Energy Tidbits

Turning Point For Oil Markets: MBS Warns Saudi Can Take "Capacity" to 13 mmb/d And Then No More

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Short-Term Energy Outlook

Forecast highlights

- The July *Short-Term Energy Outlook* (STEO) is subject to heightened uncertainty resulting from a variety of factors, including Russia's full-scale invasion of Ukraine. The possibility of economic activity being less robust than assumed in our forecast could result in lower-than-forecast energy consumption. Factors driving uncertainty about energy supply include how sanctions affect Russia's oil production, the production decisions of OPEC+, and the rate at which U.S. oil and natural gas production rises.

- The spot price of Brent crude oil averaged $71 per barrel (b) in 2021, and we forecast the Brent price will average $104/b in 2022 and $94/b in 2023.

- Global oil inventories in the forecast rise by 0.8 million barrels per day (b/d) in 2022 and remain unchanged in 2023. Inventory builds in 2022 reflect rising production of liquid fuels in the United States and OPEC, paired with slowing liquid fuels consumption growth.

- We expect global consumption of liquid fuels will grow by 2.2 million b/d in 2022 and by 2.0 million b/d in 2023.

- We forecast that OPEC crude oil production will rise by 2.4 million b/d to average 28.7 million b/d in 2022 and will further increase to 29.3 million b/d in 2023. Crude oil production from OPEC members averaged 26.3 million b/d in 2021.

- U.S. crude oil production in our forecast averages 11.9 million b/d in 2022 and 12.8 million b/d in 2023, which would set a record for most U.S. crude oil production in a year. The current record is 12.3 million b/d, set in 2019.

- U.S. regular gasoline retail prices averaged $4.11 per gallon (gal) in the first half of 2022 (1H22), up from $2.78/gal in 1H21. We forecast gasoline prices will average $4.05/gal in 2022 and $3.57/gal in 2023. U.S. diesel prices averaged $4.91/gal in 1H22, up from $3.06/gal in 1H21. We forecast diesel prices will average $4.73/gal in 2022 and $4.07/gal in 2023.

- U.S. refineries average 94% utilization in the third quarter of 2022 (3Q22) in our forecast, as a result of high wholesale product margins. Although we expect that refinery utilization will be at or near the highest levels in the past five years, operable

Note: EIA completed modeling and analysis for this report on Thursday, July 7, 2022

U.S. refinery capacity has fallen by about 1 million b/d. As a result, we do not expect U.S. refinery output of products to reach its highest level in the past five years.

- The spot price of natural gas at Henry Hub averaged $6.07 per million British thermal units (MMBtu) in the first half of 2022 (1H22). The average price increased in each month from January through May, when it reached $8.14/MMBtu before declining to $7.70/MMBtu in June. We expect the Henry Hub spot price will average $5.97/MMBtu in 2H22 and average $4.76/MMBtu in 2023.

- We estimate that U.S. liquefied natural gas (LNG) exports averaged 11.2 billion cubic feet per day (Bcf/d) in 1H22, compared with 9.5 Bcf/d in the same period in 2021. We expect LNG exports to average 10.9 Bcf/d in 2022 and 12.7 Bcf/d in 2023. We reduced our forecast for LNG exports in 2H22 as a result of the outage at the Freeport LNG export facility in Texas. Our forecast assumes the facility will return to near full operations in January 2023.

- U.S. dry natural gas production in the forecast averages 96.2 Bcf/d in 2022, up 2.7 Bcf/d (3%) from 2021. We forecast average production will increase to almost 100.0 Bcf/d in 2023.

- Compared with the 2021, U.S. natural gas consumption in the forecast will increase by 2.9 Bcf/d (3%) to average 85.9 Bcf/d in 2022 and then fall to 85.4 Bcf/d in 2023.

- We forecast U.S. natural gas inventories will end October 2022, the end of the 2022 storage injection season, at almost 3.5 trillion cubic feet, which would be 6% below the 2017–21 average for the end of October and down 5% from October 2021.

- U.S. consumption of electricity increases in the forecast by 2.3% in 2022, largely because of rising economic activity. Growth in electricity consumption slows to 0.6% in 2023.

- The largest increases in U.S. electricity generation in our forecast come from renewable energy sources, mostly solar and wind. We expect renewable sources will provide 22% of U.S. generation in 2022 and 24% in 2023, up from a share of 20% in 2021.

- We forecast that the cost of natural gas to U.S. power generators will rise from $4.97/MMBtu in 2021 to $6.35/MMBtu in 2022. Despite the increase, we forecast the share of natural gas in U.S. generation will average 37% in 2022, about the same as last year. The similar share of natural gas generation despite higher prices results partly from our forecast that electricity generation from coal will decline from 23% of the total in 2021 to 21% in 2022 and to 20% in 2023, which reflects the continued retirement of coal-fired generating capacity and other coal market constraints.

- We forecast the U.S. residential electricity price will average 14.4 cents per kilowatthour in 2022, up 5.3% from 2021. Higher retail electricity prices largely reflect an increase in

wholesale power prices driven by rising natural gas prices. Annual average wholesale prices for 2022 range from an average of $50 per megawatthour (MWh) in the Southwest Power Pool market to $85/MWh in the ISO New England market.

- We expect energy-related carbon dioxide (CO_2) emissions in the United States to increase by 1.5% in 2022 and remain generally unchanged in 2023.

Global liquid fuels

After more than two years of price volatility in global oil markets stemming from responses to the COVID-19 pandemic, Russia's full-scale invasion of Ukraine has added further uncertainty and volatility to markets in 2022. Global oil consumption has outpaced the global oil supply since mid-2020, which, combined with the increased risk that global oil supply could be constrained, has put significant upward pressure on both crude oil and petroleum product prices. Because production has not kept up with demand, commercial oil inventories in the OECD have fallen outside of their five-year (2017–2021) range and are near their lowest levels since 2014.

Oil consumption outpacing oil production has led to persistent withdrawals from global oil inventories. We estimate that global oil inventories declined for seven consecutive quarters starting in the third quarter of 2020 (3Q20) and continuing through 1Q22. Inventories declined at an average rate of 1.4 million barrels per day (b/d) over that period. The Brent crude oil spot price increased from an average of $43 per barrel (b) in 3Q20 to an average of $114/b in 2Q22.

For 2Q22, we estimate that inventories rose for the first time on a quarterly basis in two years. We expect global oil inventories will rise by an average of 0.8 million b/d in 2022 and be mostly unchanged in 2023. Inventory builds in 2022 generally put downward pressure on crude oil prices. However, we expect prices to stay elevated as inventories remain below their recent five-year average for most of the forecast, which will likely keep crude oil prices volatile. The Brent price averages $104/b in 2022 and $94/b in 2023 in our forecast.

Uncertainty in global oil markets has increased during 2022. On the demand side, the impacts of COVID-19 restrictions on oil consumption have increasingly been centered in China. In addition, given the potential for high fuel prices, inflation, and slowing economic activity, fuel demand might decrease in the coming months. On the supply side, heightened geopolitical risks and uncertainty stemming from Russia's full-scale invasion of Ukraine have increased. The full impact of sanctions against Russia remains uncertain. There is additional uncertainty about whether OPEC+ members will meet their increasing production targets and the responsiveness of new crude oil production to current high prices.

***Global petroleum and other liquid fuels consumption*.** We forecast global consumption of petroleum and other liquid fuels will grow by 2.2 million b/d in 2022. This growth is less than our January STEO forecast 2022 growth of 3.6 million b/d. Our reduced consumption forecast reflects the reduced global GDP forecast and the COVID-related lockdowns in China during the

first half of 2022 (1H22). Our global economic forecasts come from Oxford Economics, which forecasts GDP will increase by 3.2% in 2022 compared with the 4.5% we used in the January STEO. Forecasted GDP grows by 3.3% in 2023, and global consumption of petroleum and other liquid fuels grows by 2.0 million b/d in 2023.

We forecast of OECD oil consumption grows by 1.2 million b/d in 2022, and non-OECD consumption grows by 1.0 million b/d. If realized, 2022 would be the first year growth in oil consumption in the OECD outpaces growth in non-OECD consumption since 1999. Economic growth is the main driver of oil consumption growth throughout the forecast, but how higher oil prices, increasingly tight monetary policy, and a stronger U.S. dollar will affect world oil consumption in 2H22 and 2023 remains uncertain.

Many countries have significantly eased or have eliminated the restrictions on travel, mobility, and economic activity that were imposed to lessen the spread of COVID-19. China has been an exception; the government imposed a strict city-wide lockdown in Shanghai, is conducting mass testing, and is isolating significant portions of the population in an effort to control an outbreak of COVID-19 that occurred in March 2022. The lockdown in Shanghai continued for nearly all of 2Q22 and severely limited mobility and business activity in that city. Many of China's larger cities, including Beijing, also experienced COVID-19 outbreaks in 2Q22 that restricted mobility and business activity, although less so than in Shanghai. The outbreaks of COVID-19 in China and related restrictions lowered China's oil consumption in 2Q22. Although the government began easing restrictions in a number of China's cities in May 2022, some limitations on business activity and mobility continue and are expected to linger into 3Q22. Oil demand in China could fall further than we expect in the event of future outbreaks.

Non-OPEC production of petroleum and other liquid fuels. We expect non-OPEC production will increase by 2.2 million b/d in 2022 and by an additional 0.6 million b/d in 2023. The United States leads production growth among non-OPEC countries in our forecast, and Brazil, Canada, and Norway also contribute significantly to growth. Production increases in these countries more than offset a decline in Russia's driven by sanctions and independent corporate actions.

This forecast reflects the implementation of the European Union's (EU) sixth package of sanctions on Russia, with imposition of a crude oil import ban by early December 2022 and petroleum products import ban by early February 2023. These sanctions will ban most EU crude oil and petroleum product imports from Russia and will prohibit EU companies from providing certain services, including insurance and reinsurance, to ships that carry Russian oil cargoes. We assume that the United Kingdom will implement similar services sanctions, including insurance and reinsurance. However, the EU's sixth package of sanctions does not ban EU-owned and EU-operated tankers from transporting Russian crude oil and products.

Our forecast assumes that although some EU shippers will no longer participate in the trade of Russia's crude oil and petroleum products, sufficient shipping capacity exists to carry Russia's

previous exports to the EU to alternative (non-EU) destinations instead. We expect that about half of these petroleum products will go to countries in Africa and Asia and that most of these crude oil exports could find alternative buyers, mainly in Asia.

We also assume that given the timeline of the implementation of sanctions, tanker owners and operators will be able to secure alternative services, including sovereign guarantees or alternative insurance and reinsurance policies, to replace most of those currently provided by EU and UK companies. Some shippers currently involved in trade with Russia will voluntarily stop shipping Russia's oil.

Our assumptions about the EU import ban and the reduced availability of shippers are reflected in our lower forecast on Russia's crude oil production for 2023. Russia's production will ultimately depend on how markets and trade flows evolve based on these sanctions as well as any other potential future sanctions. We forecast Russia's production of liquid fuels will fall to an average of 10.4 million b/d by 4Q22, down from 11.3 million b/d in 1Q22. We expect that Russia's production will fall to 9.1 million b/d by the end of 2023.

