KAPSARC
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King Abdullah Petroleum Studies and Research Center

KAPSARC Oil Market Outlook (KOMO)

Q3, 2022

Summary

This quarter's highlights:

Despite great uncertainty in oil markets, a reduction in expected supply from Russia, and a reduction in global demand since our previous quarterly outlook, we expect oil supply growth to continue in 2022, with production coming close to parity with demand in 2022 and exceeding it in 2023. Though current high oil prices should encourage greater production and less consumption, supply risks are largely to the upside and demand risks are mainly to the downside, both of which would push prices lower.

Global oil markets have rebounded from a massive demand decline triggered by COVID-19, but there is still a high degree of uncertainty facing the industry. From the spring of 2020, when OPEC+ agreed to supply cuts of 10 million barrels per day (MMb/d) to help balance an oil market where prices hovered near $30 per barrel, to the spring of 2022, when the United States (U.S.) announced releases from its Strategic Petroleum Reserve (SPR), alongside other countries announcing similar measures. These releases amounted to over 1 MMb/d amid prices well over $100 per barrel, causing the supply and demand ratio to dramatically reverse course. This has made projections uncertain and analyzing the drivers more important. Thus, in this quarter's oil market outlook we seek to draw attention to the drivers of change as well as to the forecasts themselves, since we anticipate that future events could significantly alter the projections presented here.

The drivers of this quarter's demand outlook could indicate both higher and lower global demand. Lower demand is indicated by continued fears over the Russian-Ukrainian conflict, continued high energy prices, the growing power of the U.S. dollar (US$) and rising interest rates. However, these factors are countered by the summer driving and traveling season, strong aviation demand, China easing its COVID-19 lockdown measures, and higher demand for crude and other fuels as Europe restocks its inventories in preparation for winter amid uncertain Russian supplies.

On supply balances, during Q3, we anticipate a significant quarter-on-quarter (QoQ) growth in OECD consumption of roughly 1.61 MMb/d, after the declines of the past two quarters. Oil demand growth in non-OECD countries, which contributed more toward demand growth in the last quarter (Q2), is expected to slow to roughly 250 thousand barrels per day (Kb/d) in Q3. consumption growth is led by Saudi Arabia, with an expected additional 380 Kb/d for cooling and electricity generation, followed by the U.S. with an expected growth of 320 Kb/d due to its summer driving season, and China in third place as the country starts easing its COVID-19 lockdown measures.

On the supply side, 2.2 MMb/d of net global growth is expected this quarter (Q3). This is the highest level of QoQ growth in several years. Unusually, 1.33 Mb/d of this is expected to come from the release of SPRs, which is estimated to end by September or October. Production growth, however, is only projected to be 870 Kb/d. Even more surprising is that non-OPEC+ will represent 68% of that production growth. Indeed, as OPEC members experience net-QoQ growth of 640 Kb/d, OPEC+ sees only 280 Kb/d growth, as production declines come from OPEC partners, mainly Russia. As the Russia-Ukraine conflict drags on and Europe reduces purchases of Russian oil, Russian production may suffer a 5% decline this quarter unless Russia finds other ways to expand its oil trade further east. Recent reports have indicated that trade flows from Russia to the east have been growing since March.

Summary continued...

Total global oil consumption is still expected to increase year-on-year (YoY) by 2.15 million barrels per day (MMb/d) in 2022 to 99.8 MMb/d, but this is 320 thousand barrels per day (Kb/d) less than our previous forecast in Q2 2022. It is expected to grow by a further 2.16 MMb/d in 2023, 30 Kb/d more than our last assessment in Q2 2022. While continued recovery from global COVID-19 drives oil demand growth through 2023, the downward revision for H2 2022 results from greater clarity about the persistence of the factors that pushed demand down in the first half of 2022. These include a rising United States (U.S.) dollar, the Russian-Ukrainian conflict and the recent COVID-19 lockdowns in China. Strengthening economy-wide demand, encouraged by elevated financial liquidity, has encountered continued supply chain disruptions and tightening labor markets in both the developed and developing world. Inflation continues across a wide array of commodities, but especially in energy commodities, as production is not yet able to catch up to demand growth. Additionally, refining capacities remain below their average levels, adding an extra layer of price pressure. As a result, not only did we reduce our expectations for oil demand growth in H2 2022, but our projections for 2023 remain moderated by recession risk with a potential to bounce back stronger if the economic forecast improves.

Economic growth expectations remain the greatest driver of KAPSARC's Oil Model Outlook (KOMO) oil demand. The International Monetary Fund (IMF) predicts global economic growth of around 3.6% in 2022 and 3.6% in 2023 (its estimate for 2022 was 4.9%). The OECD has also revised its global growth forecast for 2022 down to 3% (1.5% less than its December forecast) and expects 2023 to witness growth of 2.8% (0.4% lower than its December forecast).

Lower economic growth, including the risks of both recession and stagflation, represents a significant downside risk to the KOMO oil demand forecast. Stagflation is when an economy suffers from high unemployment and high inflation while economic growth remains stagnant. Part of KOMO's methodology is to conduct a biannual survey that feeds into the forecast. The survey posed the following question, "After Sri Lanka, do you expect economic downturns in other developing countries?" with 100% of respondees answering "Yes." Although the risk of an economic downturn in a few developing countries may not alter global economic growth, the risk is non-negligible and could impact oil demand. Furthermore, recent outlooks and reports by agencies such as the OECD, the IMF, the United Nations (UN), among others, have signalled that current rising food and energy prices, and tougher financial conditions, are impacting multiple economies. On April 13, 2022, a UN report, "Global Impact of war in Ukraine on food, energy and finance systems," stated that 69 economies are facing this trilemma, of which 19 are in Latin America, 25 are in the Asia-Pacific, and the remaining 25 are in Africa. Together they represent over one-quarter of all countries. We now see the same risks growing in several developed countries. Why is this happening?

It is crucial to understand that after the financial crisis in 2008/2009, economies eased financial conditions and kept interest rates low in order to induce economic activity. During that period, economies flourished, and supply chains were healthy and able to keep up with demand. Investments have also been doing well, but there was a structural shift with regards to shale and the upstream sector. Investors opted to shift supply-securing projects from long-term projects to short-term market opportunities. Simultaneously, increasing climate concerns after the Paris Agreement have led to a general de-investment across all fossil fuel sectors.

Summary continued...

These two trends have combined to leave the industry relatively under - resourced and exposed to shocks. When COVID-19 hit, the upstream sector was already vulnerable.

Governments had to limit the economic damage inflicted in the COVID-19 era. Some printed money whereas others supported their industries. However, people had to stay at home, and much of the middle class and most vulnerable communities were impacted. Many businesses had to shut down for prolonged periods. Other industries that focus on services have not yet recovered. While liquidity remained somewhat healthy, production levels and supply chains were unable to keep up. Since some aspects of the services industry remained limited, such as tourism, much of that liquidity was directed to financial markets or other assets and commodities. As a result, we witnessed inflation that was exacerbated further when geopolitical tensions rose in 2022 and supply chain hubs such as China took strong measures to limit the reemergence of COVID, two years after the initial crash.

Hence, it is only natural for central banks to use their most trusted tool in tackling inflation by raising interest rates. However, rising interest rates limit economic activity since lending becomes more expensive. The U.S. raising their interest rates increased the power of the dollar, making the principal currency for all trade more expensive, resulting in less than anticipated economic activity. A rising U.S. dollar also encourages investors to exit stocks and head to bonds as they are safer, especially in periods where the risk of a recession is high. Increasing interest rates is currently the main solution to rising inflation. However, governments need to be reminded that quantitative easing programs need to be balanced with investments in commodity production to avoid the high prices we see today.

The risk of stagflation is currently being mentioned by news outlets. This is a possible scenario, and so is a recession. The market is going through unprecedented times, and analysts are raising concerns over a recessionary environment, hoping not to miss their forecasts as they did for the 2008-2009 financial crisis. However, the oil and gas program modelers believe that the underlying problem is not the economic situation on the ground, but also changes in policy, such as raising interest rates that will continue through 2022 and 2023. Raising interest rates seems scary to consumers, because it has been over a decade since governments had to make such unpopular decisions, but central banks believe that it is needed. So it really comes down to the fear of the unknown. Easing these fears will influence economic activity and, consequently, oil demand.

In the previous KOMO Q2 2022 report, KAPSARC ran a demand scenario with assumptions similar to the conditions surrounding the financial crisis in 2008, and oil demand still continued to grow. While several analysts have cited elevated oil prices when discussing the risk of demand destruction in the near term, we distinguish between long-term demand destruction and short-term price elasticity effects. We view the current reduction in consumption growth as being predominantly a price - mediated phenomenon. Nevertheless, we remain relatively positive over the prospects for oil demand, even in light of the currently elevated pricing. There is no doubt that the prospect of prolonged higher prices may make policymakers shy away from fossil fuels in the medium to longterm.

Summary continued...

However, the capped demand growth we witness today (in the short term) is because of price elasticity, among other factors.

China's oil demand forecast is interesting in light of its recent lockdowns. Several outlooks are not only projecting lower demand growth for China in 2022, some are even forecasting declines. In our last assessment, we expected China's 2022 demand growth to reach 430 Kb/d, but we now believe that its growth will be more muted at 270 Kb/d. This 37% decline has the potential to drop further if its 'zero-COVID' strategy remains in place. On the other hand, a significant upside revision could be warranted if China takes a more moderate approach toward COVID-19 protocols and international travel rebounds. Nevertheless, the revision to China's oil demand has balanced the overall growth prospects between OECD and non-OECD countries at 1.04 MMb/d and 1.11 MMb/d, respectively.

Total global oil supply is expected to grow by about 4.43 MMb/d in 2022 (about 1.24 Kb/d less than our Q2 2022 forecast), and by 3.2 MMb/d in 2023 (about 1.5 MMb/d more than our Q2 2022 forecast). The downward revision for 2022 is partly due to the ongoing conflict between Russia and Ukraine, making Russian energy commodities unpopular. However, this downward revision could have been steeper if not for the past three quarters of elevated prices encouraging non-OPEC+ countries to increase production. This is also why the 2023 numbers have been revised up.

Indeed, revenues have also been much higher for oil and gas enterprises and oil refiners. On June 10, 2022, during an event at the Port of Los Angeles, President Biden stated that "Exxon made more money than God last year." While higher prices today may have a material impact on investment, it will take some time before additional production reaches the market. Nevertheless, most companies are sticking to their modest production growth strategies. OPEC+ production growth only accelerated by one month, and international oil companies (IOCs) continue their long-term trend of diversifying their portfolios toward offshore, renewables and other growth opportunities as they search for higher value and lower risk opportunities.

OPEC+ has accelerated its phase-out of the supply cuts its members agreed to in April 2020 in light of the COVID-19 crisis, and all members will soon be able to pump at will. While Russia's YoY production growth is expected to decline by around 560 Kb/d in 2022 and 940 Kb/d in 2023, OPEC+ should see growth of around 2.16 MMb/d in 2022 and 1.05 MMb/d in 2023. The recent announcement of Strategic Petroleum Reserve (SPR) releases, which amounts to an extra 1.33 MMb/d of temporary supply, was accompanied by a plea for OPEC to expedite its releases and produce more. However, OPEC needs to weigh the value of using its spare capacity to balance the market against the value of preserving spare capacity to reassure the market. Indeed, OPEC's spare capacity has always served as a buffer against unpredictable global supply disruptions and price volatility, but it was not designed to handle a supply disruption involving sanctions against a producer the size of Russia. The current question for OPEC in general, and Saudi Arabia in particular, is "Should OPEC sacrifice its spare capacity in order to reduce prices, or wait for non-OPEC production to balance the market? Is the increased risk premium of zero spare capacity worse than the situation now?"

Summary continued...

Non-OPEC+ production growth continues to depend on shale producers. Drilled but uncompleted oil or gas wells (DUCs) and overall drilling activity have been slowly on the rise, and we expect to see significant shale growth in the coming months (720 Kb/d in 2022 and 1.1 MMb/d in 2023). While activity is increasing, enthusiasm falls short of the 'good old days,' as producers consider new constraints from shareholder demands, labor, supply chain limitations, and regulatory hurdles. Why respond to calls for more production when they are being told they will be run out of business later? Consistency, guarantees, and confidence could go a long way to boost shale production, which may occur by the end of the year, and even more so by 2024 with the coming U.S. presidential elections. As an anecdotal indicator of shale's future, why would Harold Hamm try to take Continental Resources private again if there was no money to be made?

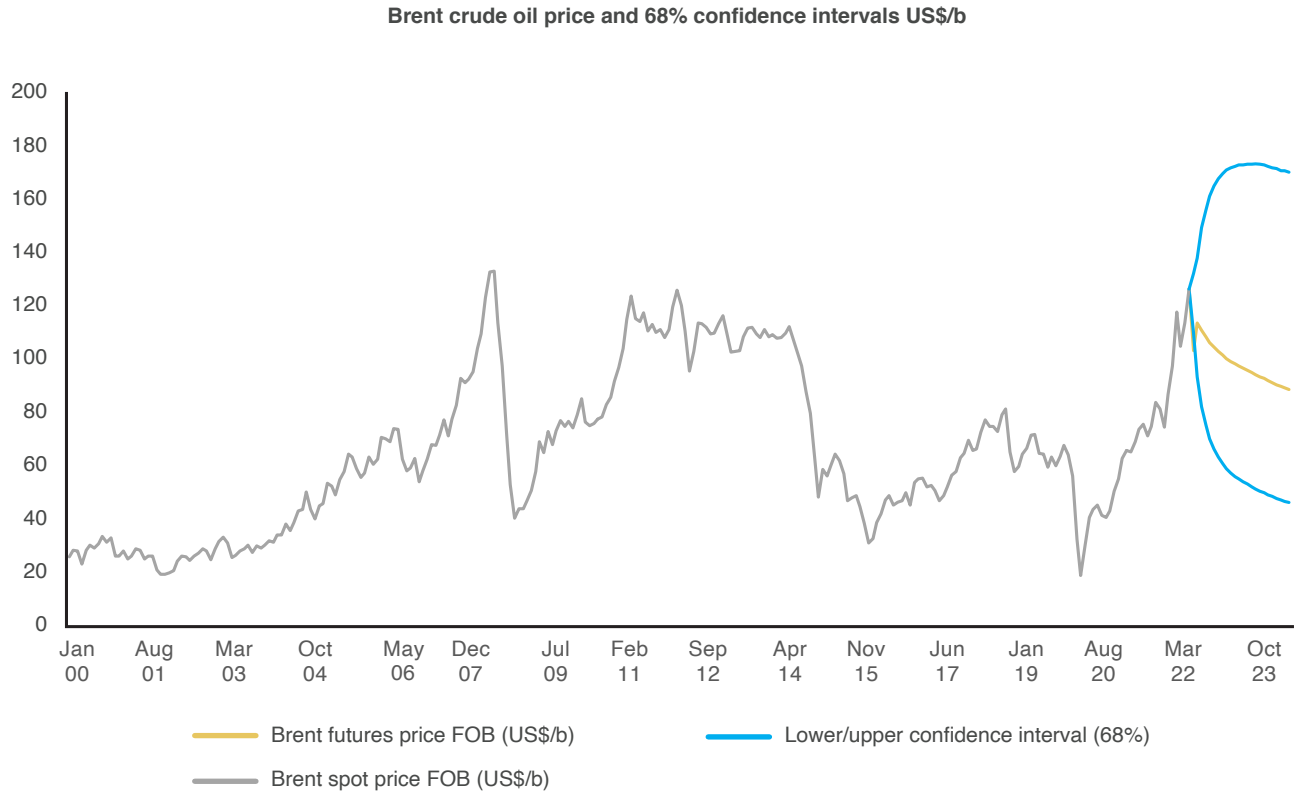
The base case supply/demand forecast suggests that the supply deficit that started in the second half of 2020 will continue through 2022, averaging 200 Kb/d for the current year, but that it will swing to a surplus of 800 Kb/d in 2023.

Under these assumptions, target inventory levels for the OECD are expected to rise by 308 MMb to 4,615 MMb in 2022 and increase by 36 MMb in 2023. The rise of target inventories mirrors the rise in geopolitical risk, as countries try to build energy security. On the other hand, real inventory levels are expected to grow gradually, remaining below the new target levels throughout the next two years, which would indicate that prices could remain elevated beyond real fundamentals throughout this period. Hence, prices for 2022 will likely reflect a risk premium, despite global liquids supply being at adequate levels to meet demand.

	2019	2020	Growth	2021	Growth	2022	Growth	2023	Growth
Demand	101.0	92.9	(8.0)	97.6	4.7	99.8	2.1	101.9	2.2
Supply	99.8	93.5	(6.4)	95.1	1.6	99.5	4.4	102.7	3.2
Δ	(1.1)	0.5		(2.5)		(0.2)		0.8	

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.



Source: KAPSARC calculations based on NYMEX data, CME Group, FINCAD, June 2022.

