuels could also substitute for gas for heating and power, which would have a short-term impact on oil demand during the winter. Prices of fuel oil and liquefied petroleum gases in Asia have already increased due to fuel substitution (Cheong 2021). Power generated from middle distillates, such as diesel, could also be next in the merit-order curve. There are currently low inventories of diesel in Asia (Cheong 2021). Gas-to-oil switching will add momentum to the rising Asian middle distillate prices. The refining margins for 10 parts per million (ppm) gasoil in Asia improved to an average of \$9/b over Dubai crude in the third quarter, rising almost 18% QoQ. Any gas-to-diesel switching could have a significant price impact on middle distillates. Overall, according to analysts from Goldman Sachs and Bank of America, a cold winter could see anywhere between 1.8 MMb/d and 2 MMb/d of total oil demand being created via fuel switching.

How global gas prices play out over the next two quarters hinges on the severity of the winter and future flows of Russian gas to Europe. Despite the completion of Nord Stream 2 in September – a new 55 billion cubic meter capacity gas pipeline from Russia to Europe – getting final regulatory approvals from Germany is expected to further delay the commissioning of the pipeline. There has been a sigh of relief from Europe after Norway gave permission to Equinor to boost output from its gas fields to support European demand. However, more supplies are needed to deal with a colder winter than usual. This may have knock-on effects for the oil commodity complex through unusual crude oil and product trade flows leading to increased regional volatility, localized shortages and supply chain bottlenecks.

**References:**

Chen, Qian, Ann Koh, Stephen Stapczynski, Martin Ritchie, and Dan Murtaugh. 2021. “Global Energy Crunch Leaves China Facing More Power Shortages.” Bloomberg, September 16. Accessed September 21, 2021. <https://www.bloomberg.com/news/articles/2021-09-16/global-energy-crunch-leaves-china-facing-more-power-shortages?sref=q6DTe7mQ>.

Cheong, Serene. 2021. “Diesel Next in Line to Jump on Gas Rally Wagon.” Bloomberg, September 21.