Brazil's liquid fuels production in our forecast increases from 3.7 million b/d in 2021 to 3.9 million b/d in 2022 and to 4.1 million b/d in 2023. Our forecast assumes that production from six new floating production storage and offloading (FPSO) units will ramp up through 2023 and continue to drive growth, notably at the Sepia, Mero, and Buzios fields.

Liquid fuels production in Canada in our forecast rises by 0.2 million b/d in 2022 and by 0.1 million b/d in 2023, bringing production to 5.9 million b/d in 2023. Canada's production growth is driven primarily by oil sands expansion and debottlenecking projects following the expansion of the Enbridge Line 3 pipeline (with a capacity of 760,000 b/d), which became operational in October 2021. The TransMountain pipeline expansion project (with a capacity of 890,000 b/d) is set to begin service at the end of 2023. Additional expansions and optimizations to Enbridge's existing pipeline system, if completed, will add more than 400,000 b/d of export capacity over the forecast period. This new pipeline capacity from Enbridge and other planned pipeline expansions will reduce existing constraints on Canada's crude oil exports by the end of 2023.

We forecast that production of liquid fuels in Norway will remain mostly flat in 2022, but we expect it to increase by 0.3 million b/d in 2023, reaching 2.3 million b/d. Growth largely reflects the completion of phase two of the Johan Sverdrup expansion project, which is scheduled to come online in 4Q22. We expect the combined production from this phase and from phase one to reach 720,000 b/d at full capacity.

The remaining key sources of forecast non-OPEC production growth come from China, Argentina, and Guyana. Notably, Guyana first began producing oil in December 2019. We expect that Guyana will be a source of liquid fuels production growth in 2022 and 2023, driven by new offshore oil resources such as the Liza oil field. We expect oil production in Guyana to increase from an average of 110,000 b/d in 2021 to 240,000 b/d in 2022 and 340,000 b/d in 2023.

We forecast that output from a number of other non-OPEC producers, notably Indonesia and Colombia, will decline in 2022 and 2023.

OPEC production of petroleum and other liquid fuels. At the June 2022 OPEC+ meeting, participants reaffirmed their decision to advance their planned September production increase to July and August and to continue their production agreement through December 2022 to compensate for some under-producing members. Notably, they made no adjustments to reflect reduced crude oil production from Russia as a result of sanctions. Our forecast assumes that OPEC+ member countries will not fully increase production in accordance with their targets in 2022. In addition to less oil from Russia, some countries will be unable to meet their new targets because of limited production capacity, and other countries will limit increases because of uncertainty over the magnitude of Russia's oil losses as well as weakening global oil demand.

OPEC crude oil production averaged 28.3 million b/d in 1H22, up 3.0 million b/d from the same period in 2021. We forecast that average OPEC crude oil production will increase to an average of 29.1 million b/d in 2H22 and then increase to 29.3 million b/d in 2023. Our OPEC crude oil production forecast is subject to considerable uncertainty, driven by a wide range of possible outcomes for country compliance with existing production targets and for future global demand growth.

We expect that surplus OPEC crude oil production capacity will decline from 5.2 million b/d in 2021 to an average of 2.8 million b/d in 2022 as OPEC production increases. We expect it to decline further to an average of 2.6 million b/d in 2023, compared with an average surplus capacity of 2.6 million b/d from 2010 to 2019.

Iran, Libya, and Venezuela are OPEC+ members that are not subject to production targets. Our STEO forecast assumes current U.S. sanctions remain in place for Iran and Venezuela for the entire forecast period. We also expect that OPEC+ will not implement further production cuts to accommodate any potential increases in oil output from Iran or Venezuela.

After five years of declines, Venezuela's crude oil production rose from 0.5 million b/d in 2020 to almost 0.6 million b/d in 2021, driven by increased service company activity and increased access to condensate and other diluents for blending with Venezuela's heavy crude oil. Even though Venezuela's crude oil production increased in 2021, its prospects are limited while sanctions remain. Overall, we expect that Venezuela's crude oil production will decline as long-run operational difficulties, including lack of field and facility maintenance, continue and as sanctions remain in effect.

Libya's crude oil production declined from 1.1 million b/d in February 2022 to less than 700,000 b/d in June. Civil unrest and protests in Libya have disrupted crude oil production and exports since mid-April. Armed militias blockaded several export facilities and large fields in the southwestern region, including Sharara, the country's largest oil field. This political strife continues to affect the oil sector, leading to disruptions in crude oil production and exports. Our

forecast for Libya's crude oil production is subject to heightened uncertainty as a result of the tentative political and security situation in Libya and the lack of a budget to support oil and natural gas infrastructure maintenance and repairs.

OPEC non-crude oil liquids. OPEC production of non-crude oil liquids averaged 5.4 million b/d in 2021, reflecting increases in production of associated liquids as a result of higher OPEC+ production targets. We expect that production of non-crude oil liquids will increase further in 2022 to 5.5 million b/d and remain relatively unchanged in 2023.

Global oil inventories. We estimate that global oil inventories decreased by an average of 1.4 million b/d from 3Q20 through 1Q22. In our forecast, global oil inventories increase by 1.2 million b/d in 2H22. Inventory growth in 2022 largely reflects growth in global oil production paired with slowing growth in oil consumption. However, we expect decelerating production growth will lead to mostly balanced markets in 2023, with inventory levels mostly unchanged next year.

Commercial oil inventories in the OECD totaled 2.6 billion barrels at the end of 2021. We expect oil inventories in the OECD to rise to more than 2.8 billion barrels at the end of 2022 and remain at that level at the end of 2023.

Crude oil prices. The Brent crude oil price has increased from an average of $87/b in January 2022 to $123/b in June. Crude oil prices increased in 1H22 following Russia's full-scale invasion of Ukraine in February. As a result of the invasion, several countries imposed sanctions on imports of crude oil and petroleum products from Russia. In addition, many international oil companies and other firms ended operations in Russia and limited or stopped trading Russia's crude oil and petroleum products. These actions have reduced Russia's oil production and caused crude oil prices to rise. Several OPEC+ members have produced below their targets, which has also put additional upward pressure on oil prices. These factors, along with already low global inventories, have intensified both upward oil price pressures and oil price volatility.

We expect the Brent crude oil price will average $101/b in 2H22 and then fall to $94/b in 2023. The forecast price declines are the result of expected increases in global oil inventories in late 2022. Most of the price declines in our forecast occur in 2H22, with prices falling from $123/b on average in June to $97/b in 4Q22. Although inventories build in our forecast, they are currently lower than in 2019, which may limit some of the downward price pressures associated with rising inventories and raises the potential for continuing volatility. In addition, we expect more balanced markets in 2023. As a result of this balance, crude oil prices in our forecast decline slowly through 2023, falling from $97/b in 4Q22 to $93/b in 4Q23.

Reduced exports of refined petroleum products from Russia as a result of sanctions and less global refining capacity than before 2020 have reduced the available supply of refined petroleum products and have led to higher retail prices for gasoline and diesel fuel. This

situation could persist and may limit the degree to which lower crude oil prices result in lower retail prices for gasoline and diesel.

Actual prices will be based on the degree to which existing sanctions imposed on Russia, any potential future sanctions, and independent corporate actions affect Russia's oil production and the sale of Russia's oil in the global market. Global economic developments will also be critical for oil prices. Our current price path reflects global oil consumption that increases by 2% from 2021 to 2022 and by an additional 2% in 2023. However, the ways that central banks may respond to inflationary concerns could affect economic growth and oil demand during the forecast period. The duration of, and compliance with, the latest OPEC+ production targets also remain uncertain. In addition, international sanctions have limited exports from Russia and global refining capacity has decreased from pre-pandemic levels. These factors have reduced the available global supply of refined petroleum products and led to higher retail prices for gasoline and diesel fuel. If this situation continues, it could limit the degree to which lower crude oil prices result in lower retail prices for gasoline and diesel.

We forecast the West Texas Intermediate (WTI) crude oil price will average about $5/b less than the Brent price in 2H22 before averaging $4/b less than the Brent price through 2023. These price discounts are based on our assumption that the recent discount of WTI to Brent, which averaged less than $3/b in 2021, reflected low global demand for oil exports and relatively low U.S. crude oil production. U.S. crude oil supply increased in early 2Q22, which put downward press on WTI prices relative to Brent prices. At the same time, reduced crude oil supply from Russia into Europe put upward pressure on Brent prices. Together, these two factors caused the WTI discount to widen. We expect the WTI discount to return to $4/b by 2023 as the global oil market adjusts to constraints on production from Russia and as new crude oil trade flows are established.

U.S. liquid fuels

U.S. consumption. We forecast that consumption of petroleum and liquid fuels in the United States will average 20.5 million barrels per day (b/d) in 2022, which would be about the same as in 2019. In 2023, we forecast that consumption will grow to 20.8 million b/d. Our forecast of growth in U.S. consumption of petroleum and liquid fuels is driven by hydrocarbon gas liquids (HGLs) in 2022 and by gasoline in 2023.

We forecast that U.S. consumption of HGLs will increase by 0.2 million b/d in 2022 and by 0.1 million b/d in 2023. We expect all of the growth in HGL consumption in 2022 and 2023 to be from increased use of ethane as a petrochemical feedstock. Domestic ethane consumption increased this year when a new petrochemical cracker came online in the beginning of 2022, and we expect an additional petrochemical cracker to start up during the next two months, both of which will exclusively use ethane as a feedstock.

U.S. gasoline consumption averaged 8.7 million b/d in 1H22, up 0.1 million b/d from the same period in 2021. The April data for vehicle miles traveled (VMT), published by the Federal Highway Administration, is lower than we had forecast in last month's STEO, which possibly reflects the effects of high gasoline prices. As a result of the lower-than-expected VMT, we revised down our forecast VMT for the third quarter of 2022 (3Q22). Following the reduction in forecast VMT, we forecast U.S. gasoline consumption will average 9.0 million b/d in the second half of 2022 (2H22), a slight decline from 2H21. Gasoline consumption declines even though we forecast almost 5 million more jobs in the U.S. economy in 2H22 compared with a year earlier, based on the S&P Global macroeconomic model. However, the effects of high gasoline prices and strong employment on driving habits are uncertain. Employees may now have more flexibility when choosing between commuting to work or working from home, and with high gasoline prices, employees may be choosing to work from home more than before the COVID-19 pandemic. In addition, we expect a 2% increase in overall vehicle fleet fuel efficiency will also limit gasoline consumption growth in 2H22 compared with 2H21.

Distillate fuel consumption in the United States averaged 4.0 million b/d in 1H22, unchanged from the same period in 2021. However, we estimate distillate consumption averaged 3.8 million b/d in 2Q22, which down by 0.1 million b/d from 2Q21. Trade press reports indicate that the spot segment of the trucking market has slowed, which is likely reducing distillate consumption. We expect distillate consumption will average 3.9 million b/d in 2H22 and 4.0 million b/d in 2023.

U.S. jet fuel consumption averaged 1.5 million b/d in 1H22, up 0.3 million b/d from 1H21. Despite this growth, jet fuel consumption in 1H22 remained 12% lower than 1H19 levels, the largest decline on a percentage basis among the major fuel types. We forecast that U.S. consumption of jet fuel will average 1.6 million b/d in 2H22 and in 2023.