US$/b	Q3 2022	Q4 2022	Q1 2023	Q2 2023	Q3 2023	Q4 2023	Q1 2024	Q2 2024
Futures	108.78	106.04	101.27	97.89	95.39	93.09	90.76	88.78
50% CI	$80.14 - $140.39	$71.50 - $143.45	$66.77 - $143.51	$63.75 - $142.72	$61.17 - $141.65	$58.92 - $139.79	$57.07 - $138.12	$54.35 - $130.72
68% CI	$94.73 - $139.52	$70.19 - $160.42	$60.62 - $169.22	$55.69 - $172.07	$52.66 - $172.79	$50.13 - $172.88	$48.01 - $171.58	$46.28 - $170.34
95% CI	$79.78 - $170.80	$47.09 - $240.11	$36.85 - $278.67	$32.21 - $297.58	$29.58 - $307.65	$27.48 - $315.33	$25.87 - $318.42	$24.58 - $320.66

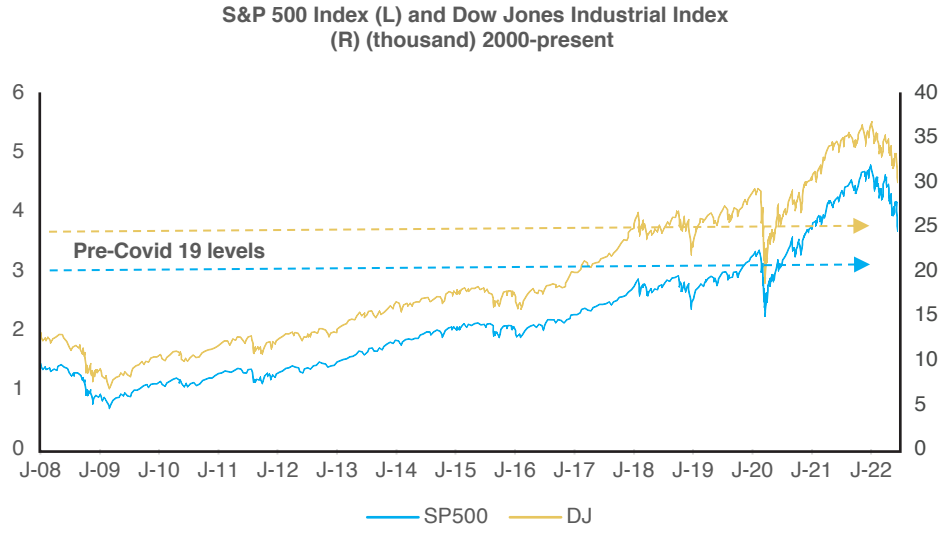
Note: CI = confidence interval

Key Issues for the Oil Market in 2022 and 2023

On April 13, 2022, the UN report "Global Impact of war in Ukraine on food, energy and finance systems" stated three main risks facing 69 economies – rising food prices, rising energy prices, and stricter financial conditions. Of the 69 countries affected by this trilemma, 19 are in Latin America, 25 are in Asia and the Pacific, and the remaining 25 are in Africa.

Highlighting the key issues impacting oil markets was a straightforward process when the global community all headed in the same direction. However, COVID-19 demonstrated the fragility of economies, and we are currently seeing acts of deglobalization and protectionism. Since early 2022, some countries have enacted export bans. China, for example, limited fuel export quotas, India banned private exports of wheat, rice and sugar, and the U.S is talking about limiting its oil exports. Another layer of pressure lies in citizens growing frustrated with domestic economic conditions amid rising inflation, leading them to seek governmental change either legitimately at the ballot box or via coups. These pressures affect not only vulnerable developing countries but also advanced economies. While some countries will opt for price reductions on energy commodities, others are exploring windfall taxes or other reforms to accelerate the energy transition, such as the European Union's (EU's) rare metals policies. Capturing all the risks and issues impacting oil markets is becoming more complicated as national responses differ from one country to another. However, what we can do is highlight some major factors that are leading to this non-cohesive decision-making process by governments.

Since domestic supply is not able to satisfy domestic demand, protectionist policies have been put in place to address suppy shortages and avoid resulting **inflationary pressure** on the economy. Prior to COVID-19, inflation was controlled, but as supply chains were disrupted during 2020 and parts of 2021, supply was not able to catch up with demand. In fact, governments since 2009 did not change their quantitative easing policies and even followed expantionary monetary policy during the pandemic (either through handouts to its citizens or by making direct deposits in business). This liquidity increased disposable incomes for many. However, during the same time, investments in commodities lagged. Following the pandemic, several businesses either remained shut for prolonged periods or even went bankrupt. Nowadays certain sectors of the economy, such as tourism, have yet to recover to their pre-pandemic levels. As a result, the avenues to which this liquidity was directed were limited. Assets such as houses have skyrocketed, food and energy commodities have inflated, and the financial markets have soaked up much of that liquidity, pushing the value of stocks beyond their underlying fundamental values.

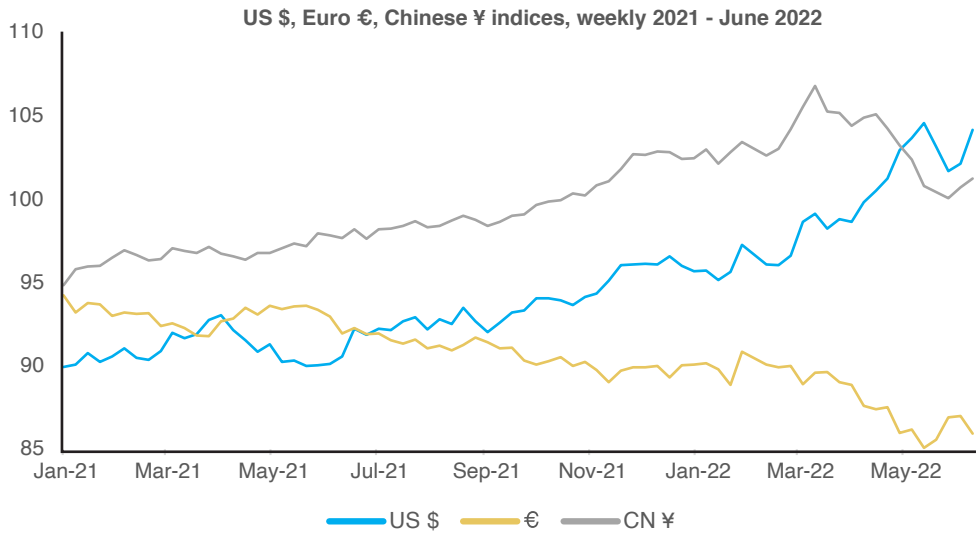


Source: Bloomberg, June 21, 2022.

Key Issues for the Oil Market in 2022 and 2023...

Given their need to fight against inflation, central banks may feel they have no choice but to reduce liquidity levels by raising interest rates. However, rising interest rates leads to less lending, resulting in less economic activity. So now governments are challenged by two risks: lowered economic activity and persistent inflation. Add to this storm of events elevated unemployment levels in several countries and regions, particularly in vulnerable economies or where economies/businesses were dependent on services that have not yet reached their 2019 levels, and you have a recipe for stagflation.

When a country raises its interest rates, its currency increases relative to others. Rising interest rates not only lead to increased purchasing power for currencies that raise rates, but also encourage investors to put their money in bonds. A strong U.S. dollar makes commodities traded in U.S. dollars more expensive to holders of other currencies. At the same time, it encourages investors to put their money in investments that are less risky, but also less likely to produce high economic output. This attitude has only exacerbated the **risk of a recession**.



Source: Bloomberg, June 21, 2022.

The US. Federal Reserve (Fed) increased its benchmark rate in March 2020, which caused an appretiation of the US$ against the euro (€).

Furthermore, it is crucial to state that an economic recession does not only mean negative gross domestic product (GDP) growth numbers. It is essential to minimize the negative impacts of a recession, such as unemployment, or supply chain disruptions. **The global governance problem awaiting 2022 and 2023 lies with the multiple individual issues that will need to be addressed across countries if things take a wrong turn for countries at risk of an economic downturn.**

Hence, addressing the need for governments to address the current global economic situation collectively is crucial. However, the current geopolitical tensions have left collectivism in disarray. Indeed, the Russian-Ukrainian conflict continues, Libya's internal strife has impacted its oil supply, and Venezuela and Iran seem to have a long way to go before sanctions against them are properly lifted.

It is also important to note that the current challenges around **energy security** are the result of poor planning and communication as well as short-sighted views on the energy transition. **Investments** in reliable energy sources (i.e., fossil fuels) have been redirected toward intermittent sources, while maintaining existing energy production capacity has been de-emphasized. A J.P. Morgan outlook published in 2022 stated that it takes approximately $2 billion a year to maintain each existing exajoule of energy but $15 billion to build an equivalent additional unit of energy. Yet from an IOC's perspective, what was the point of maintaining economically marginal refining capacity when demand was low and signals from regulators indicated that their business would be eliminated in the future?

What will the world do to address these risks? The most likely option for many countries is to make further investments in existing coal plants to address immediate energy needs while trying to accelerate renewables. This could cause a longer and more costly energy transition, and tighter oil markets, while increasing emissions.

Key Issues for the Oil Market in 2022 and 2023...

In June 2022, the IEA's World Energy Investment report stated, *"Energy investment is set to pick up by 8% in 2022 against the backdrop of the global energy crisis, but almost half of the increase in capital spending is linked to higher costs."* Furthermore, taxes on the oil industry to supplement other sources may aggravate its investment perspectives.

Regardless of what happens, our forecast remains predicated upon economic growth, high prices capping demand, gradual OPEC+ increments and production elasticity responding to elevated pricing, particularly in non-OPEC+ countries.

As a result, we anticipate oil demand growth in 2022 to average 2.15 MMb/d, with OECD and non-OECD countries witnessing similar growth levels, where OECD demand growth is expected to average 1.04 MMb/d in 2022 and non-OECD growth at 1.11 MMb/d. We are also optimistic that demand growth will reach pre-pandemic levels this quarter. Demand growth also has strong upside potential, depending on how China eases its COVID-19 restriction policies.

The outlook for supply in 2022 and 2023 has much to do with the price curve of the past few months and with what is happening with Russia. Regardless of what happens to prices, all eyes are on policymakers' attitudes toward Russian oil. Even Janet Yellen, the U.S. Secretary of the Treasury, proposes placing a price cap or extra tariffs on Russian exports rather than adopting sanctions such as those recently agreed on by the EU. Nevertheless, Russian oil will continue to be part of the oil market, and its exports will likely continue to shift toward the east, reducing prices in the developing world. At the same time, Africa and Latin America will try to make up for the supply deficit in Europe as they trade north and east, respectively.

As a result, it is expected that supply growth for this year will reach 4.43 MMb/d and 3.19 MMb/d in 2023. In both years, non-OPEC+ producers will likely witness more growth than OPEC and its partners as prices continue to be high.

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 current geopolitical changes and the duration of the COVID-19 pandemic. Other challenges may include unexpected oil supply cuts due to hurricanes, OPEC+ compliance, and geopolitical tensions escalating/diminishing, among others.

Demand forecast

Global oil demand is projected to grow by 2.15 MMb/d in 2022 and increase by an additional 2.16 MMb/d in 2023 YoY. However, fears over the economic and geopolitical situation have pushed our forecast for 2022 down. In our previous report, KOMO Q2 2022, we estimated QoQ global demand would grow slightly in Q1 and Q2 of 2022. Given continued inflation globally, China's recent COVID-19 lockdown measures in Q2, and the war in Eastern Europe, overall demand shrunk by 520 Kb/d in Q1 and 290 Kb/d in Q2.

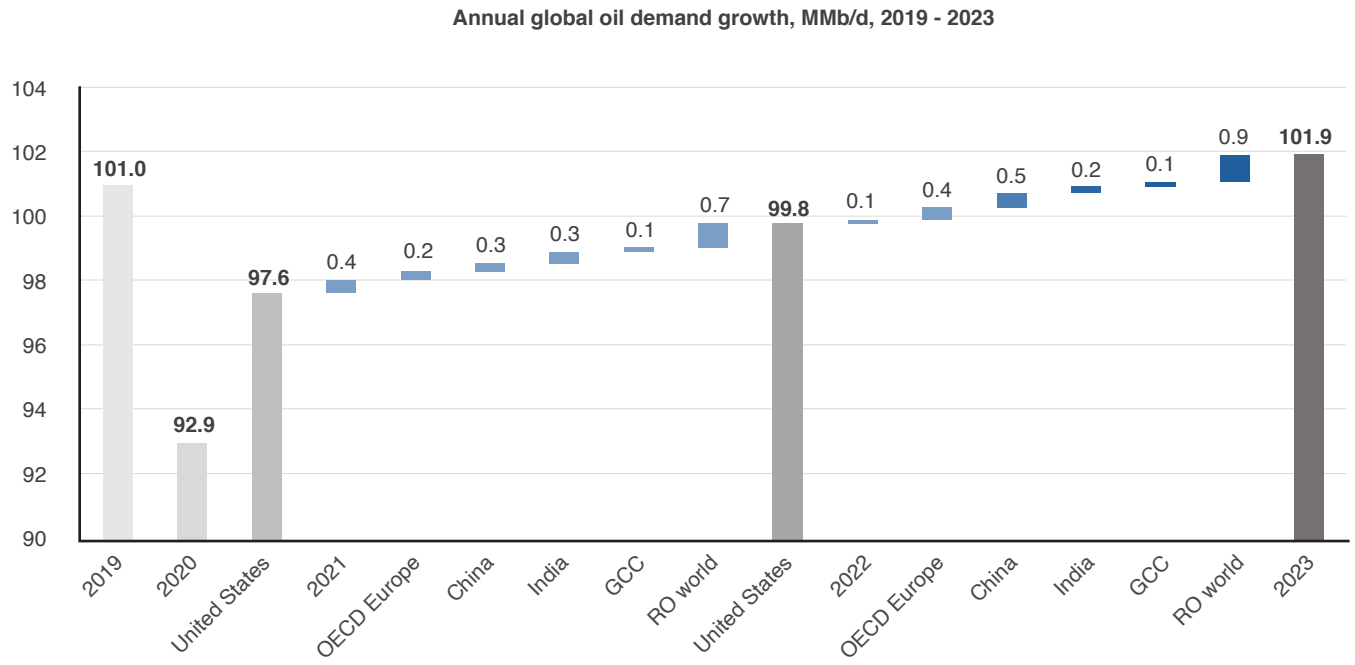
However, this quarter, oil demand is expected to bounce back by 1.87 MMb/d. This growth is expected to be led by Saudi Arabia, with an additional 380 Kb/d for cooling and electricity generation. This is followed by the U.S., with an expected growth of 320 Kb/d due to its summer driving season, and with China in third place as it starts easing its COVID-19 lockdown measures.

Several factors have changed the traditional growth patterns of several countries. These include the rising U.S. dollar, the Russian-Ukrainian conflict, the recent lockdowns in China, and continued inflation across a wide array of commodities, particularly energy commodities. These are in addition to the key issues for the oil market in 2022 and 2023 described in the previous section. Although the seasonal patterns have not been affected significantly, the growth rates have been sporadic. In the end, though, both OECD and non-OECD countries are expected to witness similar growth levels at around 1.1 MMb/d, with only a few thousand barrels difference between them. In 2021, OECD countries' demand was higher than non-OECD countries' by roughly 400 Kb/d (2.53 MMb/d), and it was expected that normal growth patterns would resume in 2022. This was the expected scenario until China took severe measures to address its COVID-19 outbreak, pushing overall demand for the non-OECD block down. Nevertheless, demand growth patterns are expected to resume in 2023, with non-OECD members leading the growth with an expected 1.38 MMb/d whereas OECD contributes 780 Kb/d.

If tariffs or price caps are placed on Russian oil, bringing an average of 1 MMb/d - 2 MMb/d back into the market, prices could decline, resulting in increased consumption. However, it is reported that Russian oil is already finding its way into Asian markets at a significant 30% discount to global benchmarks, giving Asian oil demand a significant opportunity for growth. Another area of potential demand growth lies in further border control easing and the increase in long-haul travel. Q3 demand in the United Arab Emirates (UAE) is expected to grow by roughly 90 Kb/d. Although not significant, much of that growth will go toward jet fuel. That implies that demand from countries such as China and India could increase this quarter by at least 100 Kb/d if travel restrictions are eased. High air travel prices are not just due to the limited supply of aviation fuels but also staffing shortages as airlines had to lay off workers during the pandemic. Bringing back that capacity is expected to play an important role in the recovery of air travel. Inflation and a looming recession could knock some of the projected demand growth, but in all cases, demand is expected to grow.

An important observation in this quarterly report is the decoupling of GDP growth and oil demand. As countries take climate change more seriously by enhancing energy efficiency and fuel switching, their future demand growth projections are decoupling from their GDP growth. This has been the case for Saudi Arabia as well as other Gulf Cooperation Council (GCC) countries. Kuwait, for example, is expected to witness a QoQ decline in oil demand this quarter (≈-10 Kb/d) as their energy grid becomes more gas based. This pattern was also seen in several OECD countries between 2000 and 2012.