## Editorial: SPR releases in important regions – a game of fundamentals

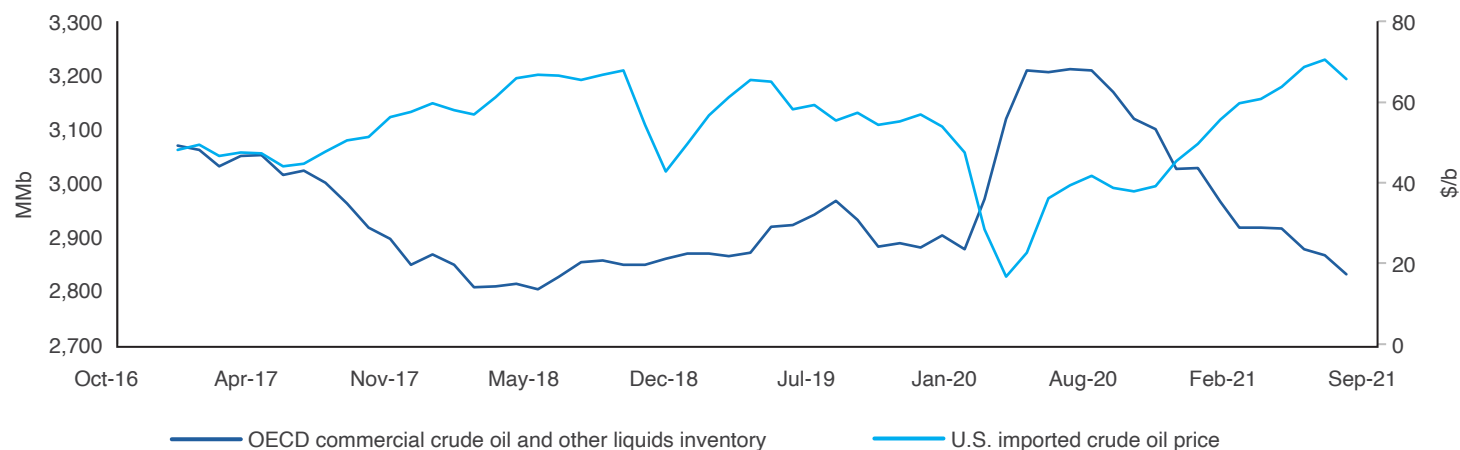
Contributed by Julio Arboleda, KAPSARC

The fundamentals of the oil market have brought the two most important Asian consumers to a risky standoff. The need to moderate oil prices has pushed India and China to release oil from their strategic petroleum reserves (SPRs). India is gambling hard by releasing 50% of its SPRs.

In April of 2020, the oil market experienced negative prices for the first time in history in one of its most important benchmarks, the WTI, due to the impact of COVID-19. This was a historic event that sounded the alarm for producers and consumers around the globe.

Depressed prices resulting from low demand under lockdown and restricted economic activities opened a unique opportunity for oil consuming countries, who decided it was time to fill their crude oil inventories and SPRs. Some countries, like China, saw this as an opportunity and filled their reserves as fast as possible. Wood Mackenzie estimates that Chinese crude stocks could reach 1.15 billion barrels or 83 days of oil demand, of which 550 MMb belongs to the country's SPR. However, not every country can take advantage of low prices because of limited storage capacity. India has a combined strategic oil reserve capacity of only 5.33 million tonnes (MMt) (39 MMb), or just 9.5 days. Including commercial crude oil and petroleum product inventories, India's buffer in an emergency is 74 days, far from the OECD's target capacity of 90 days.

OECD commercial crude oil and liquids inventories, MMb vs. U.S. imported crude oil price \$/b



Source: U.S. EIA, September 2021.

### *Editorial: SPR releases in important regions – a game of fundamentals...*

Global crude stocks reached record numbers in 2020. For example, OECD commercial inventories of crude oil and other liquids reached a historical high of 3,211 MMb in July 2020, or more than 84 days of demand. However, as supply adjustments helped crude oil prices recover, the rate of inventory growth was significantly reduced and eventually reversed.

Recently, as oil prices exceeded their pre-COVID levels during the first half of September, China's National Food and Strategic Reserves Administration, which manages its SPR, stated that it would start auctioning off stocks to control the rally in oil prices. These auctions will be held in phases and will help to supply integrated refining and chemical plants. With these historic declarations, China indicated that at least 7.38 MMb would be released in Q4, with a high chance of further releases, which had an immediate effect on oil prices.

China's actions to calm the market were offset by Hurricane Ida weeks later, which shut down production in the Gulf of Mexico (GoM), one of the most important oil-producing regions in the U.S. The supply interruption generated by the storm negated the impact of the Chinese declarations.

In response to this supply interruption, the U.S. government also released part of its SPR. On August 23, 2021, the U.S. Department of Energy (DoE) issued a price-competitive notice of sale for up to 20 MMb of SPR crude oil for delivery in Q4. The sale was awarded to eight companies, with delivery set for September. Additionally, the DoE approved oil loans totaling 3.3 MMb to refineries to prevent fuel shortages.

Global oil inventories are decreasing fast, and some countries are speculating on price movements while releasing their SPRs. At some point the inventory volumes must be replenished. In these unpredictable circumstances, countries that are aggressively drawing down their SPRs are playing a risky game.

## Editorial: Is a spillover from the real estate sector to the oil market around the corner?

Contributed by Fatih Karanfil, KAPSARC

After being at the epicenter of the COVID-19 crisis, China is in the spotlight again as the second-largest real estate developer in the country, Evergrande, is struggling to avoid defaulting on more than \$300 billion of debt. Fears of contagion through global markets are spreading as the collapse of a corporate titan can create a domino effect in the failures of many financial institutions. Evergrande is ranked 122 in the 2021 Fortune Global 500, as measured by revenue. This editorial offers a few thoughts about how contagious the current and future crises would be for the global economy and the implications they would have for the world oil market.