U.S. crude oil supply. We estimate U.S. crude oil production averaged 11.6 million b/d in 1H22, up 0.6 million b/d from year-ago levels. Although crude oil prices are high, economic headwinds including inflation, supply chain issues, and labor shortages, and less operator activity than we had forecast at the beginning of this year have limited production growth. We forecast that crude oil production will rise to an average of 12.2 million b/d in 2H22 and to 12.8 million b/d in 2023, which would surpass the previous annual record set in 2019.

During 2022, most of the drilling activity has occurred in the Permian Basin. Favorable geology combined with technological and operational improvements have made the Permian Basin one of the most prolific regions of U.S. crude oil production. We forecast that average annual crude oil production in the Permian Basin will reach 5.3 million b/d in 2022 and 5.7 million b/d in 2023.

However, the increased production of associated natural gas from this region poses a downside risk to Permian crude oil production. If natural gas pipeline constraints are not eased and the proposed 5.0 billion cubic feet per day of pipeline takeaway capacity out of the Permian Basin is not brought online by 2024, drilling activity in areas with high concentration of natural gas might

be reduced. In addition, the capital deployment decisions of producers will be critical for rig deployment and production. Further, production could be less than our forecast if supply chain issues and input cost inflation persist through the forecast period.

We expect that crude oil production from the Gulf of Mexico will average about 1.8 million b/d in both 2022 and 2023. In 2021, seven new projects came online. We expect nine more projects to come online in 2022.

Alaska's crude oil production in the forecast stays near the 2021 level of 0.4 million b/d in both 2022 and 2023.

Hydrocarbon gas liquids supply. We forecast U.S. production of HGLs to increase by 0.5 million b/d in 2022 to an average of 6.5 million b/d and then to increase to an average of 6.8 million b/d in 2023. HGL production will increase as a result of rising production of natural gas in 2022 and 2023, as well as higher rates of natural gas processing plant utilization. Ethane production is the leading contributor to the HGL growth, and we expect it will rise to meet growing demand for ethane as a petrochemical feedstock both in the United States and globally.

Liquid biofuels. Consumption of biofuels has risen in the United States in 2022, and we expect this growth to continue. Increasing demand for transportation fuels, higher 2022 Renewable Fuel Standard (RFS) program targets announced on June 3, and new renewable diesel production capacity coming online all contribute to this growth. Prices for Renewable identification number (RIN) credits—the compliance mechanism used for the Renewable Fuel Standard (RFS) program administered by the U.S. Environmental Protection Agency (EPA)—have increased in 2022 to near record-high prices, which has facilitated growing biofuel consumption. From 1H21 to 1H22, ethanol consumption increased by 24,000 b/d (3%), renewable diesel consumption increased by 32,000 b/d (46%), and other biofuels consumption increased by 6,000 b/d (133%). Biodiesel consumption was unchanged during the same period.

We expect that new renewable diesel production will help meet rising RFS targets. Marathon Petroleum's renewable diesel refinery in Dickinson, North Dakota, became fully operational in 2Q21. It is now the second-largest renewable diesel refinery in the United States and has a production capacity of 12,500 b/d. In 4Q21, Diamond Green Diesel expanded its Norco, Louisiana, refinery, which is now the largest renewable diesel refinery in the United States, with a production capacity of 44,000 b/d. So far in 2022, HollyFrontier's Cheyenne, Wyoming, refinery has come online, and CVR Energy's Wynnewood, Oklahoma, refinery has come partially online. Seven other projects are set to come online by the end of the year, potentially adding as much as 88,000 b/d of capacity, and several more projects will come online in 2023. We forecast renewable diesel consumption of 116,000 b/d in 2022, an increase of 41,000 b/d (53%) from 2021, and we expect renewable diesel consumption to increase further to 164,000 b/d in 2023. This forecast assumes that some of the capacity scheduled to come online in 2022 and 2023 will have delays or be affected by high agricultural feedstock costs.

Because one gallon of renewable diesel produces more RIN credits under the RFS program than biodiesel and also faces no infrastructure or blending constraints, we expect new renewable diesel plants to be brought online to secure scarce oil feedstocks, such as soybean oil, outpacing biodiesel refineries and limiting biodiesel production. We forecast slightly higher biodiesel consumption in 2022 than in 2021. However, we expect U.S. biodiesel consumption to decrease in 2023 as renewable diesel increasingly satisfies RFS requirements. We forecast U.S. biodiesel production in 2022 to fall 8% from 2021 to less than 100,000 b/d, the lowest annual average since 2015.

More fuel ethanol was consumed in the United States in 1H22 than in the same period in 2021, mainly because of more gasoline consumption. We expect similar gasoline and fuel ethanol consumption in 2H22. We forecast that U.S. fuel ethanol consumption will remain around 2022 levels in 2023 and that the ethanol share of U.S. gasoline consumption will be near 10.3%. If favorable blending economics for fuel ethanol, driven by lower relative fuel ethanol prices, and high RIN prices persist, the fuel ethanol share of gasoline consumption could potentially increase.

Product prices. Increased global consumption of liquid fuels during 1H22, combined with constraints on global refining capacity and rising crude oil prices, puts upward pressure on prices for petroleum products. The average U.S. retail price for regular-grade motor gasoline in 1H22 was $4.11 per gallon (gal), an increase of $1.33/gal from 1H21. Retail diesel prices in 1H22 averaged $4.91/gal, an increase of $1.85/gal over 1H21. Russia's full-scale invasion of Ukraine, which began at the end of February, has significantly raised crude oil prices and crack spreads. In 2Q22, retail gasoline averaged $4.50/gal, and diesel averaged $5.49/gal.

Rising crack spreads—the difference in price between wholesale refining products and the crude oil used to make them—have been a major contributor to rising retail fuel prices. Crack spreads have increased sharply as exports of refined products from Russia have decreased in response to sanctions. Even where there are no formal sanctions, some international buyers, particularly European countries who typically purchase Russia's fuel, have chosen to reduce or end imports from Russia.

The gasoline crack spread (calculated as the U.S. refiner gasoline price for resale against Brent crude oil) in 2Q22 increased to an average of $1.05/gal from 52 cents/gal in 2Q21, and the diesel crack spread increased to an average of $1.47/gal during the same period from 40 cents/gal in 2Q21. Increasing crude oil prices often narrow crack spreads as high input costs narrow refining margins; however, the current high crack spreads are the result of decreased refinery capacity both globally and in the United States combined with Russia's reduced product exports.

Refinery Capacity in the United States fell by 0.9 million b/d in 2020 and by 0.2 million b/d in 2021. The lost capacity mainly resulted from low refinery margins brought on by the COVID-19 pandemic, as well as a handful of refinery incidents—including the explosion at Philadelphia

Energy Solutions in 2019 and the flooding of the Phillips 66 Alliance refinery during Hurricane Ida in August 2021— and conversions to biofuels production. Decreasing refinery capacity was not limited to the United States. The IEA reports that global refinery capacity fell by 0.9 million b/d in 2021, which combined with the exclusion of refining capacity in Russia, leaves the global market with less refinery capacity available to meet increasing demand this summer.

Historically high crack spreads have encouraged U.S. refiners to increase refinery utilization, which ran at 92% in 2Q22, in order to meet high demand in the United States. We expect refinery utilization to average 94% in 3Q22, compared with 89% in 3Q21. Refinery utilization is usually higher in the second and third quarters in response to summer demand for fuel. We expect utilization to average 90% in 4Q22 up only slightly over 4Q21, at a time when low product inventories and increasing demand were already providing incentives for refiners to increase refinery runs. Although we expect refinery utilization to remain well above average through the end of the year, less refinery capacity in the United States means that actual refinery inputs and volumetric production of refined products will not exceed pre-pandemic production levels.

As rising refinery production contributes to some increases in refined product inventories, we expect crack spreads to decrease in 2H22 but remain above the five-year average through the end of the forecast. We forecast gasoline crack spreads to average $0.88/gal in 3Q22 and $0.57/gal in 4Q22, or $0.72/gal for the year, before decreasing to an annual average of $0.52/gal in 2023. Similarly, we forecast distillate crack spreads to average $1.11/gal in 3Q22 and $0.91/gal in 4Q22, averaging $1.03/gal in 2022 before dropping to $0.65/gal in 2023. In comparison, the gasoline crack spread in 2019 was $0.33/gal, and the distillate crack spread was $0.43/gal in 2019.

High product crack spreads are encouraging refiners to maximize operations to meet U.S. and global demand although their ability to do so remains subject to several uncertainties. High refinery utilization brings inherently greater risks of operational malfunctions, disruptions, and unplanned turnarounds that can temporarily take units or whole facilities out of commission. Furthermore, the National Oceanic and Atmospheric Administration (NOAA) predicts an above-average hurricane season in 2022. Hurricanes present particular weather-related risks to most of U.S. refining capacity, which is concentrated along the U.S. Gulf Coast, particularly in Texas and Louisiana.

Natural gas

Natural gas consumption. We expect U.S. natural gas consumption will increase by 2.9 billion cubic feet per day (Bcf/d) (3%) to average 85.9 Bcf/d in 2022 and fall to 85.4 Bcf/d in 2023.

We forecast U.S. consumption of natural gas to increase in all sectors in 2022, with the largest increase in the electric power sector. We forecast the U.S. electric power sector will consume an average of 31.9 Bcf/d of natural gas in 2022, which is 3% more than in 2021. Our forecast

increase occurs despite high natural gas prices in 2022, which in the past have typically encouraged more switching from natural gas to coal as an electricity generation source. The electric power sector continues to use high amounts of natural gas because coal-fired power plants are limited in their ability to act as an alternative source of electricity generation. Ongoing coal capacity retirements, limited rail capacity for fuel delivery to coal plants, and lower-than-average stocks at coal plants have all contributed to reduced coal-fired electricity generation. As a result, more natural gas has been used to meet electricity demand. We expect consumption of natural gas in the electric power sector to decline slightly by 0.5 Bcf/d (1%) in 2023 as more electric-generation capacity from renewable energy sources comes online.

Consumption of natural gas in the U.S. industrial sector in our forecast increases by 3% this year, averaging 23.2 Bcf/d in 2022, as demand for industrial goods and economic activity increases. We forecast industrial sector consumption of natural gas will be mostly unchanged in 2023 compared with 2022.

We expect combined U.S. residential and commercial natural gas consumption to average 22.6 Bcf/d in 2022 and 22.4 Bcf/d in 2023, based largely on weather expectations we derive from National Oceanic and Atmospheric Administration (NOAA) forecasts. Our July STEO assumes colder temperatures in 2022 than in 2021 and similar temperatures in 2023. NOAA forecasts 8% more heating degree days (HDDs) across the United States in 2022 compared with 2021.