Demand forecast...



Source: KAPSARC, June 2022.

Demand levels, MMb/d

2021	Q1	Q2	Q3	Q4	2021
OECD	43.3	44.8	46.2	46.3	**45.1**
Non-OECD	51.1	52.3	53.2	53.3	**52.5**
Global demand	94.4	97.1	99.4	99.5	**97.6**

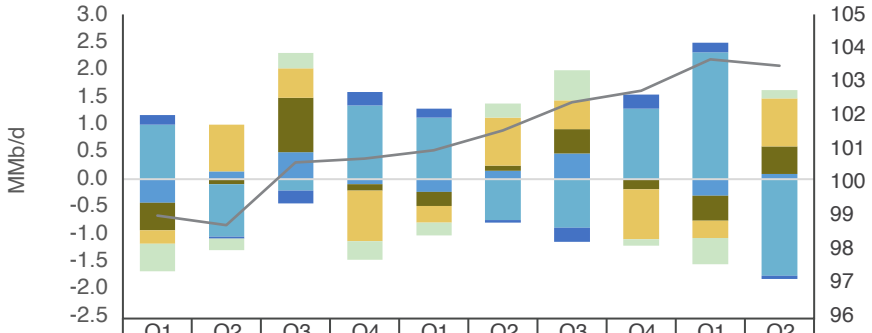
2022	Q1	Q2	Q3	Q4	2022
OECD	45.9	45.0	46.6	47.2	**46.2**
Non-OECD	53.1	53.7	54.0	53.5	**53.6**
Global demand	99.0	98.7	100.6	100.7	**99.8**

2023	Q1	Q2	Q3	Q4	2023
OECD	47.1	46.2	47.1	47.5	**46.9**
Non-OECD	53.9	55.4	55.3	55.2	**55.0**
Global demand	101.0	101.5	102.4	102.7	**101.9**

2024	Q1	Q2
OECD	47.1	46.6
Non-OECD	55.5	56.1
Global demand	102.6	102.7

Non-OECD countries are expected to retain a 54% share of global oil demand in 2022 and 55% in 2023. They will also account for 52% and 62% of demand growth in 2022 and 2023, respectively. Europe is expected to witness the largest QoQ growth at around 1 MMb/d. Both the Middle East and North America will follow, with roughly 500 Kb/d each. Eurasia is expected to increase by approximately 300 Kb/d, while Asia-Oceania and Africa may face QoQ declines of 200 Kb/d.

Regional oil demand growth, MMb/d, Q1 2022 - Q2 2024



	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
Eurasia	-0.5	-0.2	0.3	-0.3	-0.2	0.3	0.6	-0.1	-0.5	0.1
Africa	0.2	0.0	-0.2	0.3	0.2	0.0	-0.3	0.3	0.2	0.0
Middle East	-0.2	0.9	0.5	-0.9	-0.3	0.9	0.5	-0.9	-0.3	0.9
Asia-Oceania	1.0	-1.0	-0.2	1.3	1.1	-0.7	-0.9	1.3	2.3	-1.8
Europe	-0.5	-0.1	1.0	-0.1	-0.3	0.1	0.4	-0.2	-0.4	0.5
Americas	-0.4	0.1	0.5	-0.1	-0.2	0.2	0.5	0.0	-0.3	0.1
Global demand	99.0	98.7	100.6	100.7	101.0	101.5	102.4	102.7	103.7	103.5

Source: KAPSARC, June 2022.

United States

MMb/d	2021	Q1	Q2	Q3	Q4	2022	Q1	Q2	Q3	Q4	2023	Q1	Q2
United States	20.0	20.3	20.3	20.6	20.6	20.4	20.4	20.4	20.7	20.7	20.6	20.5	20.5

2022-2023

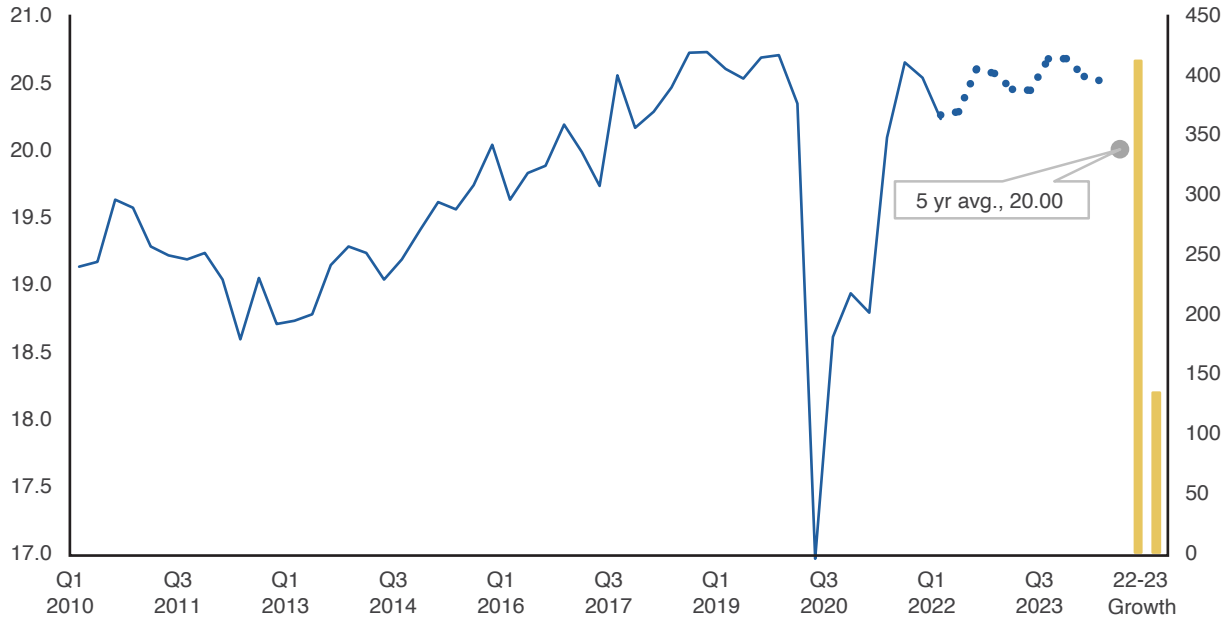
U.S. oil demand is expected to grow by around 410 Kb/d in 2022 and 130 Kb/d in 2023, reaching its 2019 levels in Q3 2022.

As transportation fuels were hit the hardest in 2020, they also recovered the fastest in 2021, and are expected to continue to do so in 2022, despite prices exceding US$5 at the pump. U.S. gasoline demand in 2022 should see the strongest growth (190 Kb/d), followed by gasoil/diesel (80 Kb/d), liquified petroleum gas (LPG) (50 Kb/d), and other heavy fuels. The semiconductor shortage has resulted in a surge in sales of second-hand vehicles during 2021. This year is expected to witness continued inflation in vehicle prices and, as a result, we estimate vehicle fuel demand will remain modest but with the potential to increase. The ongoing SPR release is expected to have a minimal effect on gasoline prices. Unfortunately, the U.S. financial markets have been falling, and the risk of a recession has capped the potential for demand growth this year and next.

Q3 2022

We expect this quarter's U.S. demand to result in a QoQ growth of around 320 Kb/d. Although we anticipate a surge in demand for all fuels this quarter, heavier fuels will lead the growth at 70 Kb/d followed by gasoline at 50 Kb/d. The July 4 holiday has the potential to increase the demand for transportion fuels, but domestic flights are at saturation levels and high gasoline prices are capping demand.

United States, MMb/d (L) and 2022 - 2023 growth Kb/d (R)



Source: KAPSARC, June 2022.

OECD Europe

MMb/d	2021	Q1	Q2	Q3	Q4	2022	Q1	Q2	Q3	Q4	2023	Q1	Q2
Europe	4.9	5.3	5.4	4.8	5.3	5.2	5.6	5.7	5.0	5.5	5.4	5.7	5.8

2022-2023

OECD Europe's oil demand is expected to grow by 250 Kb/d in 2022 (50 Kb/d more than in our Q2 2022 report) and another 370 Kb/d in 2023. Like the U.S., OECD Europe was expected to recover much faster but not regain all of its lost demand from 2020. However, its demand has been subdued due to the recent geopolitical tensions and continued elevated inflation rates. Demand may even decline further, based on how those situations unfold.

We expect demand growth across all fuels to range between 11 Kb/d and 30 Kb/d, except diesel demand, which is expected to grow by roughly 110 Kb/d in 2022. However, if Russia and Ukraine reach a ceasefire or long haul international travel rebounds more strongly than expected, the numbers for OECD Europe could be significantly higher. Furthermore, if the EU takes on the U.S. Treasury Secretary's advice on placing a price cap on Russian oil, then demand has the potential to grow further. Nevertheless, Europe is anticipating shortages of diesel, petrol and kerosene this summer.

Q3 2022

The outlook for OECD Europe this quarter was determined by its eastern borders. The conflict has reduced confidence, and expectations for Russia's and Ukraine's GDP declines are around 20%-35% for 2022. This impact, however, has not seeped into the rest of Europe, and OECD Europe seems to have been doing exceptionally well since summer arrived, with QoQ growth of 1 MMb/d. Roughly 40% of that growth comes from diesel demand, with other heavier fuels and gasoline expected to grow by around 180 Kb/d each. LPG demand is expected to be the only declining fuel in this period.

OECD Europe...

Source: KAPSARC, June 2022.

China

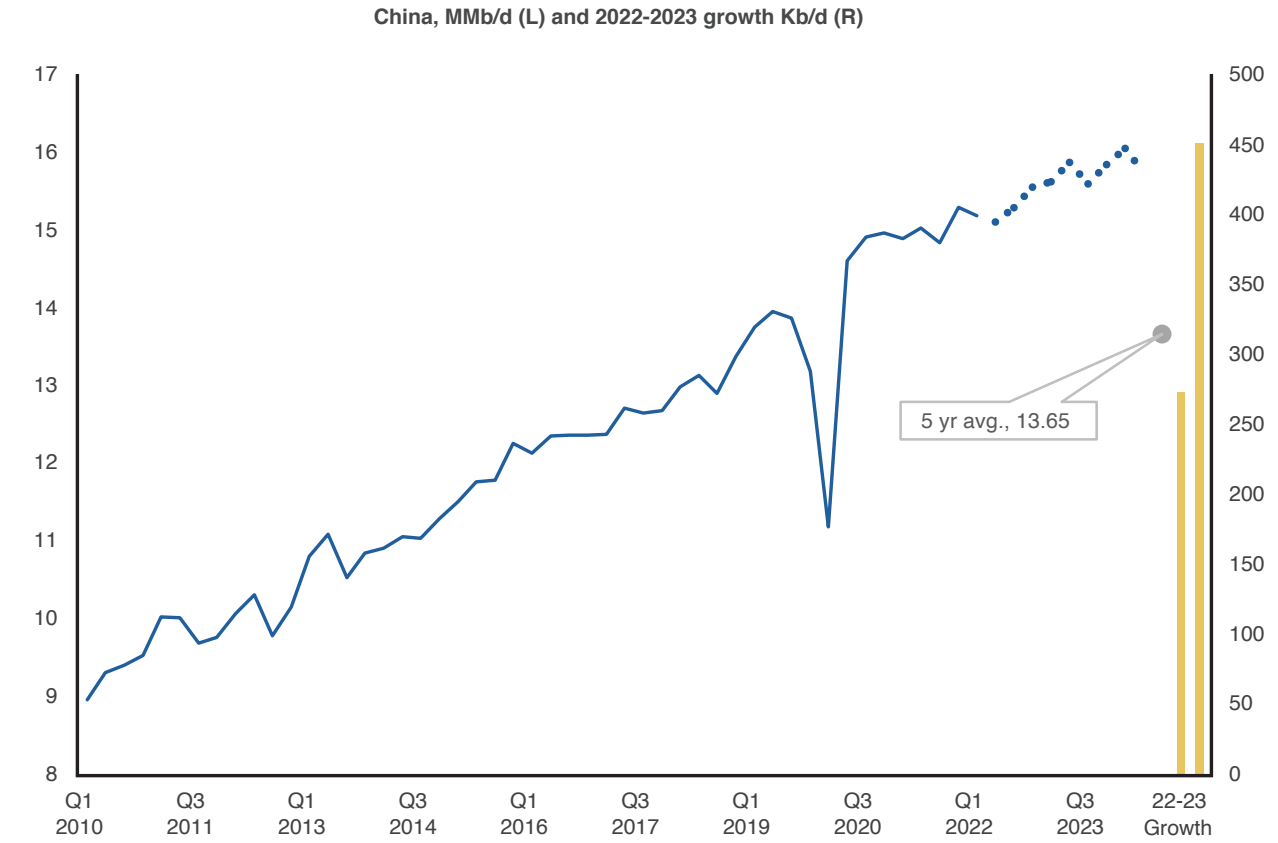
MMb/d	2021	Q1	Q2	Q3	Q4	2022	Q1	Q2	Q3	Q4	2023	Q1	Q2
China	15.0	15.2	15.1	15.3	15.5	15.3	15.6	15.9	15.6	15.8	15.7	16.0	15.7

2022-2023

China's oil demand is expected to grow by around 270 Kb/d in 2022 and 450 Kb/d in 2023. China's economy is losing momentum this year, and its recent lockdowns in Q1 and Q2 did not help. As a result, we estimate modest demand growth for all fuels, ranging between 10 Kb/d and 70 Kb/d. Although diesel demand is expected to represent the highest growth throughout the year at roughly 70 Kb/d and 65 Kb/d, followed by gasoline, the second half of this year is expected to witness significant growth in heavier fuels such as pet coke, asphalt, etc.

Q3 2022

China's QoQ demand is expected to grow by 180 Kb/d. Although we expected growing demand for heavy fuels, transport fuels will be leading growth this quarter, as China's COVID-19 restrictions are likely to ease. Hence, diesel is expected to grow by roughly 310 Kb/d followed by gasoline and jet fuels at around 160 Kb/d and 10 Kb/d, respectively. Demand for other fuels such as LPG, naphtha, and fuel oil will counterbalance the rise in demand for transport fuels. Another factor that could limit demand growth this quarter is the increase in retail gasoline and diesel prices by 390 yuan ($57.90) per tonne this year, following a series of hikes earlier this year.



Source: KAPSARC, June 2022.

India

MMb/d	2021	Q1	Q2	Q3	Q4	2022	Q1	Q2	Q3	Q4	2023	Q1	Q2
India	4.9	5.3	5.4	4.8	5.3	5.2	5.6	5.7	5.0	5.5	5.4	5.7	5.8

2022-2023

India's oil demand is expected to grow by around 330 Kb/d in 2022 and 220 Kb/d in 2023. Although 2022 should see healthy growth, 2022 and 2023 will also face the challenge of state elections leading up to the general election of 2024. We expect higher demand this year due to the Indian government's intention to front load its welfare- and economic growth-oriented policies, alongside the new fuel tax structure that became effective on May 22 to insulate consumers from rising gasoline and diesel prices. Still, this new tax structure could represent a loss for the government of more than 1 trillion Indian rupees in annual revenue. Before the pandemic, the government intended to provide tax breaks to kickstart the economy. However, crude prices have remained high during the past two quarters, reflected in higher gasoline and diesel prices at the pump. Nevertheless, recent state elections went as expected and have returned a positive result for the ruling party.