In China, the share of real-estate-related activities in GDP has been around 30% for the last 10 years. This share is far larger than those of developed countries (e.g., 19% and 17% in France and the U.S., respectively [Rogof and Yang 2020]). Evergrande maintains a significant stake in the Chinese property sector. It has over 1,300 projects in more than 280 cities across China. If Evergrande defaults, this could be a significant hit to the Chinese economy. Rogof and Yang (2020) estimate that a 20% fall in real estate activity in China could lead to a 5%-10% fall in the country's GDP. This impact would be even larger with an associated banking crisis.

Many banks and international financial institutions are exposed to the risk of a possible default by Evergrande through loans or investments. Another global impact of China's struggling real estate sector would be on the metals industry. Expectations that the world's biggest consumer of metals (and second-largest economy) would eventually decrease its demand bring uncertainty to the commodities market and would cause downward pressure on metal prices. Where there is uncertainty, there is volatility. At this point, the literature has well documented the co-movement and significant transmission of volatility between metals and oil prices (e.g., Behmiri et al. 2019). Hence, if the current situation worsens, we can expect oil prices to react accordingly during the last quarter of this year.

The above scenario reminds us of the Global Financial Crisis (GFC) of 2008, triggered by the failure of Lehman Brothers with \$619 billion in debts. In the second half of 2008, when expectations for the global outlook became pessimistic, the demand for crude oil dropped sharply. As Baumeister and Kilian (2016) indicate, shifts in oil demand may be larger than the changes in global real GDP, since a major part of GDP consists of consumption, which may maintain a relatively stable level. During the GFC, the overall effect of the crisis on oil prices was significant: they collapsed from \$134/b in June 2008 to \$39/b in February 2009.

Whether or not Evergrande will send another Lehman Brothers-like shock wave across the global economy will depend on how the Chinese government handles the crisis. What is much more certain, however, is that, as Daniel Yergin (2011) argues in his book *The Quest*, oil is no longer only a physical commodity but also a financial instrument. Hence, as Yergin argues, its "price is shaped by what happens both in the physical and financial markets." As a result, financial distress caused by a sudden and unanticipated collapse of a large corporation not only affects global oil market fundamentals, it also introduces significant noise into the financial markets, which makes forecasting oil prices a challenging task.

*Editorial: Is a spillover from the real estate sector to the oil market around the corner?...*

#### References:

Baumeister, Christiane, and Lutz Kilian. 2016. "Forty years of oil price fluctuations: Why the price of oil may still surprise us." *Journal of Economic Perspectives* 30 (1): 139-60.

Behmiri, Niaz Bashiri, Matteo Manera, and Marcella Nicolini. 2019. "Understanding dynamic conditional correlations between oil, natural gas and non-energy commodity futures markets." *The Energy Journal* 40 (2): 55-76.

Rogoff, Kenneth S., and Yuanchen Yang. 2020. "Peak China Housing." National Bureau of Economic Research, No. w27697.

Yergin, Daniel. 2011. *The Quest: Energy, security, and the remaking of the modern world*. Penguin.