Natural gas production. We forecast dry natural gas production will average 96.2 Bcf/d in 2022 in the United States, an increase of 2.7 Bcf/d (3%) compared with 2021. Increases in crude oil and domestic natural gas prices, as well as increases in the number of active oil and natural gas rigs, will contribute to an overall increase in drilling activity in 2022 and 2023 that will lead to production growth. In 2023, we expect dry natural gas production to increase by 3.7 Bcf/d (4%) to reach 100.0 Bcf/d. The Haynesville region and the Permian Basin will drive growth in dry natural gas production, supported by increased pipeline takeaway capacity in both regions and high oil production in the Permian Basin that results in greater levels of associated natural gas production.

Natural gas trade. Liquefied natural gas (LNG) exports continued to drive growth in U.S. natural gas exports in the first half of 2022 (1H22). U.S. LNG exports averaged 11.2 Bcf/d during 1H22 and set a monthly record in March 2022, averaging 11.7 Bcf/d. U.S. LNG export capacity is continuing to expand this year with the addition of the Calcasieu Pass LNG export facility, which has been ramping up LNG production ahead of schedule and is expected to be fully operational by the third quarter of 2022 (3Q22).

Strong natural gas demand and high LNG prices in Europe and Asia drove the continued growth in U.S. LNG exports in the first half of this year. During the first five months of 2022, the United States exported 71% of its LNG to Europe, compared with an annual average of 34% last year. In the past, Asia had been the main destination for U.S. LNG exports, accounting for almost half of the total exports in 2020 and 2021. LNG prices in Europe remain high amid supply uncertainties

because of Russia's invasion of Ukraine and the need to replenish Europe's natural gas inventories, which has kept Europe's demand for LNG elevated.

Since December 2021, the EU and the United Kingdom have been importing record volumes of LNG, primarily to fill natural gas storage inventories, which were historically low from fall 2021 through spring 2022. The United States became the largest LNG supplier to the EU and United Kingdom last year, accounting for 26% of total imports. In the first five months of 2022, LNG imports from the United States to the EU and the United Kingdom continued to grow. European natural gas storage inventories filled up rapidly in recent months, and they were 3% below their five-year average (2017–2021) level at the end of June.

For the second half of this year, we expect U.S. LNG exports will decline because of the outage at the Freeport LNG export facility, which we do not expect to return to full service until late 2022. The shutdown of Freeport LNG will reduce U.S. LNG export capacity by approximately 2 Bcf/d, which is about 17% of the total capacity. We forecast U.S. LNG exports to average 10.5 Bcf/d in 2H22, 14% less than the forecast in our June 2022 STEO. We expect LNG exports will continue to grow in 2023, averaging 12.7 Bcf/d on an annual basis, 17% higher than in 2022.

U.S. exports of natural gas by pipeline, almost all of which move natural gas to Mexico, average 8.8 Bcf/d in 2022 in the forecast, up 4% from 2021, and then rise by an additional 4% to reach 9.2 Bcf/d in 2023.

Natural gas inventories. U.S. storage withdrawals in 1Q22 were 27% higher than the five-year average because of colder-than-normal temperatures that led to higher consumption in the residential, commercial, and electric power sectors and because of declines in natural gas production as a result of weather-related freeze-offs in producing regions. Working natural gas inventories ended March 2022 at 1,401 Bcf, which was 17% less than the five-year average for that time of year and the least natural gas held in U.S. underground storage at the end of March (the traditional end of the heating season) since 2019.

As the Freeport LNG outage returns about 2 Bcf/d of natural gas to the domestic market, we expect end-of-October storage will be closer the five-year average than we did in last month's forecast. We expect that inventories will reach 3,468 Bcf at the end of October 2022, which would be 6% less than the five-year average for October and 5% less than the natural gas in U.S. storage at the end of October 2021.

Natural gas prices. The Henry Hub spot price averaged $6.07 per million British thermal units (MMBtu) in 1H22, rising steadily from an average of $4.38/MMBtu in January to $8.14/MMBtu in May. Prices then fell in June, in part, because of the outage at the Freeport LNG export terminal. The increase through May resulted from continued demand for LNG exports, increased demand in electric power generation as a result of limited natural gas-to-coal switching, and decreased production compared with the end of 2021.

Natural gas prices have been volatile in 2022. The 30-day historical volatility of U.S. natural gas prices averaged 179.1% in February compared with the five-year average of 47.7%. Historical volatility measures the magnitude of daily changes in the closing price for a commodity during a specific time in the past. Natural gas price volatility resulted, in large part, from the uncertainty in the global natural gas markets leading up to and following Russia's full-scale invasion of Ukraine on February 24, as well as from weather-related fluctuations in natural gas demand. Uncertainty around production that was relatively flat in 1H22 (and slightly lower than the high levels reached at the end of 2021) has also contributed to price volatility. Natural gas price volatility remained relatively high in 2Q22, averaging 87.2% in June.

We forecast the Henry Hub spot price will average $5.97/MMBtu in 2H22. This price is down from our forecast of $8.58/MMBtu in the June STEO in part because, due to the Freeport LNG facility being offline through late 2022, we expect more natural gas to be injected into storage in 2H22 than in last month's forecast. Although our end-of-October storage forecast is still less than the previous five-year average. However, because of ongoing constraints in the coal market that are limiting the use of coal in the electric power sector, we expect electric power-sector use of natural gas will remain strong, keeping upward pressure on prices, particularly in the case of a significant heat wave. Despite the outage at Freeport LNG, we also expect full utilization at remaining LNG facilities this summer to raise natural gas prices as Europe's demand for LNG from the United States remains high.

The lower natural gas price in our forecast for 2H22 contributes to our lower forecast for production in 2023 compared with the June STEO. Based partly on the lower production forecast, we raised our price forecast for May through December 2023. We expect the Henry Hub spot price will average $4.41/MMBtu during 2H23, up 59 cents/MMBtu from last month's forecast. For all of 2023, we expect the Henry Hub spot price will average $4.76/MMBtu.

Coal

Coal production. U.S. coal production totaled 289 million short tons (MMst) in the first half of 2022 (1H22), up 6 MMst (2%) from 1H21. As coal consumption decreased, increases in production have kept inventories in 1H22 from falling by as much as they did in 1H21.

In 2022, we expect U.S. coal production to rise by 17 MMst (3%) from 2021 to 595 MMst. Our forecast 2022 coal production increases by 15 MMst (5%) in the Western Region and by 1 MMst (1%) in both the Appalachia and Interior regions. We expect U.S. coal production to remain flat in 2023.

Our expectation of increased production in 2022 primarily reflects demand to replenish depleted coal stocks. Electric power sector inventories fell significantly in 2021. We expect more draws through summer 2022. In our forecast, 2022 end-of-year electric power sector coal inventories decline to 77 MMst, 18% less than at the end of 2021.

In 2023, we expect coal production to total 594 MMst, about the same as 2022. Much of the decrease in coal mine capacity that has occurred since 2020 appears to be permanent. Coal producers have experienced labor and capital shortages, which we expect will continue to limit coal supply in the forecast.

Coal consumption. In this forecast, U.S. coal consumption declines to 527 MMst (3%) in 2022 and to 506 MMst (4%) in 2023, compared with 546 MMst in 2021.

We expect the retirement of approximately 22 gigawatts (GW) of coal-fired power plant capacity through 2023, down 10% from 2021. As a result, we forecast electric power sector demand for coal will decrease by 20 MMst (4%) in 2022. Coal plant retirements and lower expected natural gas prices drive our forecast of an additional 23 MMst (5%) decline in 2023.

Increased economic activity following COVID-19 shutdowns and rising natural gas prices relative to coal prices led to increased demand for coal-fired power generation in 2021 compared with 2020. Although natural gas prices remain high in 2022, constraints on coal production from decreased mine capacity and transportation from labor shortages in the railroad industry have led to coal generators taking steps to conserve coal stocks to meet peak electricity demand during the summer, which is limiting coal-fired electricity generation.

Metallurgical coal, also known as coking coal, is an essential component of the steel-making process. We expect demand for coking coal to rise by 8% (1 MMst) from 2021 to 2023, driven by our expectation of more raw steel production in the forecast.

Coal trade. We expect U.S. coal exports to increase 3% to 88 MMst in 2022 from 85 MMst in 2021. It is unclear how much of the U.S. increase in coal exports have been a result of the improved post-pandemic economy and high natural gas prices or a result of sanctions against Russian coal.

Increased exports are driven by a forecast 2% increase in metallurgical coal exports in 2022 to accommodate increased steel production and an even larger 4% increase in steam coal exports as countries increase coal-fired electricity generation relative to natural gas-fired generation to manage costs associated with high natural gas prices. Exports in the forecast fall to 83 MMst in 2023, less than in 2021, as the economy cools down. While metallurgical coal exports remain steady, we expect steam coal exports to fall 12% in 2023 as natural gas prices fall, increasing natural gas-fired generation relative to coal-fired generation.

Although Europe—largest importer of coal from Russia—Japan, and South Korea are expected to eventually end coal imports from Russia, any decline in Russia's coal exports so far have been offset by increases in purchases of coal from Russia by China, India, and Turkey to capitalize on the discounts Russia has offered.

Coal prices. The price of coal delivered to U.S. electricity generators averaged $1.98 per million British thermal units (MMBtu) in 2021. We expect the average delivered coal prices to the

electric power sector to increase to $2.10/MMBtu (6%) in 2022 then fall to $1.99/MMBtu (5%) in 2023.

Electricity

Electricity consumption. We forecast that total consumption of electricity in the United States, including sales to ultimate customers and direct use of electricity by generators, will increase by 2% in 2022 and by 1% in 2023. Sales of electricity to ultimate customers account for about 97% of total U.S. electricity consumption.

Relative outside temperatures, often measured using heating degree days (HDDs) and cooling degree days (CDDs), are the main driver of electricity consumed by the residential sector. We estimate that 2% more electricity was sold to residential customers in the first half of 2022 (1H22) than the same period last year. Although temperatures in January and February were colder than normal, they were relatively similar to temperatures last winter. Likewise, early summer temperatures have been warmer than normal, especially in the South, but have been relatively similar to the same period in 2021.

During 2H22, we expect U.S. residential electricity consumption to be similar to 2H21. We forecast that sales of electricity to residential customers will grow by 1% for all of 2022 and then fall slightly in 2023 as winter and summer temperatures return to more normal levels.

Electricity sales to customers in the U.S. commercial and industrial sectors are growing faster than sales to the residential sector. Commercial electricity use is related both to overall weather patterns and economic trends. We estimate that 5% more electricity was used by the U.S. commercial sector in 1H22 than 1H21. Stronger economic activity than in 2021 drove most of this growth. Nonfarm employment in 1H22 grew by 5% year over year. We expect economic growth to slow somewhat in 2H22, but we still expect commercial electricity use to rise by 3% in 2022. The slower economic growth contributes to our forecast that electricity consumption in the commercial sector will remain relatively unchanged next year.

The U.S. industrial production index for electricity-intensive industries increased year over year by 5% in 1H22, and we expect it to grow at a similar rate in 2H22. As a result, we expect 4% more sales of electricity to the industrial sector in 2022 than in 2021. Our forecast of industrial electricity use grows slightly less at 3% in 2023, reflecting slower overall economic growth.