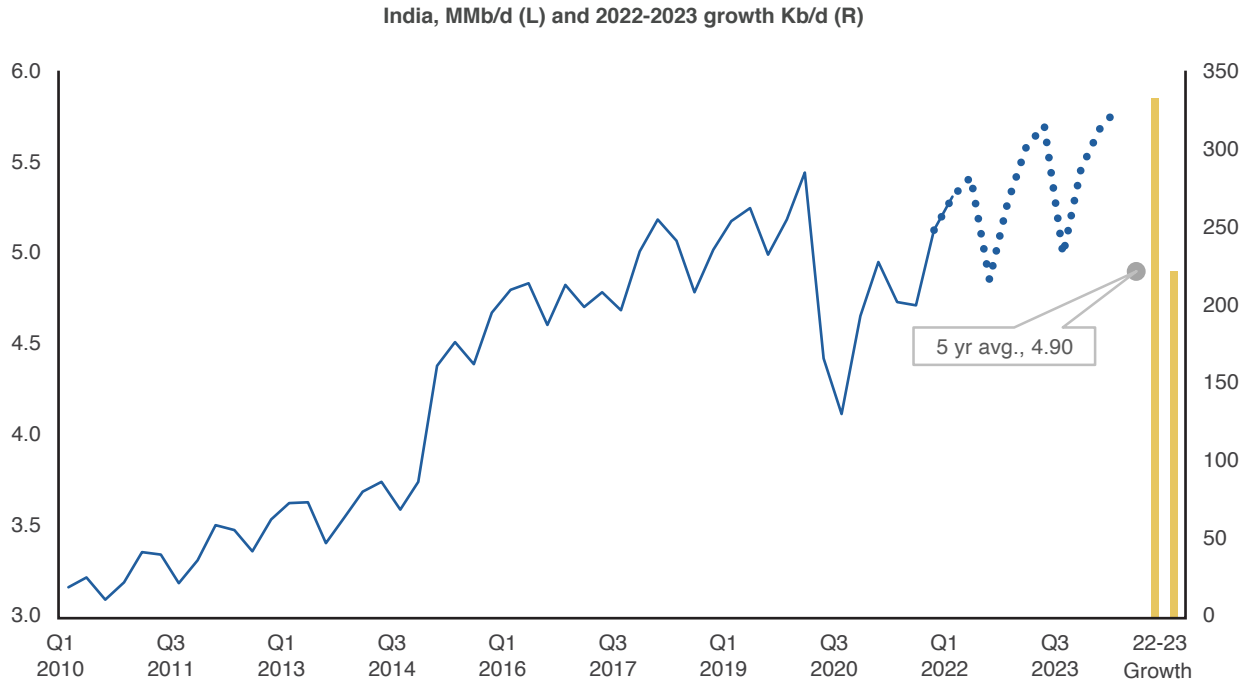
A substantial portion of India's economic growth stems from its industrial sector. However, its GDP growth in 2021 and perhaps 2022 will be largely carried by the services sector, so oil demand will not hinge on GDP growth alone. We expect diesel to represent one-third of demand growth this year, followed by heavier products used for infrastructure development, then by demand for gasoline and LPG at 50 Kb/d each.

Although oil imports from Russia and Ukraine represent 2% of all India's oil imports, Russia's discounts on oil exported to India are likely to increase. Indeed, a $30/b – $40/b discount, with the possibility for more, could increase India's demand by roughly 200 Kb/d. However, we believe that India's storage capacity would limit that to 100 Kb/d – 150 Kb/d.

Q3 2022

QoQ, India is expected to witness its strongest oil demand decline yet at roughly 570 Kb/d. Due to its seasonal monsoons, high fuel prices, and the government's intention to ban private exports of rice, wheat and sugar, it is expected that all fuels will witness some demand declines. Diesel will be leading that decline at around 350 Kb/d, and infrastructure projects will slow due to the rainy season, resulting in an added reduction of 130 Kb/d of heavy fuels.

India...



Source: KAPSARC, June 2022.

Saudi Arabia

MMb/d	2021	Q1	Q2	Q3	Q4	2022	Q1	Q2	Q3	Q4	2023	Q1	Q2
Saudi Arabia	3.6	3.1	3.8	4.2	3.4	3.6	3.1	3.8	4.2	3.4	3.6	3.1	3.8

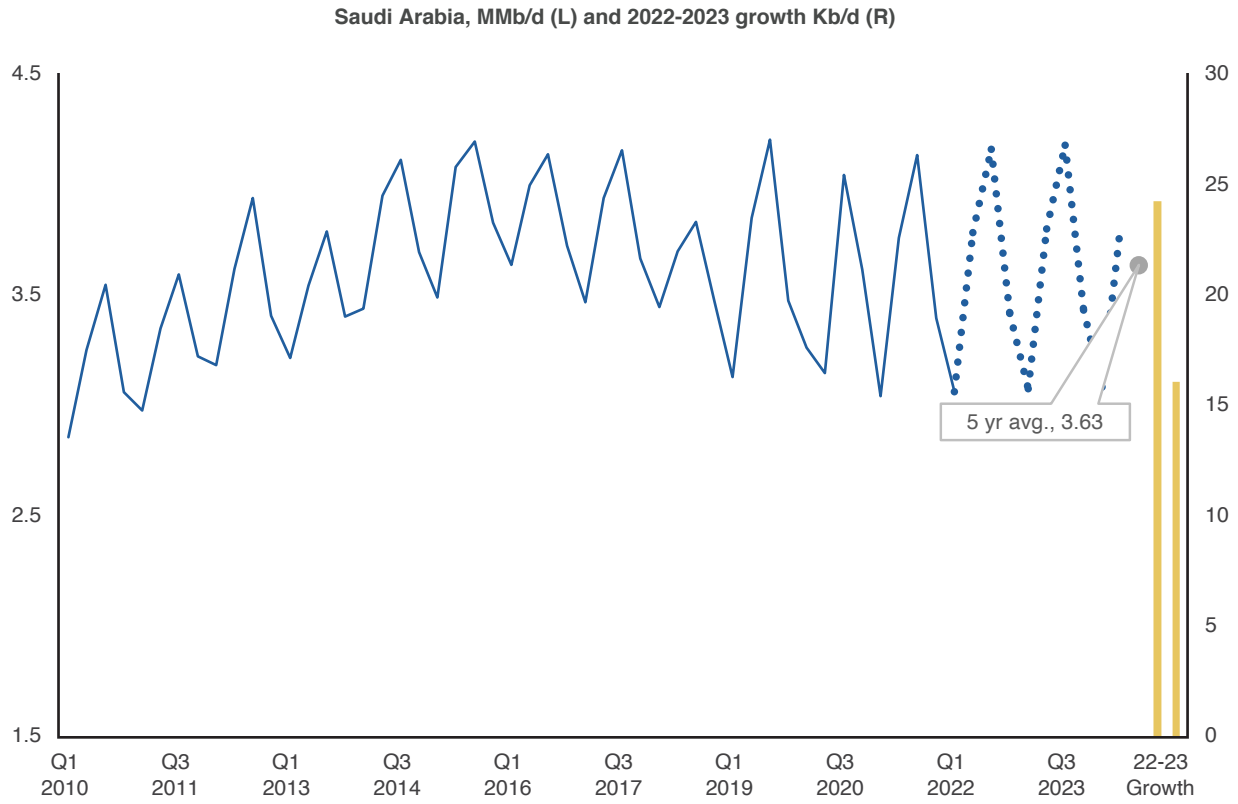
2022-2023

Saudi Arabia's oil demand is expected to grow by 24 Kb/d in 2022 and 20 Kb/d in 2023.

Despite oil prices giving Saudi Arabia a large boost to its GDP, oil demand growth will be low as the country continues its path toward energy efficiency, limiting oil demand. All fuels are expected to witness a slight demand increase, and gasoline and diesel will represent roughly 20% of that growth.

Q3 2022

Saudi Arabia is expected to witness QoQ demand growth of 380 Kb/d. Due to hotter weather, demand for heavier products as well as fuel oil and diesel will grow. Indeed, fuel oil is expected to represent 60% of this growth, followed by diesel. However, demand for naphtha and LPG is expected to decline by 40 Kb/d – 50 Kb/d.



Source: KAPSARC, June 2022.

Discussion

The global oil market is a machine that corrects itself. External shocks and changing conditions can disrupt things temporarily, but eventually it normalizes. The conflict in Ukraine and the policy responses to it have been a significant disturbance to trade flows, but alternate routes to the East show the machine's self-regulation in action. The ability of OPEC+ to fill the gaps has been lower than desired by other market participants. However, the long, slow process of raising production has been mostly successful considering the magnitude of the production cuts taken in 2020. Gradual changes are smoother. The U.S. and the EU would like to move things faster, but their policies show that a more gradual path is more manageable, with phase-outs of Russian cargoes scheduled over six to eight months.

Other attempts to influence the natural behavior of the market are having some questionable impacts. Windfall taxes are under debate worldwide, removing the upside to energy firms' profits and disincentivizing future development. Fuel tax holidays may lower prices at the pump slightly but could backfire by increasing demand. Export bans increase supply chain hurdles and can increase costs overall. Profit shifting in general is poorly received as a suggestion. (Norway kindly declined to pass their oil profits, which feed their sovereign wealth fund, back to the EU.) Lastly, blending biofuels into the fuel supply could stress an already fragile global food supply.

Sadly, the surest remedy is time. The current price environment should stimulate increased production and investment, but many new conventional projects will take years to hit oil. Increasing supplies from frontier producers like Guyana and Suriname hold some promise; Norway and Brazil are doing what they can; Vaca Muerta in Argentina is seeing a big push; OPEC+ members have plans in the short and long term to increase their upstream and downstream sectors; the shale industry is tentatively going forward with growth plans, and Canadian oil sands continue to produce, despite their logistics issues.

In the meantime, we need to make the best of what we have and try not to push the machine beyond its operating limits. Removing artificial impediments is generally good (e.g., allowing Venezuela to export to the EU), but we need to be wary of unintended consequences when making quick fixes.

Highlights from this edition are:

- The value of spare capacity will become a significant discussion point.
- The market will find equilibrium, but the risks are becoming more supply chain related.
- Energy firms are trying their best in a market of conflicting messages.

Supply forecast

Global liquids supply is expected to grow organically by about 4.1 MMb/d in 2022 to reach an average of 99.2 MMb/d for the year, with an artificial 300 Kb/d from the added SPR releases of 1.33 MMb/d. With OPEC+ cuts finished we expect 2023 to see a further 3.2 to 3.5 MMb/d increase in supply, with an average supply of 102.7 MMb/d for the year. Most of the changes from last quarter are revisions to Russian production, a shift from 2022 to 2023 for shale growth under higher price outcomes, and some rationalization of risks.

OPEC+ will be ending its cuts at an accelerated rate, but this occurs at about the same time as the end of the coordinated SPR release, so the net impact of the two is roughly balanced. While this is going on, there are several other behaviors that are having similar significant, but 'balanced' outcomes. Global crude flows are displacing one another, with Russian exports proving relatively resilient in finding eastern customers, and other producers rotating toward Europe, showing that the one-pool-of-oil market theory holds true, with only tanker firms benefitting from this arrangement.

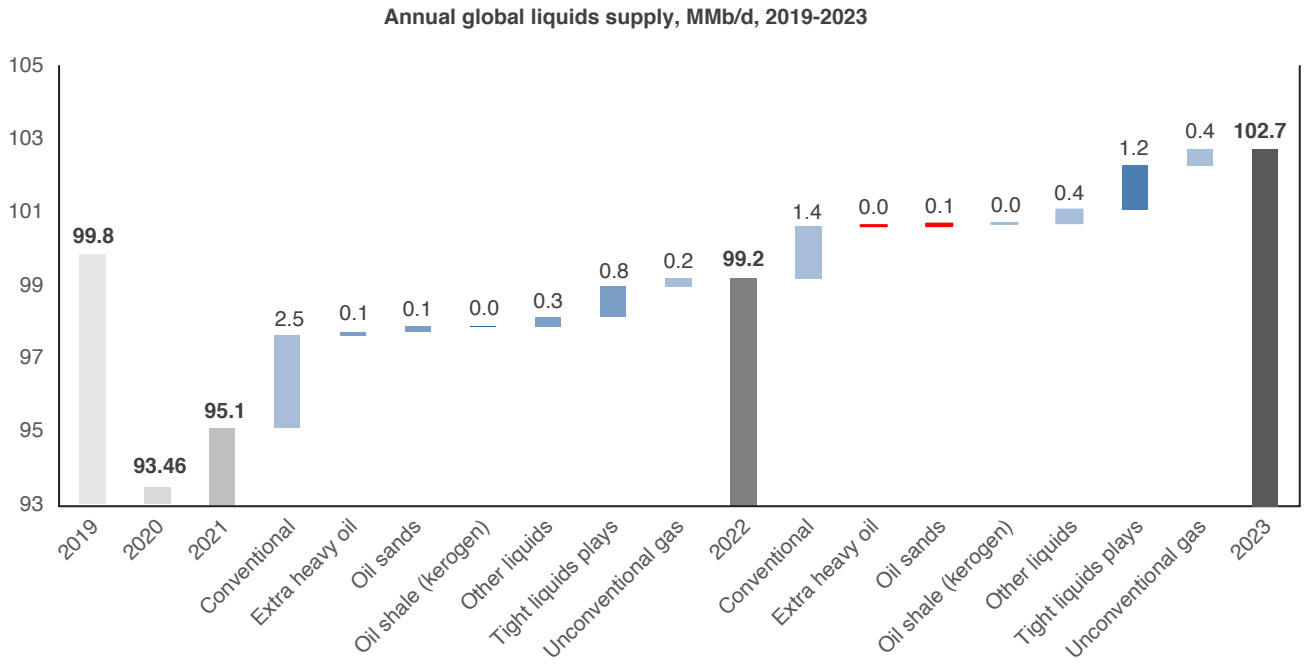
OPEC+ behavior after the end of the agreement will likely become mostly market-based, with slow growth from some members as repairs and upgrades proceed. Saudi Arabia may pull back production in early 2023 to preserve its spare capacity and calm the markets.

U.S. shale is in a particularly difficult position, with economics and politics pulling it in different directions. Government communications have become harsher, and mixed messaging makes it difficult to invest with confidence, but their investments are increasing overall. An offer by Harold Hamm to take Continental Resources private again serves as a bellwether of where some of the industry may be headed if these conflicting priorities continue.

Canadian oil sands are looking up slightly as a side-effect of firm but consistent government policy and a consolidation of investors less concerned with oil sands businesses transitioning to a lower carbon emissions model. Limitations on transportation will cap growth rates overall, with some variable use of rail in the short term.

The main story, and the driver of the market in the coming quarters, is a political one. U.S./EU/Russia/China/etc. will all work within their interests and needs, leading to some form of equilibrium. The one-pool-of-oil will likely flow around any obstacles as it is doing now, but local disruptions are very likely. The progressive phasing out of supplies and shifts of trade flows rely on an efficient supply chain and increases the impact of involuntary risks. The possibilities of a bad U.S. hurricane, another blockage of the Suez, or a terrorist attack on an oil facility are a reminder to the market of why spare capacity is a valuable resource.

Supply forecast...



Source: KAPSARC, June 2022.

OPEC+

OPEC+ has always tried to be a non-political organization and has focussed purely on business, but some in the media keep trying to apply a political angle to it. Russia's continued membership of the group is not a form of support, while the UAE and other members sending cargoes to Europe is not a form of protest against Russia. With the mantra of 'it's just business,' we can think about the impending end of the current production agreement and what the future may hold for the group.

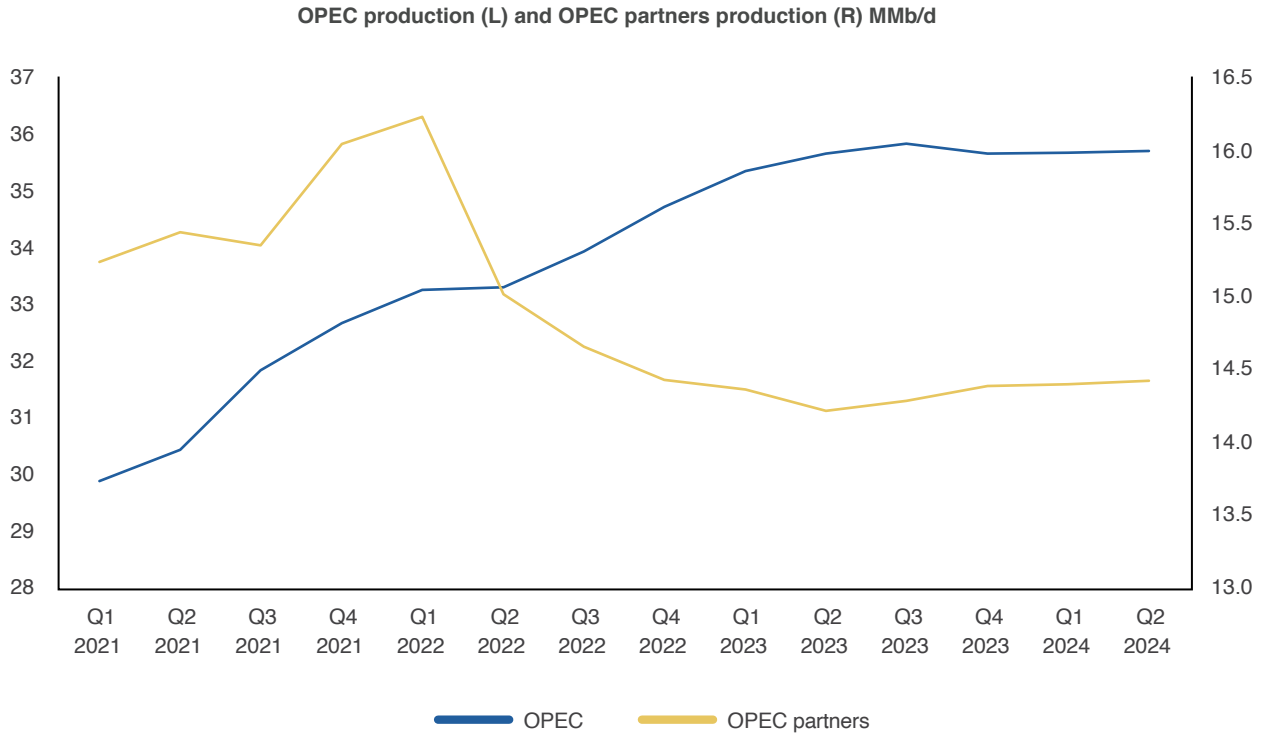
With some obvious exceptions, OPEC+ members should be in relatively high spirits. National budgets are in surplus, the COVID-19 pandemic has mostly eased, and the need for energy has given significant clout to individual members on the international stage.