# Appendix



## World oil demand, Q1 2021 - Q3 2023 (MMb/d)

		2020	Q1	Q2	Q3	Q4	2021	Q1	Q2	Q3	Q4	2022	Q1	Q2	Q3	
Americas	OECD	United States	19.0	19.3	19.9	20.8	20.9	20.2	20.6	20.5	20.6	20.6	20.7	20.9	21.3	
		Canada	2.2	2.2	2.2	2.4	2.5	2.4	2.5	2.4	2.5	2.5	2.5	2.5	2.5	2.6
		Mexico	1.6	1.6	1.8	1.8	1.9	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
		Chile	0.3	0.3	0.3	0.4	0.4	0.3	0.4	0.4	0.3	0.3	0.4	0.3	0.4	0.4
		<b>Total</b>	<b>23.2</b>	<b>23.5</b>	<b>24.3</b>	<b>25.3</b>	<b>25.7</b>	<b>24.7</b>	<b>25.3</b>	<b>25.1</b>	<b>25.4</b>	<b>25.3</b>	<b>25.3</b>	<b>25.5</b>	<b>25.6</b>	<b>26.1</b>
	Non-OECD	Argentina	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.6	0.6	0.6	0.6	0.6	0.6
		Brazil	2.9	2.9	3.0	3.1	3.1	3.0	3.0	3.0	3.1	3.1	3.0	3.0	3.1	3.2
		Venezuela	0.3	0.3	0.3	0.4	0.4	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
		RO Latin America	2.2	2.2	2.3	2.4	2.4	2.3	2.4	2.4	2.5	2.5	2.4	2.4	2.5	2.5
		<b>Total</b>	<b>6.0</b>	<b>5.9</b>	<b>6.3</b>	<b>6.5</b>	<b>6.5</b>	<b>6.3</b>	<b>6.3</b>	<b>6.5</b>	<b>6.6</b>	<b>6.5</b>	<b>6.5</b>	<b>6.4</b>	<b>6.6</b>	<b>6.7</b>
<b>Total Americas</b>		<b>29.2</b>	<b>29.4</b>	<b>30.5</b>	<b>31.8</b>	<b>32.2</b>	<b>31.0</b>	<b>31.6</b>	<b>31.6</b>	<b>31.9</b>	<b>31.9</b>	<b>31.8</b>	<b>31.9</b>	<b>32.2</b>	<b>32.9</b>	
Europe	OECD	Germany	2.2	2.1	2.2	2.4	2.3	2.2	2.3	2.3	2.4	2.3	2.3	2.3	2.4	
		France	1.5	1.6	1.6	1.7	1.7	1.6	1.7	1.6	1.7	1.7	1.7	1.7	1.7	
		United Kingdom	1.3	1.2	1.3	1.4	1.5	1.3	1.4	1.4	1.4	1.4	1.4	1.4	1.5	1.5
		Poland	0.7	0.6	0.7	0.7	0.7	0.7	0.6	0.7	0.7	0.7	0.7	0.7	0.7	0.8
		Turkey	0.9	0.8	0.9	1.0	1.0	0.9	0.9	1.0	1.0	0.9	1.0	0.9	1.0	1.1
		RO OECD Europe	6.0	6.1	6.2	6.6	6.3	6.3	6.5	6.5	6.5	6.8	6.6	6.7	6.7	6.8
	<b>Total OECD Europe</b>	<b>12.5</b>	<b>12.3</b>	<b>12.8</b>	<b>13.8</b>	<b>13.5</b>	<b>13.1</b>	<b>13.4</b>	<b>13.5</b>	<b>13.8</b>	<b>13.8</b>	<b>13.6</b>	<b>13.7</b>	<b>13.9</b>	<b>14.3</b>	
Asia-Oceania	OECD	Australia	1.0	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.2	1.1	1.1	1.2	
		Japan	3.4	3.4	3.4	3.5	3.5	3.5	3.8	3.2	3.3	3.8	3.5	4.0	3.3	3.4
		Republic of Korea	2.4	2.6	2.4	2.4	2.5	2.5	2.7	2.5	2.5	2.8	2.6	2.8	2.6	2.6
		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
		<b>Total</b>	<b>7.0</b>	<b>7.3</b>	<b>7.0</b>	<b>7.2</b>	<b>7.3</b>	<b>7.2</b>	<b>7.7</b>	<b>6.9</b>	<b>7.2</b>	<b>7.9</b>	<b>7.4</b>	<b>8.1</b>	<b>7.1</b>	<b>7.2</b>
	Non-OECD	China	13.6	14.9	14.5	14.5	14.8	14.7	14.9	15.2	15.0	15.4	15.1	15.3	15.5	15.1
		India	4.5	4.9	4.7	4.6	4.9	4.8	5.1	5.1	4.8	5.2	5.1	5.3	5.3	5.0
		Indonesia	1.6	1.7	1.7	1.8	1.8	1.7	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9