Electricity generation. We estimate that electricity generation by the U.S. electric power sector during the first half of 2022 grew 4% from 1H21, reflecting warmer-than-normal temperatures in May and June. We expect the U.S. electric power sector will generate 4,055 billion kilowatthours (BkWh) in 2022, which is a 2% increase from 2021. Forecast electric power sector generation remains at about the same level in 2023.

We forecast that most of the increase in U.S. electricity generation through 2023 will come from renewable energy sources as a result of growth in U.S. renewable generating capacity. We

expect renewable energy will provide 22% of U.S. electric power sector generation in 2022 and 24% in 2023, compared with 20% in 2021.

Most of our forecast increase in generation from renewables comes from solar capacity expansions in the electric power sector. We expect solar electricity generation to increase to 145 BkWh in 2022 and 182 BkWh in 2023. Installed capacity of solar photovoltaic (PV) generation continued to grow despite supply chain and commerce issues that affected the industry during the past six months. We forecast that the electric power sector will add 19 gigawatts (GW) of solar capacity in 2022 and an additional 23 GW in 2023. We forecast small-scale solar PV capacity, including systems installed on rooftops, will increase by 6 GW in 2022 and by 7 GW in 2023. More than two-thirds of this additional small-scale solar PV capacity over the next two years will be installed on residential rooftops.

In February, U.S. tariffs on imported crystalline silicon solar products from China were extended, setting an annual tariff-rate quota for solar cells imported from China to 5 GW, with exemption of bifacial panels. In March, the U.S. Department of Commerce (DOC) announced an anti-dumping circumvention investigation of solar cells and modules imported from Cambodia, Malaysia, Thailand, and Vietnam—countries that allegedly use parts made in China that otherwise would be subject to tariffs. DOC is expected to make a decision by the first quarter of 2023. In June, by Executive Order, the President invoked the Defense Production Act to ease import duties for a 24-month period for solar cells and modules imported from Cambodia, Malaysia, Thailand, and Vietnam. Our preliminary data from January to April 2022 indicate that an average of 3.9 GW of PV solar installations reported delays compared with 2.1 GW delayed during the same period last year.

We expect continued growth in solar energy through 2023, in part, because of the solar investment tax credit under the Consolidated Appropriations Act, which offers a 26% tax credit to projects that start in 2022. The credit drops to 22% for projects that start in 2023. States such as Texas and Florida are set to add significant solar PV in the next two years.

We forecast that U.S. electricity generation from wind will increase by 16% in 2022 from 2021 and by 4% in 2023 from 2022. Wind capacity in the electric power sector will grow by 11 GW in 2022 and by an additional 4 GW in 2023, down from the 14 GW added yearly in 2021 and 2020.

We can attribute slower growth in wind capacity, in part, to the phasedown of the production tax credit (PTC) as well as supply chain issues. The PTC, which was extended through the 2022 calendar year, provides a 2.6 cent per kWh benefit for facilities entering service or spending at least 5% of total estimated project cost (securing 5% safe harboring). Producers of safe harbored projects are able to claim the PTC four years after they qualify.

Hydropower contributed 7% of U.S. electric power generation in 2021. In the forecast, the share of hydropower generation will remain around 7% in both 2022 and 2023. Since 2021, the drought affecting the West has constrained electricity generation by hydropower, and California

is one of the most affected states. We published a supplement to the STEO in May 2022, looking at hydropower generation in California across a range of water conditions. In a severe drought case, we expect hydropower generation in California would drop to half of normal levels in 2022.

Economic factors, such as fuel costs and changes in the mix of generating capacity, are likely to affect trends in electricity generation from nonrenewable sources. The price of natural gas, in particular, has traditionally been an important driver of the relative use of natural gas and coal for power generation. Natural gas prices have significantly increased from last year, and we expect they will remain high through the end of 2022.

In the past, high natural gas prices have typically led to more generation from coal-fired power plants. However, the industry continues to retire coal-fired generation capacity. According to the latest information from the Form EIA-860 survey, the United States will have 10%, or nearly 22 GW, less operating coal capacity at the end of 2023 than at the end of 2021. In addition to these capacity retirements, coal-fired power plants have not received sufficient fuel deliveries because of limited rail capacity and reduced coal mine capacity. In some regions of the country, such as the Midcontinent Independent System Operator (MISO) and Southwest Power Pool (SPP) power markets, increased growth in renewables contributes to the forecast decline in coal-fired electricity generation. We expect that coal's share of U.S. total generation will fall from 23% in 2021 to 21% this year and 20% in 2023.

The constraints on coal-fired electricity generation are resulting in more natural gas-fired generation than we would have expected, despite the high fuel costs. We expect natural gas's share of total U.S. generation to average about 37% in 2022, similar to the generation share in 2021, and 36% 2023. Despite higher prices for natural gas, we expect that some regions, particularly in the mid-Atlantic and Southeast, will increase natural gas-fired electricity generation this year. The recent coal-fired power plant retirements and the constraints on coal deliveries are affecting these regions the most.

In May 2022, the Palisades nuclear power plant in Michigan shut down as planned. This retirement of 769 megawatts (MW) of capacity contributes to our expected slight reduction in U.S. nuclear generation in 2022. Two new reactors at the Vogtle plant in Georgia are scheduled to come online in 2023, adding 2.2 GW of nuclear power to the system. We expect the nuclear share of total generation to be 19% in 2022 and 2023, about the same share as last year.

Electricity prices. The large increase in natural gas fuel costs over the past year is also driving up wholesale electricity prices throughout the United States. Increases in wholesale prices during the first half of 2022 ranged from 13% higher than first half 2021 in the Southwest region to 135% higher in the New York ISO region. Average year-to-date prices are lower in the Central/SPP and Texas/ERCOT regions because of extreme price spikes that occurred in February 2021. We expect wholesale electricity prices to remain elevated through the remainder of 2022. Our forecast for a decline in natural gas prices next year contributes to our forecast that

electricity prices will fall in all regions in 2023, ranging from 18% lower in the Mid-Atlantic region's PJM market to 40% lower in the ERCOT market in Texas.

The higher prices of wholesale electricity and generation fuels contributes to our forecast for higher prices for electricity sold to ultimate customers. We forecast the U.S. retail electricity price for the residential sector will average 14.4 cents/kWh in 2022, which is 5% higher than the average retail price in 2021. The forecast increases in residential electricity prices vary by region, ranging from 2% higher in the West South Central states to 14% higher in New England. The forecast commercial sector electricity price averages 11.9 cents/kWh in 2022 (up 5%), and the industrial sector price averages 7.6 cents/kWh (up 5%).

U.S. economic assumptions and energy-related carbon dioxide emissions

U.S. economy. We incorporate the S&P Global macroeconomic forecast model for the United States with our own energy price forecasts to create STEO forecasts.

Based on this model, we estimate that U.S. real GDP will grow by 2.4% in 2022 and by 2.5% in 2023. In comparison, real U.S. GDP grew by 5.7% in 2021. Total industrial production will grow at a relatively faster pace, increasing by 6.2% in 2022 and 3.4% in 2023, following a 5.5% increase in 2021. S&P Global estimates that the unemployment rate will fall from 5.4% in 2021 to 3.7% in 2022, but it will increase slightly to 3.9% in 2023. Nonfarm payroll employment will increase by 5.7 million jobs (3.9%) in 2022 and by 1.9 million (1.3%) in 2023. Price levels are elevated in 2022, when the Consumer Price Index (CPI) will rise by 7.4%, but forecast inflation falls to 2.8% in 2023.

Energy-related carbon dioxide emissions. Energy-related carbon dioxide (CO_2) emissions rose by 6.5% in the United States during 2021, and we estimate that they will rise by 1.5% in 2022 and remain flat in 2023. Forecast petroleum-related CO_2 emissions increase by 2.4% in 2022 and by 1.1% in 2023 as transportation demand begins to return to pre-pandemic levels, but this growth is limited by high fuel prices. We expect CO_2 emissions from coal will fall by 3.9% in 2022 and by a further 3.2% in 2023 as coal-fired electricity generation is displaced, primarily by renewable sources. We expect CO_2 emissions from natural gas to rise by 3.6% in 2022, as demand for space heating increases, and to fall by 0.7% in 2023.

Notable forecast changes

- We forecast Russia's liquid fuels production will average 10.7 million b/d in 2H22, up from a forecast of 10.0 million b/d in last month's STEO. The increase reflects our expectation that Russia's production will remain in 3Q22 before EU sanctions take effect at the end of 2022. However, we forecast a larger drop in Russia's production next year, with 2023 production averaging 9.3 million b/d, down by 0.2 million b/d from last month's forecast.

- We expect U.S. LNG exports will decline because of the outage at the Freeport LNG export facility, which we do not expect to return to full service until late 2022. U.S. LNG exports are forecast to average 10.5 Bcf/d in 2H22, 14% lower than in our June STEO.
- We forecast the Henry Hub spot price will average $5.97/MMBtu in 2H22. This price is down from our forecast of $8.58/MMBtu in the June STEO because of an additional 2 Bcf/d of natural gas that will be available in the domestic market as a result of the Freeport LNG facility being offline through the end of the year.
- You can find more information in the detailed table of forecast changes.

Table 3a. International Petroleum and Other Liquids Production, Consumption, and Inventories