The sanctioned members are seeing some of the most tangible benefits of being in the group. Venezuela is in talks with the U.S. and has a legitimate export route to the EU through Eni and Repsol to begin paying off its debts. Iran has increased its leverage in the Joint Comprehensive Plan of Action (JCPOA) discussions, and while there may not be an official resolution anytime soon, it is possible that shipments from Iran to the EU may be intentionally overlooked. This is particularly relevant as Chinese imports have been shifting toward Russian crude, displacing Iranian liquids. Interestingly, Iran, Venezuela and Russia are starting to operate as a mutual aid society in parallel to OPEC itself. Iran and Venezuela signed a 20-year cooperation pact and have been trading liquids, investment, tankers, and engineering knowledge. Iran and Russia are working together more closely, with official visits and knowledge transfers concerning how to operate under sanctions, and Russia/Venezuela appear to be supporting one another in the political and financial arenas.

For the other members, the short-term outlook is to apply their profits toward upgrading/fixing existing capacity where possible. Anyone with refining capacity is in a particularly good position, with crack spreads in the +$50/b range. African OPEC+ members could benefit especially from a cash injection to the industry, as European demand for their products has increased significantly. Visits from the U.S. and United Kingdom to the GCC show improved prospects for trade and security, but it will take time to see the impacts. In the longer run, plans to increase maximum capacity this decade have been discussed before, but have recently taken on a more urgent tone as the reality of energy security overshadows energy transition concerns.

Only Libya is truly struggling, with intermittent shutdowns due to domestic political problems. An almost total shutdown of 1.1 MMb/d (close to the SPR release in magnitude) serves as a warning of downside risks in the market and why keeping some spare capacity going forward may be prudent.

OPEC+...



Source: KAPSARC, June 2021.

OPEC and partners supply changes for 2021 – 2023, Kb/d

	2021	2022	2023
Mexico	(0.2)	(19.1)	(80.4)
South Sudan	(2.5)	7.3	14.4
Equatorial Guinea	(20.0)	(6.7)	(6.9)
Sudan	0.4	7.1	6.4
Brunei	10.9	(6.2)	(11.9)
Bahrain	(6.4)	9.5	(3.4)
Gabon	2.5	5.4	(12.2)
Malaysia	(29.6)	18.6	34.0
Congo	(12.5)	(5.6)	(38.4)
Azerbaijan	(2.8)	0.4	21.7
Oman	(10.0)	79.1	32.4
Algeria	-	104.0	41.8
Nigeria	(232.5)	(35.5)	19.5
Kazakhstan	12.3	25.0	65.3
Kuwait	(20.0)	300.1	206.2
Iran	432.5	141.9	113.6
Venezuela	60.0	193.4	47.1
UAE	(87.5)	383.1	362.1
Saudi Arabia	(93.0)	1,334.9	758.5
Iraq	(5.0)	396.7	130.5
Libya	795.0	(406.5)	206.3
Russia	146.9	(539.1)	(846.8)
OPEC	692.0	2,451.4	1,769.3
OPEC partners	118.9	(417.4)	(768.3)
OPEC+ TOTAL	810.9	2,034.0	1,001.0

Kb/d
50
0
-50
-100
-400

Source: KAPSARC, June 2022

OPEC+ spare capacity

Spare capacity is the most valuable resource on earth, but not for the reasons you might think.

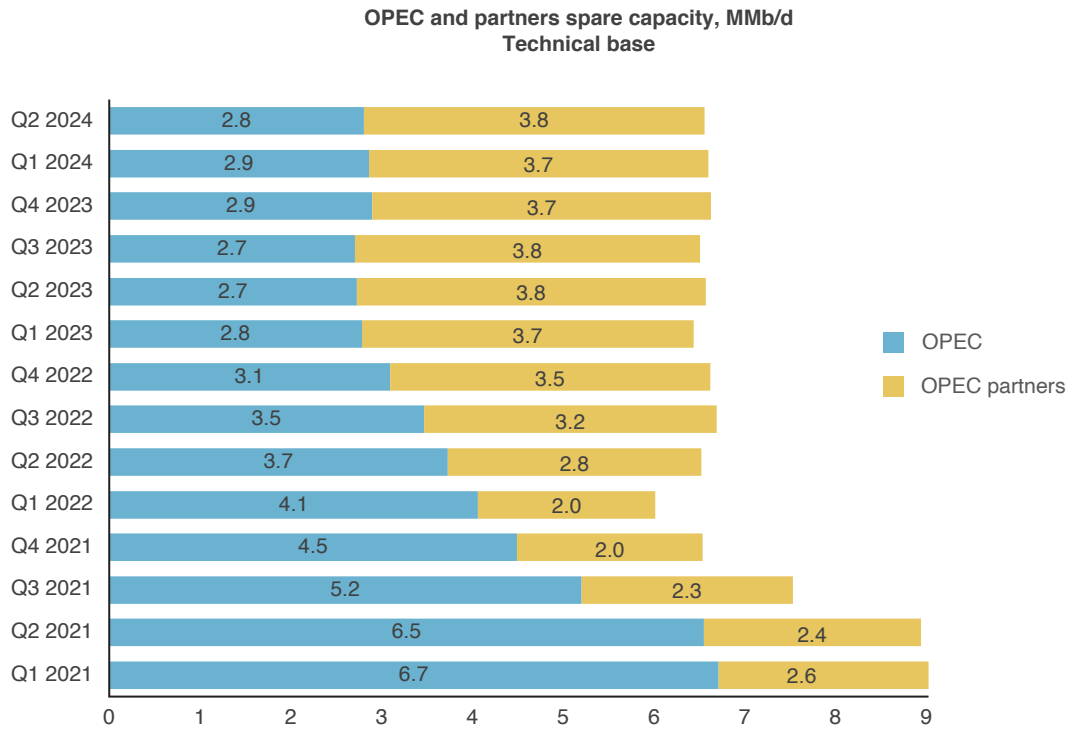
What is better, a stable market, or lower prices? This is the dilemma members of OPEC+ that hold spare capacity are asking themselves, while the rest of the world demands more production. In a static market, increased supply would be a benefit to all, but that is not the situation we find ourselves in. Increasing supply might accelerate sanctions against Russia and drain any price benefit to consumers. Even more alarming than this, a complete lack of spare capacity would leave the world exposed to shocks. The U.S. hurricane season started in June and this is projected to be an active year. Libya and other countries are experiencing more unrest than usual, and there are many reasons why a group or government might want to interfere with the global energy supply to make headlines. The volatility of a market with no spare capacity would be unlike anything we have seen.

While it is incredibly unpopular to say this, elevated but stable prices are much better in the short term. This is because it is estimated that the current levels include a +$30/b risk premium caused by market uncertainty – because nobody can be sure how much spare capacity there really is.

Since there is no spare capacity outside of OPEC+ and there has been inconsistent production growth from the members themselves, expectations of further supply have been lowered significantly. As mentioned in earlier editions of KOMO, the definition of spare capacity begins to blur if delayed growth and voluntarily closed capacity (Iran/Venezuela/Russia) are considered. However, we can ignore those considerations for now. In a very pessimistic scenario, the only holders of spare capacity are Saudi Arabia, Kuwait, Iraq, and the UAE. The size of that spare capacity is debatable, but the majority is held in Saudi Arabia.

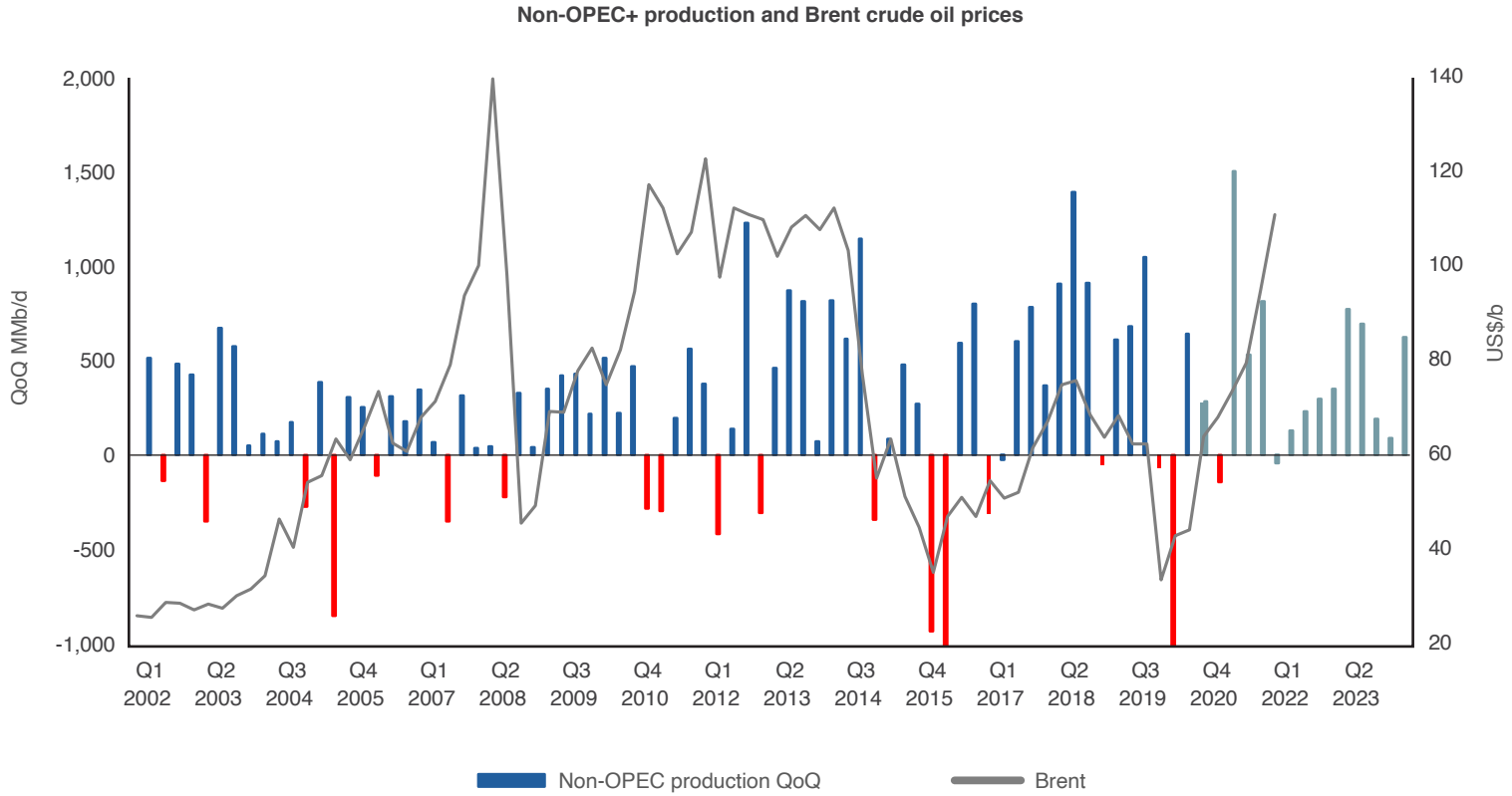
As part of our assumptions for the future, the KOMO team believes that as the members of OPEC+ end their current production agreement, they will continue to increase production as they are able to. However, as we begin to see a return to mild oversupply, there will be more value in lowering production slightly to a more ‘comfortable’ level. This is particularly the case for Saudi Arabia, which has a crude production target of 11 MMb/d. Whatever the market believes about spare capacity, this level probably leaves enough to cover short-term shocks and support market confidence.

OPEC+ spare capacity...



Source: Rystad; KAPSARC, June 2022.

Non-OPEC+



Source: IEA, March 2022; KAPSARC, June 2022.

Non-OPEC+ growth:

- In 2022, we expect the supply of global tight oil to rise by 1.120 MMb/d, and unconventional gas liquids to rise by 280 Kb/d, with oil sands reclaiming 170 Kb/d.
- In 2023, the outlook for global tight oil is a drop of 310 Kb/d, with unconventional gas liquids growing by 30 Kb/d, and oil sands staying effectively flat.
- Key issues for non-OPEC+ producers to consider are the political landscape and the levers available to OPEC+ and western nations to stabilize supply.

Non-OPEC (tight oil and oil sands)

"At a time of war – historically high refinery profit margins being passed directly onto American families are not acceptable,"- Letter from President Biden to oil companies

Indirectly calling domestic energy firms war profiteers is no way to make friends. Neither is threatening them with windfall taxes, export bans, or the Defense Production Act. Underinvestment in all areas of the U.S. energy market, including shale, has been driven by uncertainty in the long-term viability of energy businesses. Industry responses have illustrated this, with calls for clearer, more consistent policies, along with increased leasing activity and other requests.

Shale's ability to develop resources quickly should make it the least risky option for increasing production. It will be growing at a significant rate for the next couple of years, but not what we would have expected for an environment of oil prices above $100/b. Limitations in investment due to shareholder demand for returns, labor shortages, increased material costs, an uncertain policy landscape, and several other hurdles have been cited as reasons why shale production cannot grow to its full potential. While these are all good points, there is reason to wonder if they are all real concerns.

Continental Resources founder Harold Hamm offered to buy back all outstanding shares of the company and take it private again. This indicates that the benefit of a Continental Resources as a private firm over a public one is worth several billion dollars to Mr. Hamm, and certainly exceeds any other concerns he may have about the future of the American energy industry. The private firms have been leading the rebound from the pandemic so far and may continue to do so. For the public firms, growth may be tepid until a clear message is received one way or the other.

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

Source: KAPSARC, June 2022.

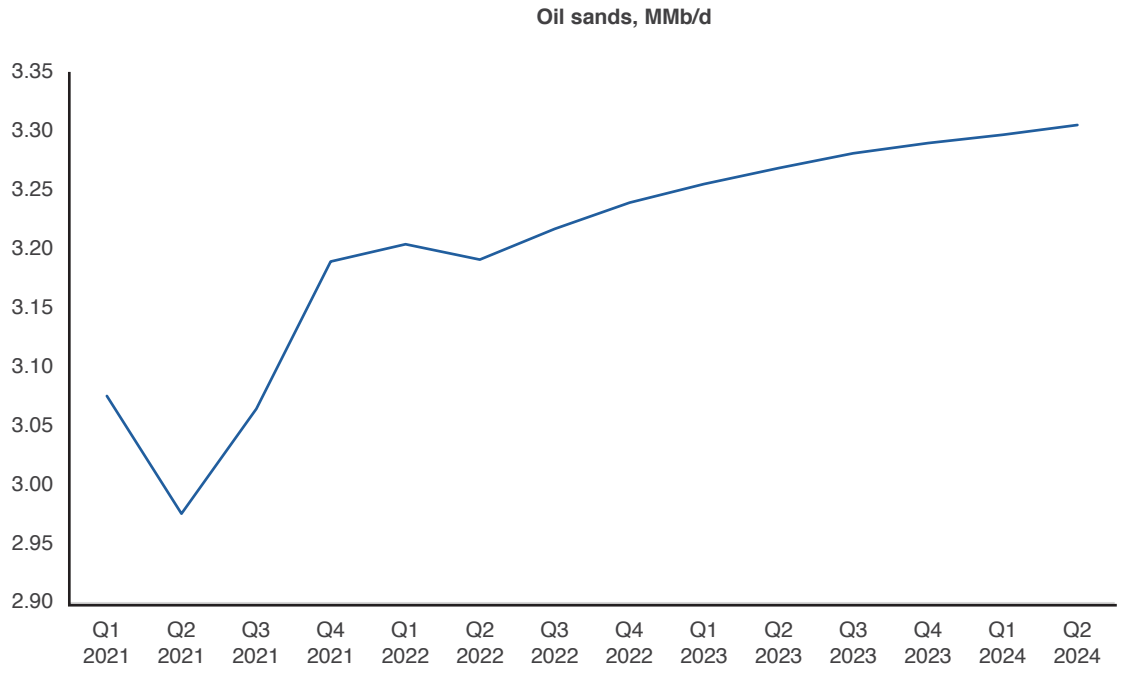
Non-OPEC (tight oil and oil sands)...

The ongoing trend of risk averse IOCs and investors moving away from oil sands is starting to look like a blessing in disguise. Those that remain in the market (either operating or investing) are much more supportive of the industry and sound almost enthusiastic. High oil prices have improved companies' profitability, and a generally weak economy has attracted more market interest overall. Unlike their American counterparts, the pressure on the Canadian oil sands industry to improve its environmental record has been firm and consistent, reducing uncertainty in the sector. Lastly, the social good angle of providing what is called 'ethical' oil to stressed allies is a political bonus.