		RO Asia	6.4	6.9	6.8	7.0	6.9	6.9	7.3	7.3	7.8	7.8	7.5	7.9	7.7	7.7
		<b>Total</b>	<b>26.2</b>	<b>28.4</b>	<b>27.7</b>	<b>27.9</b>	<b>28.3</b>	<b>28.1</b>	<b>29.1</b>	<b>29.5</b>	<b>29.5</b>	<b>30.2</b>	<b>29.6</b>	<b>30.4</b>	<b>30.4</b>	<b>29.8</b>
<b>Total Asia</b>		<b>33.2</b>	<b>35.7</b>	<b>34.7</b>	<b>35.0</b>	<b>35.6</b>	<b>35.3</b>	<b>36.8</b>	<b>36.4</b>	<b>36.7</b>	<b>38.1</b>	<b>37.0</b>	<b>38.5</b>	<b>37.5</b>	<b>37.0</b>	
Middle East	OECD	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	
	Bahrain	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	
	Iraq*	0.7	0.7	0.8	0.8	0.7	0.7	0.7	0.8	0.9	0.7	0.8	0.7	0.7	0.8	
	Kuwait	0.6	0.5	0.6	0.7	0.6	0.6	0.5	0.6	0.8	0.5	0.6	0.5	0.5	0.7	
	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	0.2	
	Saudi Arabia	2.8	2.5	3.0	3.3	2.7	2.9	2.5	3.1	3.4	2.8	2.9	2.5	3.1	3.4	
	Qatar	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	
	UAE	1.0	0.9	1.0	1.0	1.0	1.0	0.9	1.1	1.0	1.0	1.0	0.9	0.9	0.9	
	<b>Total GCC</b>	<b>5.6</b>	<b>5.0</b>	<b>5.9</b>	<b>6.4</b>	<b>5.6</b>	<b>5.7</b>	<b>5.2</b>	<b>6.1</b>	<b>6.7</b>	<b>5.6</b>	<b>5.9</b>	<b>5.1</b>	<b>5.8</b>	<b>6.3</b>	
	Iran	1.8	1.7	1.7	1.6	1.6	1.6	1.7	1.7	1.7	1.7	1.7	1.8	1.8	1.7	
	RO Middle East	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	0.5	
	<b>Total</b>	<b>7.9</b>	<b>7.1</b>	<b>8.0</b>	<b>8.5</b>	<b>7.6</b>	<b>7.8</b>	<b>7.3</b>	<b>8.2</b>	<b>8.8</b>	<b>7.7</b>	<b>8.0</b>	<b>7.3</b>	<b>8.0</b>	<b>8.5</b>	
	<b>Total Middle East</b>		<b>8.1</b>	<b>7.3</b>	<b>8.2</b>	<b>8.7</b>	<b>7.9</b>	<b>8.0</b>	<b>7.6</b>	<b>8.4</b>	<b>9.1</b>	<b>7.9</b>	<b>8.3</b>	<b>7.5</b>	<b>8.3</b>	<b>8.7</b>
Africa	Non-OECD	Egypt	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	
		South Africa	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.5	0.6	0.6	0.5	
		Other Africa	2.5	2.6	2.6	2.4	2.6	2.5	2.7	2.7	2.4	2.7	2.6	2.8	2.8	2.5
	<b>Total Africa</b>		<b>3.6</b>	<b>3.7</b>	<b>3.7</b>	<b>3.5</b>	<b>3.7</b>	<b>3.6</b>	<b>3.8</b>	<b>3.8</b>	<b>3.6</b>	<b>3.8</b>	<b>3.8</b>	<b>4.0</b>	<b>3.9</b>	<b>3.7</b>
Eurasia	Non-OECD	Russia	3.4	3.4	3.5	3.8	3.8	3.6	3.6	3.5	3.8	3.7	3.7	3.6	3.9	
		RO Eurasia	2.1	1.7	1.9	2.1	2.0	1.9	1.8	1.9	2.1	2.0	2.0	1.8	2.0	2.2
	<b>Total Eurasia</b>		<b>5.6</b>	<b>5.1</b>	<b>5.4</b>	<b>5.9</b>	<b>5.8</b>	<b>5.6</b>	<b>5.4</b>	<b>5.5</b>	<b>5.9</b>	<b>5.7</b>	<b>5.6</b>	<b>5.4</b>	<b>5.5</b>	<b>6.1</b>
<b>Global Demand</b>		<b>92.1</b>	<b>93.5</b>	<b>95.3</b>	<b>98.7</b>	<b>98.7</b>	<b>96.5</b>	<b>98.7</b>	<b>99.2</b>	<b>100.9</b>	<b>101.2</b>	<b>100.0</b>	<b>100.9</b>	<b>101.3</b>	<b>102.7</b>	