U.S. Energy Information Administration | Short-Term Energy Outlook - July 2022

	2021				2022				2023				Year		
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	2021	2022	2023
Production (million barrels per day) (a)															
OECD	**30.08**	**30.74**	**31.06**	**32.19**	**31.66**	**32.23**	*32.79*	*33.45*	*33.68*	*33.85*	*34.10*	*34.73*	**31.02**	*32.54*	*34.09*
U.S. (50 States)	**17.62**	**19.05**	**18.94**	**19.87**	**19.44**	**20.10**	*20.52*	*20.95*	*20.97*	*21.20*	*21.55*	*22.00*	**18.88**	*20.26*	*21.44*
Canada	**5.62**	**5.37**	**5.49**	**5.68**	**5.66**	**5.75**	*5.73*	*5.84*	*5.91*	*5.87*	*5.89*	*5.90*	**5.54**	*5.75*	*5.89*
Mexico	**1.93**	**1.95**	**1.90**	**1.92**	**1.91**	**1.89**	*1.89*	*1.86*	*1.90*	*1.87*	*1.83*	*1.79*	**1.92**	*1.89*	*1.85*
Other OECD	**4.92**	**4.37**	**4.73**	**4.71**	**4.65**	**4.49**	*4.65*	*4.80*	*4.89*	*4.91*	*4.83*	*5.02*	**4.68**	*4.65*	*4.91*
Non-OECD	**62.58**	**63.99**	**65.62**	**66.13**	**67.21**	**67.07**	*68.74*	*68.14*	*67.19*	*67.55*	*67.80*	*67.32*	**64.59**	*67.79*	*67.46*
OPEC	**30.34**	**30.88**	**32.28**	**33.10**	**33.75**	**33.82**	*34.49*	*34.64*	*34.88*	*34.80*	*34.85*	*34.85*	**31.66**	*34.18*	*34.84*
Crude Oil Portion	**25.08**	**25.49**	**26.84**	**27.67**	**28.19**	**28.38**	*29.01*	*29.12*	*29.32*	*29.36*	*29.37*	*29.33*	**26.28**	*28.68*	*29.35*
Other Liquids (b)	**5.26**	**5.39**	**5.44**	**5.44**	**5.56**	**5.43**	*5.48*	*5.52*	*5.56*	*5.43*	*5.48*	*5.52*	**5.38**	*5.50*	*5.50*
Eurasia	**13.42**	**13.66**	**13.63**	**14.27**	**14.39**	**13.47**	*13.94*	*13.49*	*12.61*	*12.27*	*12.21*	*12.21*	**13.75**	*13.82*	*12.32*
China	**4.99**	**5.03**	**5.01**	**4.93**	**5.18**	**5.18**	*5.14*	*5.18*	*5.22*	*5.25*	*5.24*	*5.28*	**4.99**	*5.17*	*5.25*
Other Non-OECD	**13.82**	**14.42**	**14.70**	**13.82**	**13.90**	**14.61**	*15.18*	*14.82*	*14.47*	*15.23*	*15.50*	*14.97*	**14.19**	*14.63*	*15.05*
Total World Production	**92.66**	**94.73**	**96.68**	**98.31**	**98.87**	**99.30**	*101.53*	*101.59*	*100.87*	*101.40*	*101.89*	*102.04*	**95.62**	*100.33*	*101.55*
Non-OPEC Production	**62.32**	**63.85**	**64.40**	**65.21**	**65.13**	**65.48**	*67.04*	*66.95*	*65.99*	*66.60*	*67.04*	*67.19*	**63.95**	*66.16*	*66.71*
Consumption (million barrels per day) (c)															
OECD	**42.45**	**44.08**	**45.82**	**46.81**	**45.89**	**45.29**	*46.12*	*46.66*	*46.23*	*45.69*	*46.46*	*46.79*	**44.81**	*45.99*	*46.29*
U.S. (50 States)	**18.45**	**20.03**	**20.21**	**20.41**	**20.22**	**20.30**	*20.53*	*20.88*	*20.41*	*20.75*	*20.95*	*21.09*	**19.78**	*20.48*	*20.80*
U.S. Territories	**0.21**	**0.19**	**0.19**	**0.20**	**0.22**	**0.20**	*0.20*	*0.22*	*0.22*	*0.20*	*0.21*	*0.22*	**0.20**	*0.21*	*0.21*
Canada	**2.26**	**2.24**	**2.50**	**2.40**	**2.33**	**2.38**	*2.50*	*2.48*	*2.46*	*2.40*	*2.51*	*2.48*	**2.35**	*2.43*	*2.46*
Europe	**11.91**	**12.62**	**13.83**	**13.89**	**13.08**	**13.33**	*13.65*	*13.35*	*13.20*	*13.21*	*13.61*	*13.38*	**13.07**	*13.36*	*13.35*
Japan	**3.73**	**3.08**	**3.18**	**3.67**	**3.73**	**3.09**	*3.19*	*3.52*	*3.78*	*3.12*	*3.15*	*3.45*	**3.42**	*3.38*	*3.37*
Other OECD	**5.89**	**5.92**	**5.90**	**6.23**	**6.30**	**5.99**	*6.03*	*6.20*	*6.17*	*6.00*	*6.03*	*6.17*	**5.99**	*6.13*	*6.09*
Non-OECD	**51.78**	**52.20**	**52.53**	**53.64**	**53.04**	**53.37**	*53.83*	*54.10*	*55.24*	*55.66*	*55.30*	*54.95*	**52.54**	*53.59*	*55.29*
Eurasia	**4.66**	**4.73**	**5.09**	**4.95**	**4.48**	**4.33**	*4.69*	*4.62*	*4.30*	*4.46*	*4.77*	*4.69*	**4.86**	*4.53*	*4.55*
Europe	**0.74**	**0.74**	**0.74**	**0.76**	**0.75**	**0.75**	*0.76*	*0.77*	*0.75*	*0.77*	*0.77*	*0.78*	**0.75**	*0.76*	*0.77*
China	**15.27**	**15.48**	**14.99**	**15.33**	**15.25**	**15.24**	*15.33*	*15.78*	*16.54*	*16.43*	*15.80*	*15.72*	**15.27**	*15.40*	*16.12*
Other Asia	**13.43**	**12.98**	**12.84**	**13.69**	**13.81**	**13.89**	*13.48*	*13.90*	*14.51*	*14.48*	*13.90*	*14.19*	**13.23**	*13.77*	*14.27*
Other Non-OECD	**17.68**	**18.27**	**18.87**	**18.91**	**18.75**	**19.15**	*19.57*	*19.03*	*19.15*	*19.53*	*20.06*	*19.57*	**18.44**	*19.13*	*19.58*
Total World Consumption	**94.23**	**96.29**	**98.35**	**100.45**	**98.93**	**98.65**	*99.95*	*100.75*	*101.47*	*101.35*	*101.76*	*101.74*	**97.35**	*99.58*	*101.58*
Total Crude Oil and Other Liquids Inventory Net Withdrawals (million barrels per day)															
U.S. (50 States)	**0.47**	**0.51**	**0.37**	**0.77**	**0.75**	**0.51**	*0.44*	*0.56*	*-0.05*	*-0.39*	*-0.09*	*0.40*	**0.53**	*0.57*	*-0.03*
Other OECD	**0.87**	**0.15**	**0.97**	**0.67**	**-0.23**	**-0.37**	*-0.65*	*-0.45*	*0.21*	*0.11*	*-0.01*	*-0.23*	**0.66**	*-0.43*	*0.02*
Other Stock Draws and Balance	**0.24**	**0.90**	**0.33**	**0.69**	**-0.47**	**-0.78**	*-1.37*	*-0.95*	*0.44*	*0.24*	*-0.03*	*-0.48*	**0.54**	*-0.90*	*0.04*
Total Stock Draw	**1.57**	**1.56**	**1.67**	**2.13**	**0.06**	**-0.64**	*-1.59*	*-0.84*	*0.60*	*-0.05*	*-0.13*	*-0.31*	**1.73**	*-0.76*	*0.03*
End-of-period Commercial Crude Oil and Other Liquids Inventories (million barrels)															
U.S. Commercial Inventory	**1,302**	**1,271**	**1,241**	**1,194**	**1,154**	**1,182**	*1,231*	*1,217*	*1,225*	*1,269*	*1,280*	*1,253*	**1,194**	*1,217*	*1,253*
OECD Commercial Inventory	**2,908**	**2,864**	**2,745**	**2,636**	**2,616**	**2,678**	*2,787*	*2,815*	*2,804*	*2,838*	*2,850*	*2,845*	**2,636**	*2,815*	*2,845*

(a) Supply includes production of crude oil (including lease condensates), natural gas plant liquids, biofuels, other liquids, and refinery processing gains.

(b) Includes lease condensate, natural gas plant liquids, other liquids, and refinery processing gain. Includes other unaccounted-for liquids.

(c) Consumption of petroleum by the OECD countries is synonymous with "petroleum product supplied," defined in the glossary of the EIA *Petroleum Supply Monthly* , DOE/EIA-0109. Consumption of petroleum by the non-OECD countries is "apparent consumption," which includes internal consumption, refinery fuel and loss, and bunkering.

- = no data available

OECD = Organization for Economic Cooperation and Development: Australia, Austria, Belgium, Canada, Chile, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Latvia, Lithuania, Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Poland, Portugal, Slovakia, Slovenia, South Korea, Spain, Sweden, Switzerland, Turkey, the United Kingdom, the United States.

OPEC = Organization of the Petroleum Exporting Countries: Algeria, Angola, Congo (Brazzaville), Equatorial Guinea, Gabon, Iran, Iraq, Kuwait, Libya, Nigeria, Saudi Arabia, the United Arab Emirates, Venezuela.

Notes: EIA completed modeling and analysis for this report on July 7, 2022.

The approximate break between historical and forecast values is shown with historical data printed in bold; estimates and forecasts in italics.

Historical data: Latest data available from Energy Information Administration international energy statistics.

Minor discrepancies with published historical data are due to independent rounding.

Forecasts: EIA Short-Term Integrated Forecasting System.