It is uncertain, however, if the industry's perennial (and novel) logistics problems can be overcome. While not building the Keystone XL pipeline did limit some growth, oil sands production has been on a relatively steady path upward as incremental pipeline expansions and rail options allow further growth. Next year, the completion of the Transmountain pipeline to the pacific should be an opportunity to reach Asian markets and diversify the consumer base for Canadian bitumen.

In the short term, however, any substantial export increases would need to be delivered by rail to the Gulf of Mexico. Unfortunately, that means competing with the U.S. SPR releases flooding the local market until about October. After that, the Canadian producers may have more reasons to celebrate.

For now, with some margin of error, we expect oil sands to grow at a steady but restrained rate for the next eight quarters.



Source: KAPSARC, June 2022.

Risk scenarios January 2022

**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 the table below 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.

Risk category	Item	Supply/ demand	Impact (Kb/d)	2022	2023	2024
Producer supply risks	EU sanctions on Russian crude	Supply	↓500 - 1,000*			
	Guyana & Namibia strong YoY growth	Supply	↑100 - 150*			
	U.S production increase beyond 1 MMb/d	Supply	↑ 500 - 800*			
	JCPOA progress and more production from Iran	Supply	↑150 - 250			
	Venezuela increasing production	Supply	↑ 50 - 200			
	UAE, Kuwait and Iraq capacity to increase	Supply	↑ 500*			
Demand risks	Economic downturn	Demand	↓ 260 - 500			
	Continued inflation	Demand	↓ 230 - 500			
	China's lockdowns	Demand	↓ 60 - 200			
	Long haul/international aviation rebound	Demand	↑240 - 430			
	India's growth in oil demand exceeding pre-pandemic levels	Demand	↑ 0 - 170			

A resolution to the Russia-Ukraine conflict	Yes	65%
Oil prices remaining above $100/b	Yes	80%
OECD energy transition acceleration	No	55%
Tourism activity to resume to pre-pandemic levels	Yes	70%
U.S. dollar to continue getting stronger	Yes	50%
Euro exchange rate to remain weak against the US$	Yes	75%
Future domestic unrest	Yes	95%
Future economic downfalls in developing countries	Yes	100%
SPR releases to have an impact on oil prices	No	70%
Nigeria and Angola to reach pre-pandemic production levels	No	60%
Supply chain challenges impacting production	Yes	90%
Aviation to contract in some regions due to high prices	Yes	65%
U.S taking further measures to address fuel prices	Yes	70%

The results are based on a survey conducted biannually

* The survey results agree with the underlying model or assumptions, so the net impact is already accounted for.

2022 and 2023 Balances

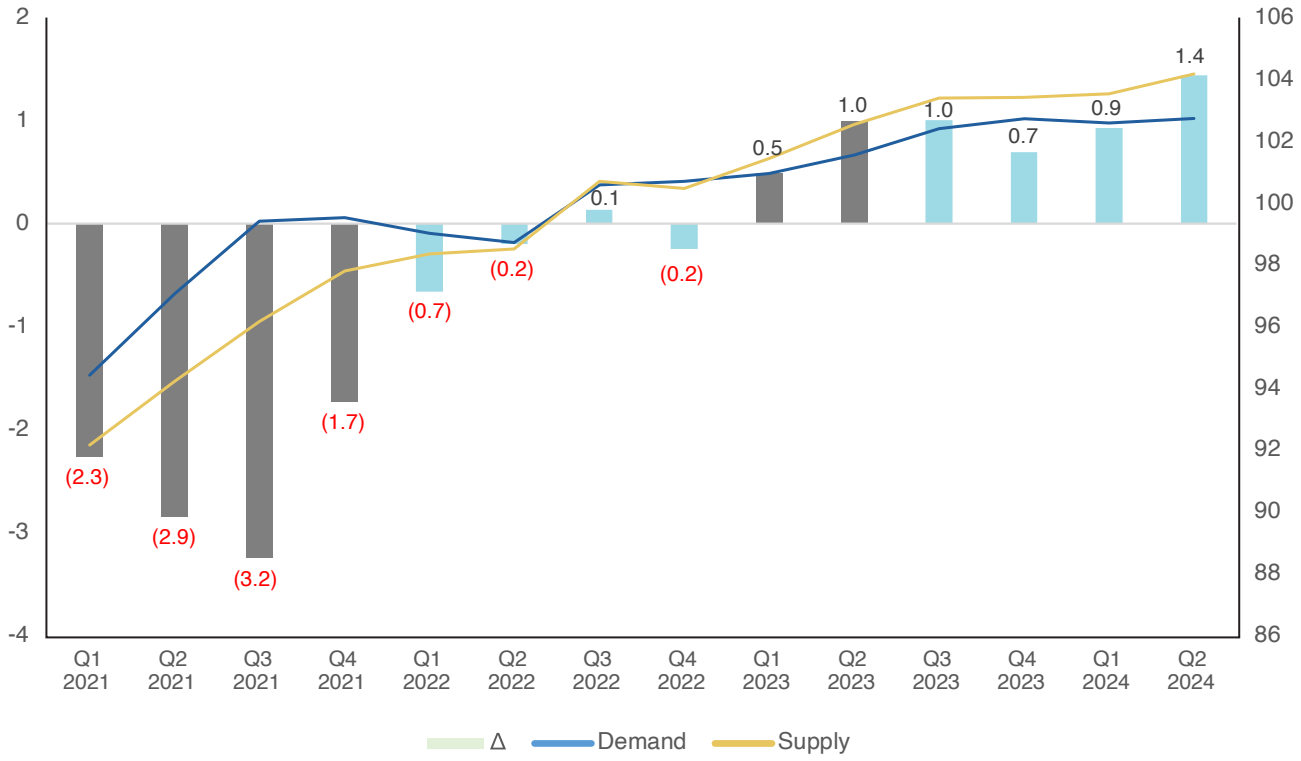
Given the recent changes to KOMO's supply/demand balances and the current price levels, we estimate an average deficit in 2022 of around 200 Kb/d, followed by a surplus of 800 Kb/d in 2023.

The KOMO forecast assumes that demand will continue to run strong, and OPEC+ will continue with its monthly increments throughout 2022 and reach its pre-cut level by 2023.

Throughout 2022, we expect a deficit in each quarter, except for Q3, when there is likely to be a surplus of 100 Kb/d. This estimation, however, has nothing to do with supply and demand balances as demand will grow by a significant margin this quarter, with Europe leading that growth while production lags. The actual deficit is expected to be 1.2 MMb/d. However, as the SPR releases ramp up, they are estimated to account for roughly 1.33 Mb/d.

The next quarter is expected to witness the final deficit of the COVID-19 era at 200 Kb/d, before bouncing into a surplus from 2023. Mounting pressure on OPEC and its partners to increase production continues. However, today's $30-40/b risk premium will seem small if the markets run without spare capacity. It is understandable that OPEC and its partners are taking a cautious 'wait and see' approach rather than overcorrecting too quickly. This is because it is easy for the group to increase production. Still, it would be significantly more challenging for them to bring production down and lose future market share after restricting their supply for so long. In fact, if OPEC+ members continued to increase without the safety net of spare capacity, bringing back that capacity would entail three to five more years of risk. So a moderate short-term price hike is better for both consumers and producers than the risk of a three-to-five-year price hike. At the end of the day, OPEC's mandate is to reduce market volatility, even if that entails making some hard decisions.

Quarterly supply demand balance, MMb/d, Q1 2021 - Q2 2024



Source: KAPSARC, June 2022.

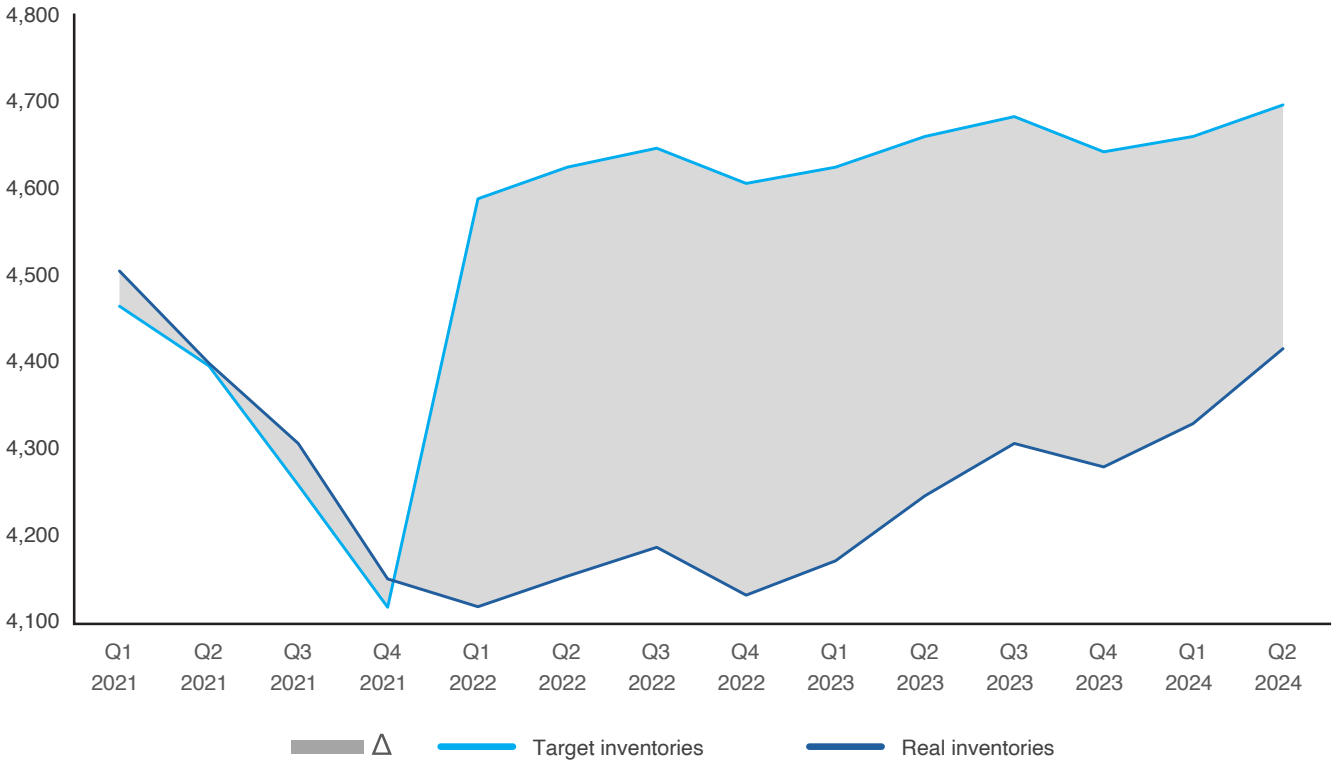
Price fundamentals (inventories)

Price movements for the foreseeable future will continue to be mainly influenced by evolving inventory levels, stagflation, and the Russian-Uranian conflict. It will also be pressured by the current high demand and lagging refiners. Other factors include OPEC+ increments. In this outlook, we expect target inventory levels to increase considerably due to the risk of geopolitical tensions as well as to make up for the past few quarters of declining inventories and SPRs (since Q2 2020). So, although real stockpiles are projected to continue increasing, target levels will remain higher. This dynamic will maintain prices above their fundamental values throughout the near future or until supply anxiety decreases.

Nevertheless, the political pressure on OPEC+ to increase production will continue in the coming months, despite the possible surplus in 2023.

In this regard, target inventory levels for the OECD are expected to rise by 308 MMb to 4,615 MMb in 2022 and by 36 MMb in 2023. Real inventory levels are expected to decline by 193 MMb and then increase by 103 MMb/d in 2023 to reach 4,248 MMb.

Target inventories vs. real inventories (L) and Brent prices (R) MMb



Source: EIA; KAPSARC, June 2022.

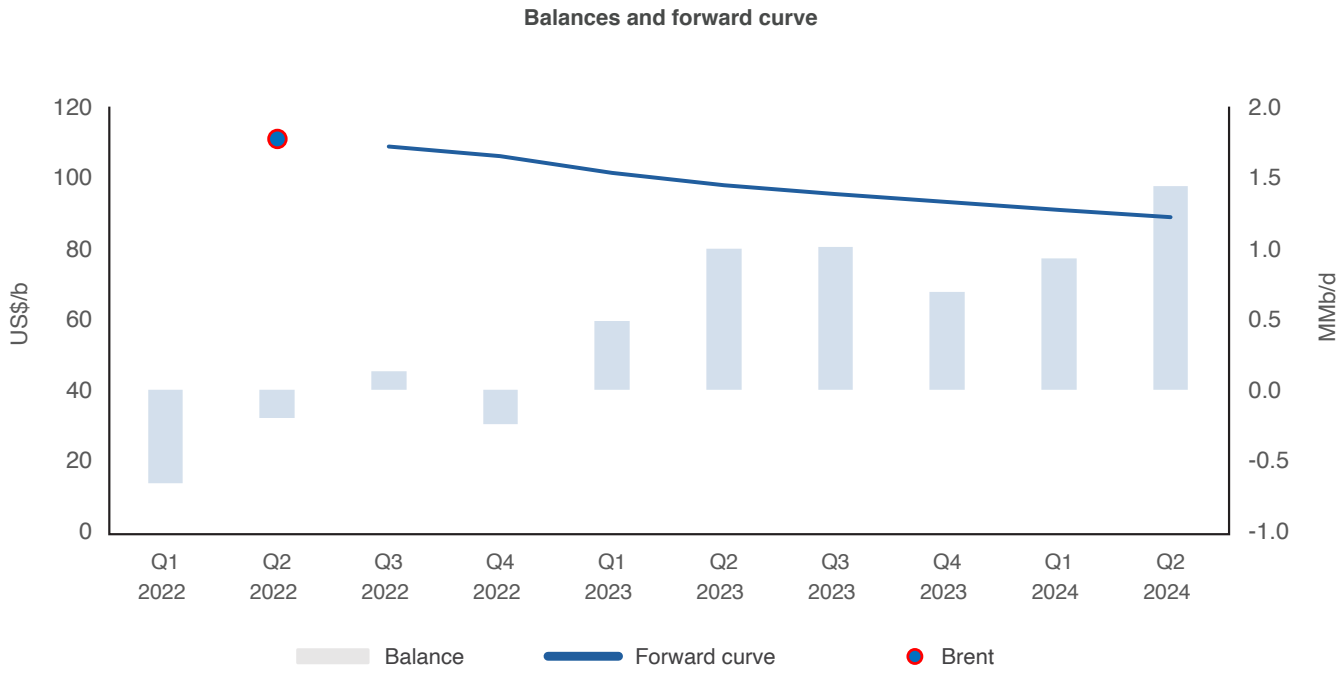
Price fundamentals (Brent)

	Q3 2022	Q4 2022	Q1 2023	Q2 2023	Q3 2023	Q4 2023
Bloomberg	107.54	99.76	97.93	93.58	93.74	
Market sentiment	100.75	100.25	101.67	97.67	91.33	83.00

	2022	2023	2024
Bloomberg	103.41	92.30	84.50
Market sentiment	100.08	87.17	

Source: Bloomberg, April 3, 2022.