## World oil supply, Q1 2021 - Q2 2023 (MMb/d)

	2021 Q1	2021 Q2	2021 Q3	2021 Q4	2022 Q1	2022 Q2	2022 Q3	2022 Q4	2023 Q1	2023 Q2	2023 Q3
Africa	7.42	7.38	7.42	7.61	7.69	7.73	7.73	7.68	7.59	7.50	7.43
Americas	31.47	33.35	33.89	34.04	34.28	34.95	35.35	35.04	34.43	34.41	34.18
Asia	9.32	9.26	9.28	9.19	9.16	9.14	9.12	9.09	9.04	8.98	8.92
Eurasia	13.38	13.61	13.60	14.44	14.60	14.93	15.22	15.29	15.36	15.41	15.46
Europe	4.38	3.91	4.34	4.31	4.33	4.37	4.42	4.48	4.54	4.58	4.59
Middle East	26.75	27.20	28.71	29.71	29.95	30.73	31.43	31.59	31.72	31.87	32.01
<b>Total</b>	<b>92.72</b>	<b>94.71</b>	<b>97.24</b>	<b>99.30</b>	<b>100.01</b>	<b>101.85</b>	<b>103.27</b>	<b>103.17</b>	<b>102.68</b>	<b>102.74</b>	<b>102.58</b>
	2021 Q1	2021 Q2	2021 Q3	2021 Q4	2022 Q1	2022 Q2	2022 Q3	2022 Q4	2023 Q1	2023 Q2	2023 Q3
Conventional	67.65	68.68	70.56	72.33	72.70	73.79	74.72	74.78	74.73	74.68	74.63
Extra heavy oil	3.23	3.27	3.30	3.31	3.34	3.38	3.40	3.39	3.35	3.31	3.21
Oil sands	3.06	2.98	3.11	3.14	3.18	3.22	3.26	3.28	3.29	3.30	3.31
Oil shale (kerogen)	0.03	0.03	0.03	0.04	0.04	0.05	0.05	0.05	0.05	0.06	0.06
Other liquids	6.37	6.47	6.66	6.60	6.42	6.86	7.07	6.84	6.67	7.10	7.29
Tight oil	10.06	10.81	11.19	11.46	11.85	12.04	12.27	12.35	12.19	11.95	11.75
Unconventional gas	2.31	2.47	2.38	2.41	2.48	2.52	2.51	2.47	2.40	2.34	2.33
<b>Total</b>	<b>92.72</b>	<b>94.71</b>	<b>97.24</b>	<b>99.30</b>	<b>100.01</b>	<b>101.85</b>	<b>103.27</b>	<b>103.17</b>	<b>102.68</b>	<b>102.74</b>	<b>102.58</b>
	2021 Q1	2021 Q2	2021 Q3	2021 Q4	2022 Q1	2022 Q2	2022 Q3	2022 Q4	2023 Q1	2023 Q2	2023 Q3
Algeria	0.87	0.88	0.92	0.95	0.95	0.96	0.96	0.96	0.96	0.96	0.96
Angola	1.11	1.08	1.09	1.11	1.12	1.11	1.11	1.09	1.07	1.05	1.03
Congo	0.28	0.27	0.26	0.25	0.25	0.25	0.25	0.24	0.24	0.24	0.23
Equatorial Guinea	0.11	0.12	0.12	0.11	0.10	0.10	0.10	0.09	0.08	0.07	0.06
Gabon	0.16	0.17	0.18	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
Iran	2.18	2.47	2.52	2.60	2.71	2.83	2.96	3.09	3.23	3.34	3.44
Iraq	3.94	3.98	4.08	4.22	4.23	4.32	4.39	4.40	4.41	4.42	4.42
Kuwait	2.33	2.36	2.46	2.53	2.53	2.61	2.68	2.68	2.68	2.68	2.68
Libya	1.18	1.16	1.20	1.22	1.19	1.18	1.18	1.18	1.19	1.20	1.21
Nigeria	1.31	1.32	1.24	1.33	1.41	1.45	1.47	1.47	1.45	1.43	1.40
Saudi Arabia	8.36	8.40	9.45	9.92	9.92	10.17	10.41	10.41	10.41	10.41	10.41
UAE	2.61	2.65	2.77	2.86	2.86	3.02	3.17	3.17	3.17	3.17	3.17
Venezuela	0.52	0.53	0.52	0.59	0.64	0.68	0.71	0.73	0.75	0.75	0.76
Oil field production	24.96	25.39	26.82	27.86	28.08	28.85	29.54	29.68	29.79	29.88	29.93
Other production	5.29	5.27	5.36	5.56	5.67	5.73	5.75	5.73	5.69	5.68	5.69
<b>OPEC</b>	<b>30.25</b>	<b>30.66</b>	<b>32.18</b>	<b>33.42</b>	<b>33.75</b>	<b>34.58</b>	<b>35.29</b>	<b>35.41</b>	<b>35.48</b>	<b>35.56</b>	<b>35.63</b>
	2021 Q1	2021 Q2	2021 Q3	2021 Q4	2022 Q1	2022 Q2	2022 Q3	2022 Q4	2023 Q1	2023 Q2	2023 Q3
Call on OPEC	31.04	29.45	28.44	27.62	27.24	26.23	25.52	25.75	26.31	26.32	26.55
OPEC	30.25	30.66	32.18	33.42	33.75	34.58	35.29	35.41	35.48	35.56	35.63
OPEC Partner	15.23	15.44	15.41	16.29	16.44	16.78	17.08	17.16	17.23	17.28	17.33
Non-OPEC	47.23	48.61	49.65	49.60	49.82	50.49	50.90	50.60	49.97	49.90	49.63
<b>Total</b>	<b>92.72</b>	<b>94.71</b>	<b>97.24</b>	<b>99.30</b>	<b>100.01</b>	<b>101.85</b>	<b>103.27</b>	<b>103.17</b>	<b>102.68</b>	<b>102.74</b>	<b>102.58</b>