Table 4a. U.S. Petroleum and Other Liquids Supply, Consumption, and Inventories

U.S. Energy Information Administration | Short-Term Energy Outlook - July 2022

	2021				2022				2023				Year		
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	2021	2022	2023
Supply (million barrels per day)															
Crude Oil Supply															
Domestic Production (a)	**10.69**	**11.28**	**11.13**	**11.63**	**11.46**	**11.75**	*12.08*	*12.34*	*12.45*	*12.58*	*12.87*	*13.17*	**11.19**	*11.91*	*12.77*
Alaska	**0.46**	**0.44**	**0.41**	**0.44**	**0.45**	**0.42**	*0.41*	*0.42*	*0.44*	*0.43*	*0.42*	*0.45*	**0.44**	*0.43*	*0.43*
Federal Gulf of Mexico (b)	**1.80**	**1.79**	**1.49**	**1.73**	**1.67**	**1.75**	*1.76*	*1.82*	*1.89*	*1.86*	*1.78*	*1.76*	**1.70**	*1.75*	*1.82*
Lower 48 States (excl GOM)	**8.44**	**9.05**	**9.24**	**9.46**	**9.34**	**9.58**	*9.91*	*10.10*	*10.12*	*10.29*	*10.68*	*10.96*	**9.05**	*9.74*	*10.52*
Crude Oil Net Imports (c)	**2.87**	**2.96**	**3.60**	**3.09**	**3.00**	**2.97**	*3.28*	*3.06*	*2.95*	*3.41*	*3.12*	*2.20*	**3.13**	*3.08*	*2.92*
SPR Net Withdrawals	**0.00**	**0.18**	**0.04**	**0.26**	**0.31**	**0.81**	*0.98*	*0.41*	*0.04*	*0.09*	*0.03*	*0.11*	**0.12**	*0.63*	*0.07*
Commercial Inventory Net Withdrawals	**-0.18**	**0.59**	**0.30**	**-0.01**	**0.08**	**-0.10**	*0.05*	*-0.17*	*-0.40*	*0.11*	*0.21*	*-0.06*	**0.18**	*-0.04*	*-0.03*
Crude Oil Adjustment (d)	**0.42**	**0.63**	**0.54**	**0.54**	**0.71**	**0.60**	*0.23*	*0.16*	*0.22*	*0.22*	*0.23*	*0.16*	**0.53**	*0.42*	*0.21*
Total Crude Oil Input to Refineries	**13.81**	**15.65**	**15.60**	**15.51**	**15.56**	**16.03**	*16.62*	*15.80*	*15.27*	*16.40*	*16.46*	*15.59*	**15.15**	*16.00*	*15.93*
Other Supply															
Refinery Processing Gain	**0.84**	**0.97**	**0.97**	**1.04**	**0.95**	**1.06**	*1.07*	*1.05*	*1.02*	*1.00*	*1.00*	*0.99*	**0.95**	*1.03*	*1.01*
Natural Gas Plant Liquids Production	**4.86**	**5.46**	**5.52**	**5.74**	**5.61**	**5.87**	*5.96*	*6.10*	*6.10*	*6.19*	*6.25*	*6.37*	**5.40**	*5.89*	*6.23*
Renewables and Oxygenate Production (e)	**1.03**	**1.13**	**1.10**	**1.24**	**1.19**	**1.19**	*1.19*	*1.23*	*1.19*	*1.21*	*1.20*	*1.26*	**1.12**	*1.20*	*1.22*
Fuel Ethanol Production	**0.90**	**0.99**	**0.96**	**1.06**	**1.02**	**1.01**	*1.01*	*1.02*	*0.99*	*1.00*	*0.99*	*1.02*	**0.98**	*1.02*	*1.00*
Petroleum Products Adjustment (f)	**0.19**	**0.22**	**0.22**	**0.23**	**0.22**	**0.22**	*0.22*	*0.22*	*0.21*	*0.22*	*0.22*	*0.22*	**0.22**	*0.22*	*0.21*
Product Net Imports (c)	**-2.94**	**-3.13**	**-3.24**	**-3.86**	**-3.74**	**-3.88**	*-3.94*	*-3.85*	*-3.68*	*-3.68*	*-3.85*	*-3.69*	**-3.29**	*-3.85*	*-3.73*
Hydrocarbon Gas Liquids	**-2.02**	**-2.23**	**-2.16**	**-2.19**	**-2.14**	**-2.26**	*-2.31*	*-2.40*	*-2.40*	*-2.49*	*-2.56*	*-2.58*	**-2.15**	*-2.28*	*-2.51*
Unfinished Oils	**0.14**	**0.25**	**0.22**	**0.08**	**0.09**	**0.32**	*0.35*	*0.21*	*0.18*	*0.25*	*0.38*	*0.21*	**0.17**	*0.24*	*0.25*
Other HC/Oxygenates	**-0.08**	**-0.04**	**-0.03**	**-0.06**	**-0.09**	**-0.09**	*-0.05*	*-0.03*	*-0.03*	*-0.03*	*-0.03*	*-0.02*	**-0.05**	*-0.06*	*-0.03*
Motor Gasoline Blend Comp.	**0.55**	**0.79**	**0.66**	**0.40**	**0.40**	**0.60**	*0.50*	*0.21*	*0.38*	*0.63*	*0.38*	*0.43*	**0.60**	*0.43*	*0.45*
Finished Motor Gasoline	**-0.66**	**-0.66**	**-0.68**	**-0.85**	**-0.76**	**-0.82**	*-0.86*	*-0.63*	*-0.70*	*-0.68*	*-0.70*	*-0.71*	**-0.71**	*-0.77*	*-0.70*
Jet Fuel	**0.03**	**0.09**	**0.09**	**0.00**	**-0.04**	**-0.08**	*-0.01*	*0.01*	*-0.06*	*0.04*	*0.05*	*0.07*	**0.05**	*-0.03*	*0.03*
Distillate Fuel Oil	**-0.49**	**-0.90**	**-0.94**	**-0.89**	**-0.81**	**-1.23**	*-1.13*	*-0.91*	*-0.66*	*-1.03*	*-0.98*	*-0.84*	**-0.80**	*-1.02*	*-0.88*
Residual Fuel Oil	**0.08**	**0.05**	**0.08**	**0.16**	**0.14**	**0.12**	*0.07*	*0.14*	*0.04*	*0.07*	*0.04*	*0.14*	**0.09**	*0.12*	*0.07*
Other Oils (g)	**-0.49**	**-0.49**	**-0.50**	**-0.50**	**-0.54**	**-0.43**	*-0.50*	*-0.45*	*-0.43*	*-0.44*	*-0.42*	*-0.39*	**-0.49**	*-0.48*	*-0.42*
Product Inventory Net Withdrawals	**0.65**	**-0.26**	**0.03**	**0.52**	**0.37**	**-0.20**	*-0.59*	*0.33*	*0.31*	*-0.59*	*-0.33*	*0.35*	**0.23**	*-0.03*	*-0.07*
Total Supply	**18.43**	**20.03**	**20.21**	**20.41**	**20.16**	**20.30**	*20.53*	*20.88*	*20.41*	*20.75*	*20.95*	*21.09*	**19.78**	*20.47*	*20.80*
Consumption (million barrels per day)															
Hydrocarbon Gas Liquids	**3.40**	**3.33**	**3.31**	**3.60**	**3.87**	**3.45**	*3.40*	*3.87*	*3.97*	*3.49*	*3.50*	*3.91*	**3.41**	*3.65*	*3.72*
Other HC/Oxygenates	**0.11**	**0.13**	**0.11**	**0.16**	**0.13**	**0.17**	*0.18*	*0.23*	*0.22*	*0.21*	*0.20*	*0.26*	**0.13**	*0.18*	*0.22*
Unfinished Oils	**0.05**	**0.03**	**-0.05**	**-0.01**	**0.13**	**0.06**	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	**0.00**	*0.05*	*0.00*
Motor Gasoline	**8.00**	**9.07**	**9.13**	**8.96**	**8.47**	**8.90**	*9.03*	*8.94*	*8.55*	*9.09*	*9.14*	*8.94*	**8.80**	*8.84*	*8.93*
Fuel Ethanol blended into Motor Gasoline	**0.82**	**0.93**	**0.94**	**0.95**	**0.87**	**0.93**	*0.92*	*0.93*	*0.87*	*0.94*	*0.93*	*0.94*	**0.91**	*0.91*	*0.92*
Jet Fuel	**1.13**	**1.34**	**1.52**	**1.49**	**1.45**	**1.58**	*1.57*	*1.55*	*1.46*	*1.61*	*1.65*	*1.62*	**1.37**	*1.54*	*1.58*
Distillate Fuel Oil	**3.97**	**3.93**	**3.87**	**4.00**	**4.14**	**3.83**	*3.85*	*4.03*	*4.10*	*3.97*	*3.95*	*4.05*	**3.94**	*3.96*	*4.02*
Residual Fuel Oil	**0.26**	**0.25**	**0.33**	**0.41**	**0.38**	**0.35**	*0.34*	*0.34*	*0.30*	*0.31*	*0.32*	*0.34*	**0.31**	*0.35*	*0.32*
Other Oils (g)	**1.53**	**1.95**	**1.98**	**1.81**	**1.65**	**1.97**	*2.16*	*1.92*	*1.81*	*2.07*	*2.20*	*1.97*	**1.82**	*1.92*	*2.01*
Total Consumption	**18.45**	**20.03**	**20.21**	**20.41**	**20.22**	**20.30**	*20.53*	*20.88*	*20.41*	*20.75*	*20.95*	*21.09*	**19.78**	*20.48*	*20.80*
Total Petroleum and Other Liquids Net Imports	**-0.07**	**-0.16**	**0.35**	**-0.77**	**-0.74**	**-0.91**	*-0.66*	*-0.79*	*-0.73*	*-0.28*	*-0.73*	*-1.48*	**-0.16**	*-0.77*	*-0.81*
End-of-period Inventories (million barrels)															
Commercial Inventory															
Crude Oil (excluding SPR)	**501.9**	**448.0**	**420.4**	**421.4**	**414.4**	**423.8**	*418.9*	*434.8*	*470.6*	*460.7*	*441.4*	*447.2*	**421.4**	*434.8*	*447.2*
Hydrocarbon Gas Liquids	**168.6**	**195.8**	**225.6**	**188.4**	**142.0**	**187.2**	*233.6*	*189.9*	*154.2*	*204.8*	*245.6*	*203.3*	**188.4**	*189.9*	*203.3*
Unfinished Oils	**93.3**	**93.0**	**90.2**	**80.3**	**87.9**	**88.0**	*89.2*	*82.8*	*92.3*	*89.3*	*89.2*	*82.4*	**80.3**	*82.8*	*82.4*
Other HC/Oxygenates	**29.1**	**27.5**	**25.4**	**28.6**	**34.1**	**30.4**	*30.1*	*30.4*	*32.4*	*31.2*	*30.9*	*31.2*	**28.6**	*30.4*	*31.2*
Total Motor Gasoline	**237.6**	**237.2**	**227.0**	**232.2**	**238.5**	**219.1**	*219.0*	*235.1*	*233.6*	*235.9*	*226.7*	*241.2*	**232.2**	*235.1*	*241.2*
Finished Motor Gasoline	**20.3**	**18.6**	**18.5**	**17.7**	**17.3**	**17.6**	*21.1*	*24.8*	*21.8*	*23.1*	*24.1*	*26.8*	**17.7**	*24.8*	*26.8*
Motor Gasoline Blend Comp.	**217.4**	**218.6**	**208.5**	**214.5**	**221.2**	**201.5**	*197.9*	*210.3*	*211.9*	*212.8*	*202.6*	*214.4*	**214.5**	*210.3*	*214.4*
Jet Fuel	**39.0**	**44.7**	**42.0**	**35.8**	**35.6**	**39.9**	*42.5*	*39.3*	*38.8*	*39.6*	*42.2*	*39.0*	**35.8**	*39.3*	*39.0*
Distillate Fuel Oil	**145.5**	**140.1**	**131.7**	**129.9**	**114.6**	**111.1**	*124.9*	*127.8*	*116.9*	*121.8*	*128.7*	*130.8*	**129.9**	*127.8*	*130.8*
Residual Fuel Oil	**30.9**	**31.1**	**28.0**	**25.4**	**27.9**	**28.4**	*28.2*	*30.2*	*30.1*	*30.9*	*29.5*	*31.0*	**25.4**	*30.2*	*31.0*
Other Oils (g)	**55.8**	**54.1**	**50.5**	**51.8**	**58.5**	**53.5**	*44.8*	*46.7*	*56.3*	*54.5*	*45.5*	*47.1*	**51.8**	*46.7*	*47.1*
Total Commercial Inventory	**1301.7**	**1271.5**	**1240.7**	**1193.8**	**1153.6**	**1181.5**	*1231.1*	*1217.0*	*1225.2*	*1268.8*	*1279.7*	*1253.2*	**1193.8**	*1217.0*	*1253.2*
Crude Oil in SPR	**637.8**	**621.3**	**617.8**	**593.7**	**566.1**	**492.0**	*402.0*	*364.2*	*360.4*	*352.6*	*350.0*	*339.5*	**593.7**	*364.2*	*339.5*

(a) Includes lease condensate.

(b) Crude oil production from U.S. Federal leases in the Gulf of Mexico (GOM).

(c) Net imports equals gross imports minus gross exports.

(d) Crude oil adjustment balances supply and consumption and was previously referred to as "Unaccounted for Crude Oil."

(e) Renewables and oxygenate production includes pentanes plus, oxygenates (excluding fuel ethanol), and renewable fuels. Beginning in January 2021, renewable fuels includes biodiesel, renewable diesel, renewable jet fuel, renewable heating oil, renewable naphtha and gasoline, and other renewable fuels. For December 2020 and prior, renewable fuels includes only biodiesel.

(f) Petroleum products adjustment includes hydrogen/oxygenates/renewables/other hydrocarbons, motor gasoline blend components, and finished motor gasoline.

(g) "Other Oils" includes aviation gasoline blend components, finished aviation gasoline, kerosene, petrochemical feedstocks, special naphthas, lubricants, waxes, petroleum coke, asphalt and road oil, still gas, and miscellaneous products.