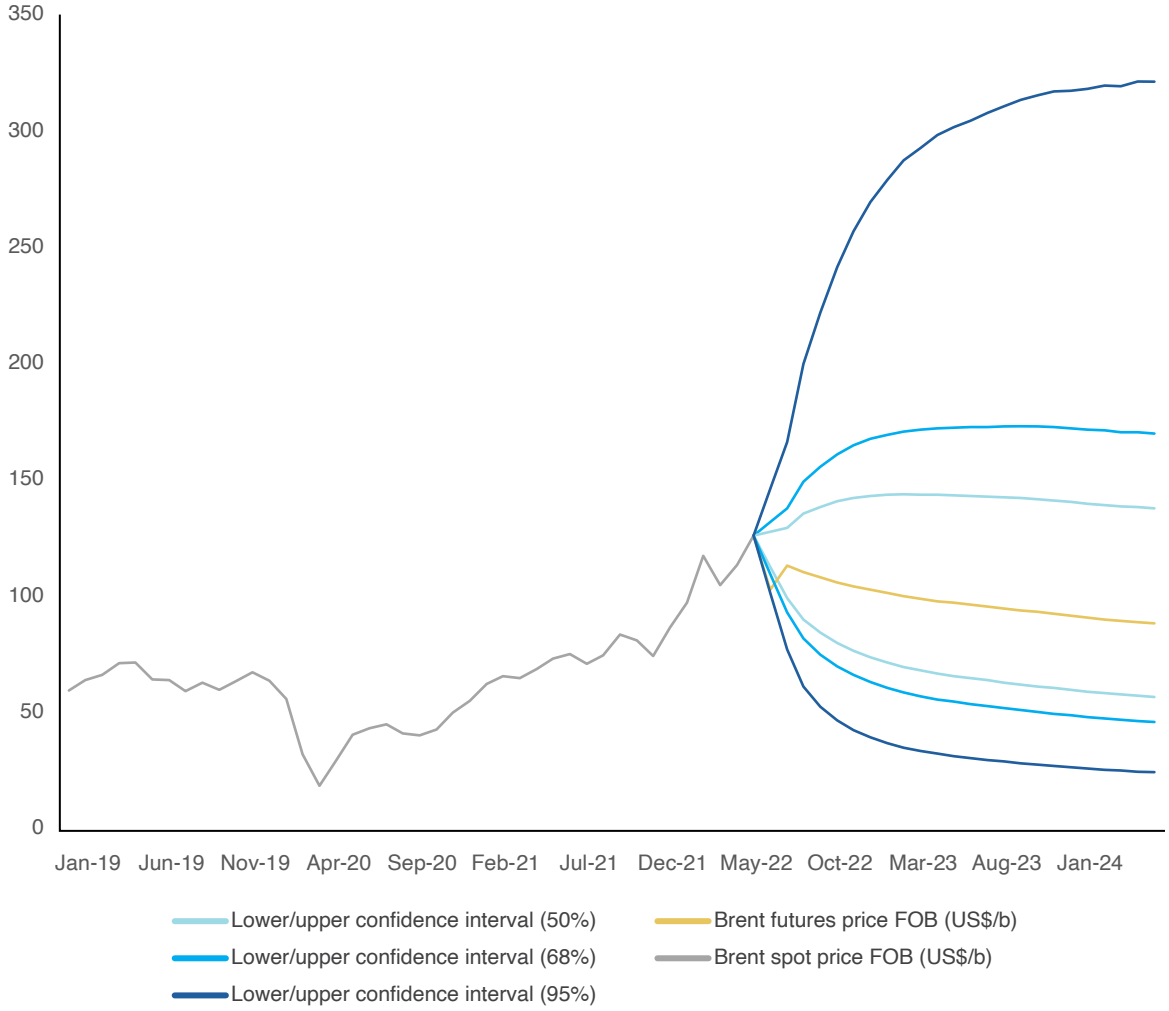
*Market sentiment is based on publicly available forecast data.



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.

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



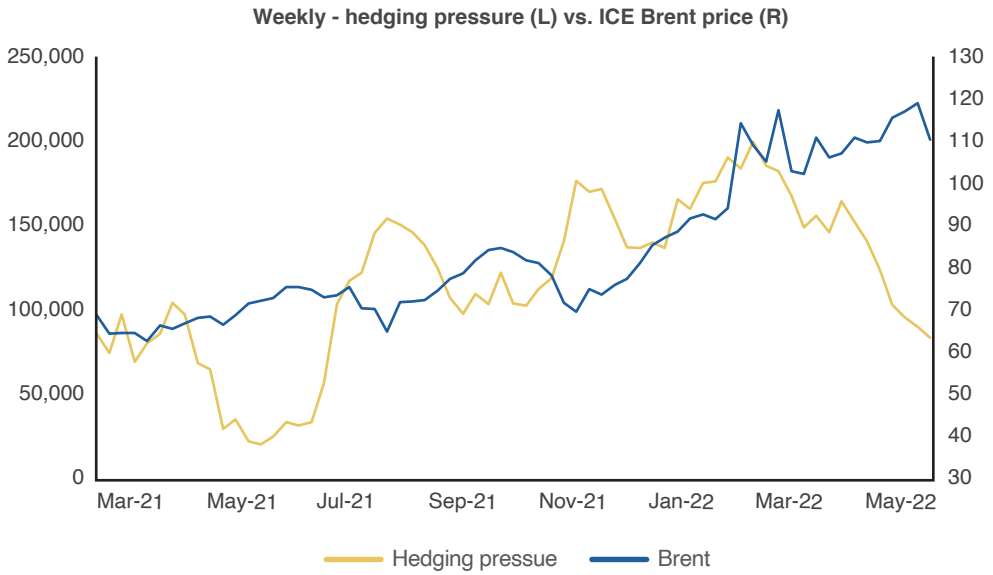
Source: KAPSARC calculations based on NYMEX data, CME Group, FINCAD, June 2022.

Note: FOB = free on board.

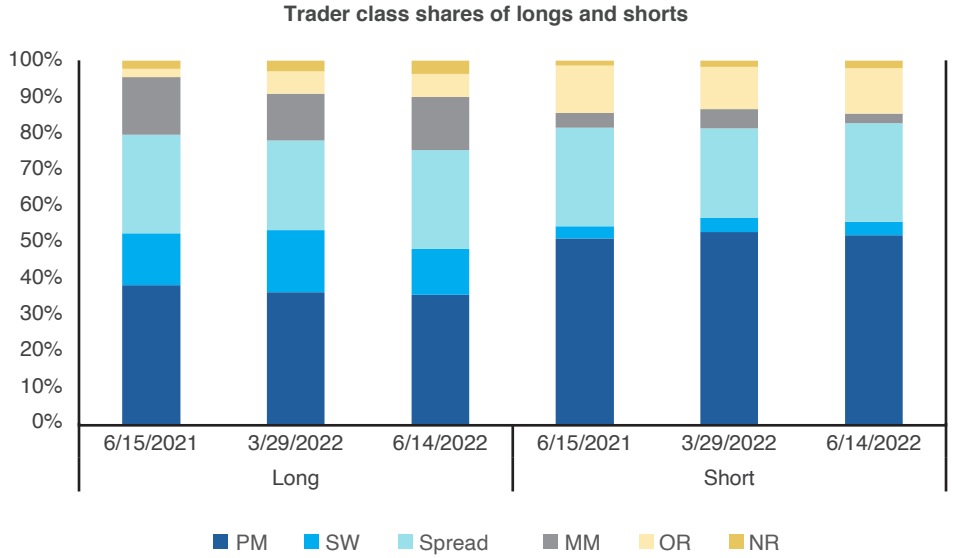
Price fundamentals (markets)

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 falling hedging pressure despite elevated prices in 2022, this could either mean that there is a significant number of long positions or that short positions are in decline. Data indicates that both of these possibilities are occuring. This could produce high prices, but what it really shows is that stock market investors are wary of falling financial market values or of future volatility.

Trader class shares: Despite the continued high prices of oil and other commodities, the overall number of trader positions has been declining. In fact, the daily number of oil trades between June 15, 2021 and June 14, 2022 shrank by roughly 24%. This means they have either exited the market or found lucrative opportunities in other commodities. However, during the last quarter, money managers' long positions have declined by 12%, but surprisingly their short positions have grown by roughly 53%, indicating that they believe in the backwardation forecasts and expect oil prices to decline.



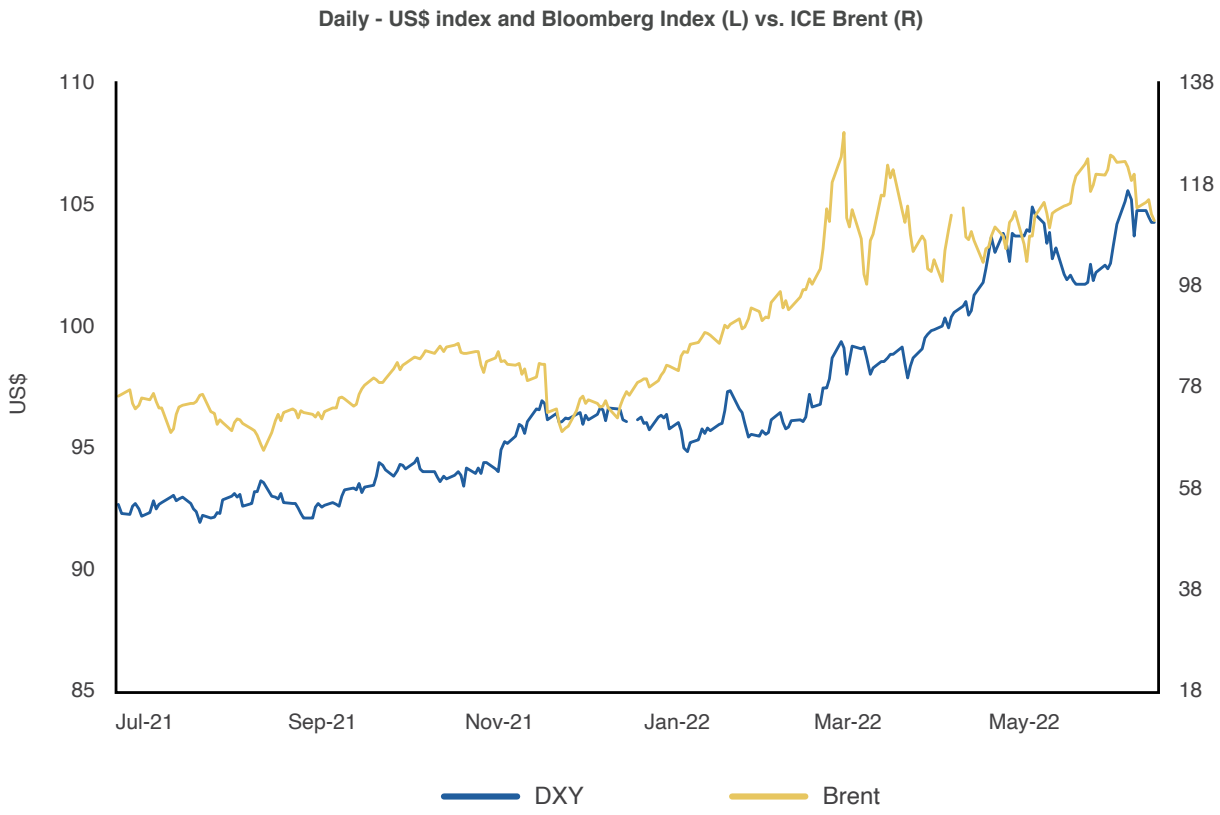
Source: Bloomberg, June 23, 2022.



Note: Refer to the glossary for abbreviations.
Source: Bloomberg, June 23, 2022.

Price fundamentals (markets)

U.S. Dollar Index: Although the U.S. Dollar Index (DXY) sometimes has a negative relationship with commodity prices, they have both been trending up recently. This has been partly fueled by the U.S. Federal Reserve (Fed) raising its risk-free interest rate alongside increased oil demand. Indeed, the U.S. economy is improving relatively quickly compared to other parts of the world, despite declines in its financial markets. As stated in the summary of this report, inflation has been playing a role in this trend, and it is expected to maintain this relationship in the coming months.



Source: Bloomberg, June 23, 2022.

Editorial: Capturing Saudi Electricity Demand Flexibility to Lower the System's Fuel Cost and Increase Oil Exports

Contributed by Salaheddine Soummane, KAPSARC

Saudi electricity demand is characterized by high seasonality due to weather variations. The load during the summer season amounts to two times the winter load, causing large disparities in the cost of electricity generation. Since 2016, Saudi Arabia has implemented price reforms and energy efficiency measures to curb its historically fast growing electricity demand. However, other options can lower the cost of operating the power system, thus saving fuel and potentially increasing exports. Load shifting, i.e., using demand flexibility to shift uses from peak periods to off-peak periods, is an important demand response mechanism. A recent KAPSARC study, "Cross-seasonal Fuel Savings from Load Shifting in the Saudi Industrial Sector: Insights Using a Power System Model," assessed the potential benefits of load shifting in the Saudi industrial sector. This study showed that partially displacing the industrial load from the peak season (i.e., summer) to the rest of the year results in fuel savings. These savings are achieved without reducing overall electricity consumption or altering end user prices. The study used a national dispatch model, representing the six Saudi Electricty Company's operating regions, to simulate several load-shifting scenarios. Overall, the projected national gains range from $7.9 million to $17.7 million per year at regulated fuel prices. When considering the low prevailing administered fuel prices, these account for only a small fraction of the overall fuel cost. Other reasons justify the savings level, such as the regional distribution of industrial demand and the current power mix. However, when considering the opportunity cost of saved fuel from load shifting, the savings range from $127.2 million to $239.4 million per year. These savings comprise between 4.2% and 8.1% of the power system's annual fuel cost.

From a policymaker's perspective, fossil fuel producers, i.e., in our case, oil, with regulated energy prices, face challenging trade-offs in fuel allocations to sustain government revenue while meeting increased domestic demand. Our results show the potential for freeing significant quantities of fuel without affecting the country's total electricity demand or altering end-user tariffs. This study is relevant not only in the Saudi context. Insights could also be useful for the region's oil and gas producers that share common features with Saudi Arabia, and that face high seasonality in power demand under regulated prices.

Based on our findings, we recommend three policy actions to unlock potential industrial load-shifting gains in Saudi Arabia. First, we recommend conducting pilot experiments at the industrial plant level to identify the technical flexibility potential of load shifting. We suggest assessing flexibility through audits and industry expert interviews. Second, we recommend considering various payment structures to incentivize scheduling demand to reflect the variability in the cost of electricity supply. As mentioned throughout the paper, load shifting in our approach is not tariff driven but rather by the marginal cost of generation, thus providing savings at the power system level. Third, we recommend establishing an enhanced understanding of the opportunity cost of saved fuel to maximize its value between domestic uses and exports to international markets.

Editorial: The 'Phasing Out' of E.U. Long-Term Gas Contracts – A Double-Edged Sword?

Contributed by Zlata Sergeeva, KAPSARC

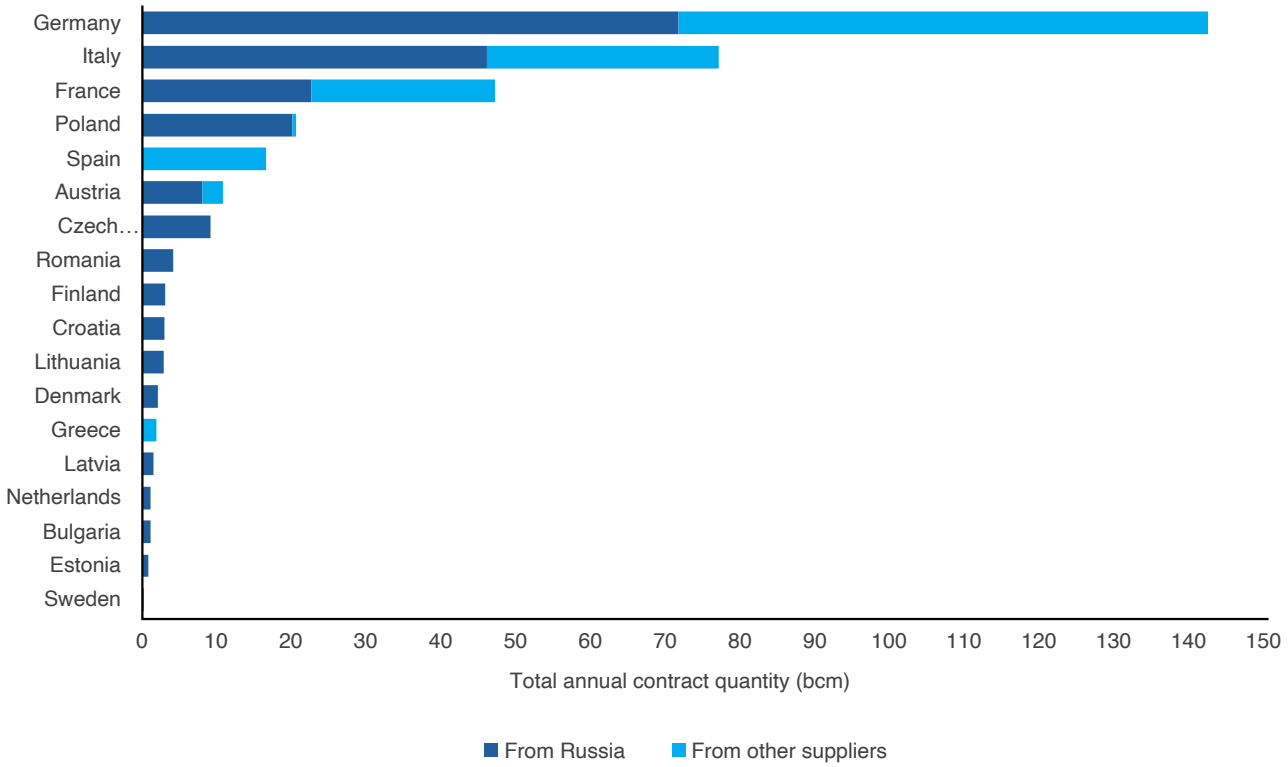
On December 15, 2021, the European Commission proposed a ban for long-term contracts of natural gas with "unabated emissions" imported into the European Union (EU) from non-EU countries that extends beyond 2049 (Krukowska 2021). The proposed framework in the Directive of The European Parliament and of the Council on Common Rules for the Internal Markets in Renewable and Natural Gases and in Hydrogen states that "No long-term contracts for the supply of unabated fossil gas shall be concluded with a duration beyond the end of the year 2049." However, it does not specify which gas will be considered 'unabated.'