## Glossary

<b>MMb/d</b>	Million barrels of oil per day
<b>Kb/d</b>	Thousand barrels of oil per day
<b>Target inventories</b>	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.
<b>Real inventories</b>	Represents the real inventory levels based on KOMO's forecast of supply/demand and inventory surplus/deficit balances.
<b>Hedging pressure</b>	<p>HP = PMnS – MMnL, where PMnS is producer/merchant/processor/user net short, and MMnL is managed money net long.</p> <p>Note that HP is always positive, meaning that managed money net longs are insufficient to meet all of the desired hedging of the PM traders. Also, a negative relationship between price and HP is expected. This is because as HP increases, there is expected to be downward pressure on price: more shorts seeking counterbalancing longs will put downward pressure on the price. The increased hedging pressure costs the short hedgers more because they have to accept lower prices.</p>
<b>PM</b>	Producers/merchants/processors/users
<b>SW</b>	Swap dealers
<b>MM</b>	Managed money
<b>OR</b>	Other reporters
<b>NR</b>	Non-reporters
<b>OPEC partners</b>	Azerbaijan, Bahrain, Brunei, Kazakhstan, Malaysia, Mexico, Oman, Russia, South Sudan and Sudan

## About KAPSARC

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KOMO usually uses the IMF's GDP forecasts. However, due to the timing of this publication, Oxford Economics' GDP forecast numbers were used, rather than those of the IMF.

Same information as of September 2021 was used in the preparation of this Report.



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