The framework was positioned as an element for achieving the European environmental targets announced in 2020. Back then, the European Commission approved the European Green Deal, setting the EU's goal to achieve climate neutrality by 2050. Half a year later, on July 14, 2021, the Commission unveiled a detailed plan to achieve 55% emission reductions by 2030, the Fit for 55 Package. It included legislative proposals and policy initiatives related to, for instance, the EU Emissions Trading System, renewable energy, energy efficiency, and a carbon border adjustment mechanism.

The framework can also be perceived as a political instrument due to its disproportionate effect on the EU's relations with its major natural gas supplier, Russia, which is now accountable for almost half of the EU's pipeline imports. What is more important is that most of the volumes under the 70 existing long-term contracts with delivery to the EU countries are contracted to come from Russia (Figure 1). On the other side, Russia is heavily dependent on revenues from European countries, whose demand represents almost 82% of all Russia's exports. It will be very hard for both parties to survive without each other: No other exporter can substitute the volumes supplied to the EU from Russia. Furthermore, Russia cannot reroute all the volumes from Europe to another importer (especially considering the limitations of the pipeline routes that were built from Russia into the West, making Russia a hostage to existing pipeline infrastructure).

Editorial: The 'Phasing Out' of E.U. Long-Term Gas Contracts – A Double-Edged Sword?...

Figure 1. Total annual contract quantity (in billion cubic meters) of the long-term pipeline contracts between EU countries and their suppliers.



Source: Author, based on the Nexant World Gas Model 2021.

Editorial: The 'Phasing Out' of E.U. Long-Term Gas Contracts – A Double-Edged Sword?...

However, apart from political motivation, every piece of legislation should consider the economic implications of the issue. The implications of the framework are discussed in detail in the forthcoming KAPSARC discussion paper, "The Ban on Long-Term Natural Gas Contracts for the European Union: A Double-Edged Sword?" In short, long-term contracts are critical market mechanisms that provide security of supply for customers and security of demand for producers, thus helping shape and inform energy markets. The plans to phase them out for 'unabated' fossil gas could potentially disrupt not only the European but also global energy markets by causing the following consequences:

- **A surge in gas prices due to low-carbon gas imports and a potential shortage of conventional natural gas.**
  - In the absence of long-term commitments from customers, natural gas producers might be disincentivized to invest in production, which might lead to a shortage of natural gas in the world markets, which would drive prices to higher levels.
  - Given European efforts to replace Russian pipeline gas with gas from other countries that need to invest in either expanding existing production facilities (Qatar) or creating them from scratch (Israel and some African countries), the absence of future long-term contracts that guarantee a return on investment will inevitably become a stumbling block in negotiations with potential alternative suppliers of gas.
  - The abatement of emissions of natural gas is an expensive process due to the necessity of either deploying capital-intensive technologies like carbon capture, utilization and storage (CCUS), direct air capture (DAC), or purchasing carbon offsets from projects that reduce emissions elsewhere. As a result, carbon-neutral hydrocarbon products should be traded at a premium to conventional products. In a situation requiring a lot of investment into decarbonization measures, long-term contracts are needed to persuade investors that the demand for the product is guaranteed. However, the absence of a clear definition of 'unabated' fossil gas creates additional uncertainty.
- **Foregone government revenues to offset the rise in prices and economic crisis in most vulnerable countries.** For instance, Spain, Italy, and France together spent more than €5 billion from their budgets to support their citizens during periods of sharp increases in gas prices in 2021 (Sergeeva et al. 2022). Another example: Due to the surge in natural gas prices, the Pakistani government had to purchase a liquified natural gas cargo for a record price of $100 million, and is now facing severe blackouts (Stapczynski et al. 2022).
- **The necessity for gas producers to explore new markets and alternatives to market their gas.** Gas exporters are likely to move to the Asian market (where gas demand is projected to grow due to the increasing demand from developing countries) and/or offset emissions from natural gas to keep contracts in force. However, if they fail to do so, they will be forced to sell gas on the spot market, which is less predictable than long-term sales. Spot market volatility and a lack of security of demand could disincentivize traditional natural gas producers to invest in new projects, and it could discourage potential producers from entering the market unless other financial tools are developed and widely used.

Editorial: The 'Phasing Out' of E.U. Long-Term Gas Contracts – A Double-Edged Sword?...

- **Increase in the use of other fossil fuels such as coal for power generation.** This happened in 2021 when the United Kingdom had to fire up its coal plant West Burton A due to the low performance of renewable energy sources and soaring gas prices (Sergeeva et al. 2022), thus delaying and questioning the future of the energy transition.

Due to these reasons, the proposed European legislation might become a double-edged sword, endangering its intended beneficiaries.

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Appendix

World oil demand, 2021 - Q1 2024 (MMb/d)

			2021	Q1	Q2	Q3	Q4	2022	Q1	Q2	Q3	Q4	2023	Q1	Q2
Americas	OECD	United States	20.0	20.3	20.3	20.6	20.6	20.4	20.4	20.4	20.7	20.7	20.6	20.5	20.5
		Canada	2.4	2.4	2.4	2.5	2.5	2.4	2.5	2.4	2.6	2.6	2.5	2.5	2.4
		Mexico	1.7	1.8	1.8	1.8	1.9	1.8	1.9	1.9	1.9	1.9	1.9	1.9	2.0
		Chile	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.4	0.3	0.4
		Total	*24.5*	*24.8*	*24.9*	*25.3*	*25.3*	*25.1*	*25.2*	*25.1*	*25.5*	*25.5*	*25.3*	*25.3*	*25.3*
	Non-OECD	Argentina	0.6	0.6	0.6	0.6	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
		Brazil	3.0	3.0	3.0	3.1	3.1	3.0	3.0	3.0	3.1	3.1	3.1	3.0	3.1
		Venezuela	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
		RO Latin America	2.3	2.4	2.4	2.5	2.4	2.4	2.4	2.5	2.5	2.5	2.4	2.4	2.5
		Total	*6.3*	*6.4*	*6.5*	*6.5*	*6.5*	*6.4*	*6.3*	*6.5*	*6.7*	*6.7*	*6.5*	*6.5*	*6.7*
	Total Americas		**30.8**	**31.2**	**31.3**	**31.8**	**31.7**	**31.5**	**31.5**	**31.7**	**32.1**	**32.1**	**31.9**	**31.8**	**31.9**
Europe	OECD	Germany	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.3
		France	1.6	1.7	1.6	1.7	1.7	1.6	1.7	1.6	1.7	1.6	1.7	1.6	1.7
		United Kingdom	1.3	1.3	1.4	1.4	1.5	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
		Poland	0.7	0.6	0.7	0.8	0.8	0.7	0.7	0.7	0.8	0.8	0.7	0.7	0.7
		Turkey	0.9	0.8	1.0	1.1	1.1	1.0	0.8	1.0	1.1	1.1	1.0	0.8	1.0
		RO OECD Europe	6.6	6.5	6.2	6.8	6.8	6.6	6.8	6.8	6.9	6.9	6.9	6.8	7.0
	Total OECD Europe		13.3	13.2	13.1	14.1	13.9	13.6	13.7	13.8	14.2	14.0	13.9	13.6	14.1
Asia-Oceania	OECD	Australia	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.2	1.1	1.2	1.2
		Japan	3.5	3.8	3.2	3.4	3.8	3.5	4.0	3.3	3.4	3.7	3.6	3.9	3.2
		Republic of Korea	2.5	2.7	2.4	2.4	2.6	2.5	2.7	2.5	2.5	2.7	2.6	2.7	2.5
		New Zealand	0.2	0.2	0.1	0.1	0.2	0.2	0.2	0.1	0.1	0.2	0.2	0.2	0.1
		Total	*7.1*	*7.7*	*6.8*	*7.0*	*7.7*	*7.3*	*8.0*	*7.0*	*7.1*	*7.8*	*7.5*	*7.9*	*7.0*
	Non-OECD	China	15.0	15.2	15.1	15.3	15.5	15.3	15.6	15.9	15.6	15.8	15.7	16.0	15.7
		India	4.9	5.3	5.4	4.8	5.3	5.2	5.6	5.7	5.0	5.5	5.4	5.7	5.8
		Indonesia	1.7	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	2.1	2.0
		RO Asia	6.7	7.1	6.9	6.9	6.9	6.9	7.3	7.1	7.1	7.1	7.1	7.5	7.3
		Total	*28.3*	*29.4*	*29.3*	*28.9*	*29.5*	*29.3*	*30.4*	*30.6*	*29.6*	*30.3*	*30.2*	*31.3*	*30.8*
	Total Asia		**35.4**	**37.1**	**36.1**	**35.9**	**37.2**	**36.6**	**38.4**	**37.6**	**36.7**	**38.0**	**37.7**	**39.3**	**37.8**
Middle East	OECD	Israel	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
	Non-OECD	Bahrain	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		Iraq*	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.7	0.7	0.7	0.7
		Kuwait	0.4	0.4	0.4	0.5	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	3.6	3.1	3.8	4.2	3.4	3.6	3.1	3.8	4.2	3.4	3.6	3.1	3.8
		Qatar	0.2	0.2	0.3	0.3	0.3	0.3	0.2	0.3	0.3	0.3	0.3	0.2	0.3
		UAE	0.9	0.9	1.0	1.0	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.1	1.1
		Total GCC	*6.1*	*5.5*	*6.4*	*6.9*	*6.0*	*6.2*	*5.7*	*6.5*	*7.1*	*6.2*	*6.3*	*5.7*	*6.6*
		Iran	1.8	1.9	1.9	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0
		RO Middle East	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.4	0.4	0.4	0.5
		Total	*8.3*	*7.8*	*8.7*	*9.2*	*8.3*	*8.5*	*8.0*	*8.9*	*9.4*	*8.5*	*8.7*	*8.2*	*9.0*
	Total Middle East		**8.5**	**8.1**	**8.9**	**9.4**	**8.5**	**8.7**	**8.2**	**9.1**	**9.6**	**8.7**	**8.9**	**8.4**	**9.3**
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	2.7	2.8	2.8	2.6	2.8	2.7	2.9	2.9	2.7	2.9	2.9	3.1	3.0
	Total Africa		**3.9**	**4.1**	**4.1**	**3.9**	**4.1**	**4.0**	**4.3**	**4.2**	**4.0**	**4.2**	**4.2**	**4.4**	**4.4**
Eurasia	Non-OECD	Russia	3.7	3.7	3.3	3.4	3.1	3.4	3.1	3.2	3.6	3.6	3.4	3.3	3.3
		RO Eurasia	2.0	1.8	1.9	2.1	2.0	2.0	1.8	2.0	2.1	2.0	2.0	1.8	2.0
	Total Eurasia		**5.6**	**5.4**	**5.2**	**5.5**	**5.2**	**5.3**	**4.9**	**5.2**	**5.7**	**5.6**	**5.4**	**5.1**	**5.3**
	Global Demand		**97.6**	**99.0**	**98.7**	**100.6**	**100.7**	**99.8**	**101.0**	**101.5**	**102.4**	**102.7**	**101.9**	**102.6**	**102.7**

World oil supply, 2022 - Q2 2024 (MMb/d)

	2022 Q1	2022 Q2	2022 Q3	2022 Q4	2023 Q1	2023 Q2	2023 Q3	2023 Q4	2024 Q1	2024 Q2
Africa	7.38	6.96	6.98	7.19	7.28	7.35	7.37	7.37	7.38	7.36
Americas	33.66	34.98	35.66	36.04	36.13	36.97	37.55	37.64	37.76	38.41
Asia	9.19	9.22	9.04	8.97	9.11	9.08	9.04	8.99	8.92	8.85
Eurasia	14.35	13.17	12.79	12.56	12.50	12.35	12.43	12.54	12.58	12.61
Europe	4.08	4.06	4.09	4.27	4.42	4.51	4.57	4.58	4.56	4.56
Middle East	29.69	30.13	30.82	31.45	32.02	32.28	32.44	32.29	32.33	32.38
Total	**98.35**	**98.52**	**99.38**	**100.47**	**101.45**	**102.54**	**103.41**	**103.43**	**103.54**	**104.18**

	2022 Q1	2022 Q2	2022 Q3	2022 Q4	2023 Q1	2023 Q2	2023 Q3	2023 Q4	2024 Q1	2024 Q2
Conventional	71.31	70.73	71.02	71.66	72.44	72.61	72.82	72.59	72.40	72.20
Extra heavy oil	3.42	3.46	3.46	3.45	3.45	3.44	3.43	3.42	3.41	3.40
Oil sands	3.20	3.19	3.22	3.24	3.26	3.27	3.28	3.29	3.30	3.31
Oil shale (kerogen)	0.04	0.04	0.04	0.05	0.05	0.05	0.06	0.06	0.06	0.06
Other liquids	6.40	6.81	6.99	6.86	6.77	7.19	7.37	7.15	6.98	7.36
Tight oil	11.37	11.58	11.86	12.28	12.44	12.81	13.18	13.56	13.94	14.31
Unconventional gas	2.62	2.72	2.80	2.94	3.05	3.17	3.27	3.35	3.45	3.53
Total	**98.35**	**98.52**	**99.38**	**100.47**	**101.45**	**102.54**	**103.41**	**103.43**	**103.54**	**104.18**

	2022 Q1	2022 Q2	2022 Q3	2022 Q4	2023 Q1	2023 Q2	2023 Q3	2023 Q4	2024 Q1	2024 Q2
Algeria	0.97	1.00	1.03	1.04	1.05	1.05	1.05	1.05	1.05	1.05
Angola	1.15	1.18	1.15	1.14	1.13	1.12	1.09	1.04	0.99	0.94
Congo	0.27	0.29	0.25	0.24	0.23	0.22	0.22	0.22	0.21	0.21
Equatorial Guinea	0.09	0.09	0.09	0.09	0.09	0.09	0.08	0.08	0.07	0.06
Gabon	0.19	0.19	0.17	0.17	0.17	0.17	0.17	0.17	0.16	0.16
Iran	2.55	2.54	2.54	2.51	2.56	2.61	2.68	2.74	2.80	2.86
Iraq	4.30	4.42	4.52	4.58	4.58	4.59	4.59	4.59	4.59	4.59
Kuwait	2.61	2.69	2.74	2.82	2.89	2.90	2.95	2.95	2.95	2.95
Libya	1.06	0.60	0.60	0.75	0.83	0.93	1.00	1.07	1.13	1.18
Nigeria	1.27	1.25	1.26	1.30	1.30	1.30	1.29	1.26	1.27	1.28
Saudi Arabia	9.93	10.13	10.44	10.75	11.07	11.13	11.14	10.95	10.95	10.95
UAE	2.94	3.04	3.15	3.27	3.40	3.48	3.49	3.49	3.49	3.49
Venezuela	0.70	0.77	0.78	0.79	0.80	0.81	0.81	0.81	0.80	0.80
Oil field production	28.03	28.20	28.73	29.45	30.10	30.39	30.56	30.43	30.48	30.53
Other production	5.21	5.08	5.19	5.26	5.23	5.26	5.26	5.21	5.18	5.15
OPEC	**33.24**	**33.28**	**33.92**	**34.70**	**35.33**	**35.65**	**35.82**	**35.65**	**35.67**	**35.69**

	2022 Q1	2022 Q2	2022 Q3	2022 Q4	2023 Q1	2023 Q2	2023 Q3	2023 Q4	2024 Q1	2024 Q2
Call on OPEC	33.91	33.48	35.12	34.95	34.85	34.66	34.81	34.95	34.74	34.25
OPEC	33.24	33.28	33.92	34.70	35.33	35.65	35.82	35.65	35.67	35.69
OPEC Partner	16.23	15.01	14.64	14.42	14.35	14.21	14.28	14.37	14.39	14.41
Non-OPEC	48.88	50.23	50.82	51.35	51.76	52.69	53.31	53.40	53.48	54.08
Total	**98.35**	**98.52**	**99.38**	**100.47**	**101.45**	**102.54**	**103.41**	**103.43**	**103.54**	**104.18**

Glossary

MMb/d	Million barrels of oil per day
Kb/d	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.
Hedging pressure	HP = PMnS – MMnL, where PMnS is producer/merchant/processor/user net short, and MMnL is managed money net long. 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.
PM	Producers/merchants/processors/users
SW	Swap dealers
MM	Managed money
OR	Other reporters
NR	Non-reporters
OPEC partners	Azerbaijan, Bahrain, Brunei, Kazakhstan, Malaysia, Mexico, Oman, Russia, South Sudan and Sudan

About KAPSARC

The King Abdullah Petroleum Studies and Research Center (KAPSARC) is a non-profit global institution dedicated to independent research into energy economics, policy, technology and the environment across all types of energy. KAPSARC's mandate is to advance the understanding of energy challenges and opportunities facing the world today and tomorrow, through unbiased, independent, and high-caliber research for the benefit of society. KAPSARC is located in Riyadh, Saudi Arabia.

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 June 2022 was used in the preparation of this Report.

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