- = no data available

SPR: Strategic Petroleum Reserve

HC: Hydrocarbons

Notes: EIA completed modeling and analysis for this report on July 7, 2022.

The approximate break between historical and forecast values is shown with historical data printed in bold; estimates and forecasts in italics.

Historical data: Latest data available from Energy Information Administration databases supporting the following reports: *Petroleum Supply Monthly* , DOE/EIA-0109; *Petroleum Supply Annual* , DOE/EIA-0340/2; and *Weekly Petroleum Status Report* , DOE/EIA-0208.

Minor discrepancies with published historical data are due to independent rounding.

Forecasts: EIA Short-Term Integrated Forecasting System.

Table 5a. U.S. Natural Gas Supply, Consumption, and Inventories (e)

U.S. Energy Information Administration | Short-Term Energy Outlook - July 2022

	2021				2022				2023				Year		
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	2021	2022	2023
Supply (billion cubic feet per day)															
Total Marketed Production	**97.65**	**101.12**	**101.89**	**104.86**	**102.77**	**103.83**	*105.34*	*106.44*	*106.90*	*108.26*	*109.34*	*110.04*	**101.40**	*104.61*	*108.64*
Alaska	**1.02**	**0.95**	**0.90**	**1.02**	**1.06**	**0.83**	*0.75*	*0.87*	*0.93*	*0.82*	*0.76*	*0.89*	**0.97**	*0.88*	*0.85*
Federal GOM (a)	**2.26**	**2.25**	**1.82**	**2.11**	**2.04**	**2.25**	*2.17*	*2.13*	*2.16*	*2.09*	*1.97*	*1.91*	**2.11**	*2.15*	*2.03*
Lower 48 States (excl GOM)	**94.37**	**97.92**	**99.17**	**101.73**	**99.67**	**100.75**	*102.43*	*103.44*	*103.81*	*105.35*	*106.61*	*107.23*	**98.32**	*101.58*	*105.76*
Total Dry Gas Production	**90.59**	**93.15**	**93.86**	**96.53**	**94.61**	**95.51**	*96.88*	*97.89*	*98.40*	*99.62*	*100.60*	*101.25*	**93.55**	*96.23*	*99.98*
LNG Gross Imports	**0.15**	**0.02**	**0.03**	**0.04**	**0.15**	**0.18**	*0.18*	*0.20*	*0.32*	*0.18*	*0.18*	*0.20*	**0.06**	*0.18*	*0.22*
LNG Gross Exports	**9.27**	**9.81**	**9.60**	**10.32**	**11.50**	**10.94**	*10.14*	*10.85*	*13.00*	*12.61*	*12.27*	*12.89*	**9.76**	*10.85*	*12.69*
Pipeline Gross Imports	**8.68**	**6.81**	**7.24**	**7.82**	**8.92**	**6.84**	*6.42*	*6.71*	*7.78*	*6.47*	*6.33*	*6.50*	**7.63**	*7.21*	*6.76*
Pipeline Gross Exports	**8.31**	**8.66**	**8.50**	**8.40**	**8.43**	**8.39**	*9.24*	*9.20*	*9.12*	*9.02*	*9.33*	*9.24*	**8.47**	*8.82*	*9.18*
Supplemental Gaseous Fuels	**0.17**	**0.15**	**0.15**	**0.17**	**0.19**	**0.17**	*0.17*	*0.17*	*0.17*	*0.17*	*0.18*	*0.18*	**0.16**	*0.17*	*0.17*
Net Inventory Withdrawals	**17.18**	**-9.12**	**-7.87**	**1.03**	**20.14**	**-10.17**	*-8.83*	*2.74*	*14.96*	*-12.35*	*-8.62*	*3.84*	**0.24**	*0.90*	*-0.59*
Total Supply	**99.18**	**72.53**	**75.31**	**86.87**	**104.08**	**73.19**	*75.44*	*87.65*	*99.51*	*72.45*	*77.06*	*89.83*	**83.42**	*85.02*	*84.67*
Balancing Item (b)	**0.26**	**-0.53**	**-0.23**	**-1.25**	**0.23**	**1.16**	*0.50*	*1.45*	*1.36*	*0.49*	*0.37*	*0.65*	**-0.44**	*0.83*	*0.72*
Total Primary Supply	**99.44**	**72.00**	**75.08**	**85.62**	**104.30**	**74.35**	*75.94*	*89.10*	*100.87*	*72.95*	*77.43*	*90.49*	**82.98**	*85.85*	*85.38*
Consumption (billion cubic feet per day)															
Residential	**25.67**	**7.50**	**3.63**	**14.43**	**26.09**	**7.65**	*3.49*	*16.82*	*24.71*	*7.77*	*3.90*	*16.74*	**12.75**	*13.46*	*13.23*
Commercial	**14.87**	**6.25**	**4.68**	**10.08**	**15.62**	**6.09**	*4.44*	*10.43*	*15.11*	*6.36*	*4.83*	*10.52*	**8.94**	*9.12*	*9.18*
Industrial	**23.81**	**21.49**	**21.12**	**23.44**	**25.23**	**22.05**	*21.41*	*24.13*	*23.49*	*21.44*	*22.31*	*25.34*	**22.46**	*23.20*	*23.15*
Electric Power (c)	**26.79**	**29.20**	**37.94**	**29.47**	**28.65**	**30.75**	*38.66*	*29.27*	*28.65*	*29.40*	*38.20*	*29.20*	**30.88**	*31.85*	*31.38*
Lease and Plant Fuel	**4.87**	**5.04**	**5.08**	**5.23**	**5.12**	**5.18**	*5.25*	*5.31*	*5.33*	*5.40*	*5.45*	*5.49*	**5.05**	*5.21*	*5.42*
Pipeline and Distribution Use	**3.29**	**2.38**	**2.48**	**2.83**	**3.45**	**2.49**	*2.54*	*3.00*	*3.43*	*2.44*	*2.60*	*3.06*	**2.74**	*2.87*	*2.88*
Vehicle Use	**0.15**	**0.15**	**0.15**	**0.15**	**0.15**	**0.15**	*0.15*	*0.15*	*0.15*	*0.15*	*0.15*	*0.15*	**0.15**	*0.15*	*0.15*
Total Consumption	**99.44**	**72.00**	**75.08**	**85.62**	**104.30**	**74.35**	*75.94*	*89.10*	*100.87*	*72.95*	*77.43*	*90.49*	**82.98**	*85.85*	*85.38*
End-of-period Inventories (billion cubic feet)															
Working Gas Inventory	**1,801**	**2,585**	**3,306**	**3,210**	**1,401**	**2,327**	*3,139*	*2,887*	*1,541*	*2,664*	*3,457*	*3,103*	**3,210**	*2,887*	*3,103*
East Region (d)	**313**	**515**	**804**	**766**	**242**	**479**	*789*	*673*	*253*	*586*	*873*	*740*	**766**	*673*	*740*
Midwest Region (d)	**395**	**630**	**966**	**887**	**296**	**558**	*909*	*802*	*343*	*641*	*978*	*820*	**887**	*802*	*820*
South Central Region (d)	**760**	**993**	**1,053**	**1,143**	**587**	**889**	*974*	*987*	*674*	*1,011*	*1,077*	*1,065*	**1,143**	*987*	*1,065*
Mountain Region (d)	**113**	**175**	**205**	**171**	**90**	**137**	*182*	*168*	*100*	*144*	*208*	*188*	**171**	*168*	*188*
Pacific Region (d)	**197**	**246**	**248**	**218**	**165**	**239**	*261*	*233*	*147*	*258*	*297*	*267*	**218**	*233*	*267*
Alaska	**23**	**27**	**30**	**25**	**21**	**24**	*24*	*24*	*24*	*24*	*24*	*24*	**25**	*24*	*24*

(a) Marketed production from U.S. Federal leases in the Gulf of Mexico.

(b) The balancing item represents the difference between the sum of the components of natural gas supply and the sum of components of natural gas demand.

(c) Natural gas used for electricity generation and (a limited amount of) useful thermal output by electric utilities and independent power producers.

(d) For a list of States in each inventory region refer to *Weekly Natural Gas Storage Report, Notes and Definitions (http://ir.eia.gov/ngs/notes.html)* .

(e) We published the Natural Gas Monthly on Friday July 8, which was after we completed this forecast, and as a result, this forecast does not include final Natural Gas Monthly data for April

- = no data available

LNG: liquefied natural gas.

Notes: EIA completed modeling and analysis for this report on July 7, 2022.

The approximate break between historical and forecast values is shown with historical data printed in bold; estimates and forecasts in italics.

Historical data: Latest data available from Energy Information Administration databases supporting the following reports: *Natural Gas Monthly* , DOE/EIA-0130; and *Electric Power Monthly* , Minor discrepancies with published historical data are due to independent rounding.

Forecasts: EIA Short-Term Integrated Forecasting System.

https://www.reuters.com/business/energy/exclusive-top-us-lng-producer-cheniere-asks-biden-admin-drop-pollution-rule-2022-07-08/
July 8, 20225:35 AM MDTLast Updated an hour ago

Exclusive: Top U.S. LNG producer Cheniere asks Biden admin to drop pollution rule

By Valerie Volcovici

WASHINGTON, July 8 (Reuters) - Cheniere Energy Inc (LNG.A) has asked the Biden administration to exempt it from limits on emissions of cancer-causing pollutants, arguing they would force the top U.S. exporter of liquefied natural gas to shut for an extended period and endanger the country's efforts to ramp up supplies to Europe, according to documents reviewed by Reuters.

The request imposes an uncomfortable dilemma on President Joe Biden's administration as it tries to balance efforts to slash pollution from the fossil fuel industry against promises to help European allies cut energy ties with Moscow over its invasion of Ukraine.

Denying Cheniere could shut off the bulk of America's LNG exports for months or years, while granting its request would mean ongoing emissions of toxic pollutants into poor and minority neighborhoods Biden has vowed to protect.

Texas regulators have already given Cheniere's massive LNG plant on the outskirts of the Gulf Coast city of Corpus Christi a pass for overshooting emissions limits on other pollutants, according to previous Reuters reporting. read more

The request also reflects a huge financial vulnerability for Cheniere and its shareholders at a time it has been enjoying increased sales and a rising stock price.

At issue is a rule under the U.S. Clean Air Act called the National Emissions Standards for Hazardous Pollutants (NESHAP), which imposes curbs on emissions of known carcinogens like formaldehyde and benzene from stationary combustion turbines.

The Environmental Protection Agency (EPA) announced in February that starting in August, the rule will apply to two types of gas-fired turbines that had been left out of the regulation for nearly two decades.

Gas-powered turbines emit formaldehyde and other dangerous pollutants through a chemical transformation that occurs when methane is superheated.

Around 250 U.S. gas turbines will be subject to the rule, according to an EPA list that showed Cheniere is the only LNG company that uses these type of turbines and whose facilities will be impacted.

The Houston-based company, which accounts for around 50% of U.S. shipments of the supercooled fuel, told the EPA in a series of emails this spring that its two LNG facilities in Louisiana and Texas use a unique turbine design that cannot be easily equipped with pollution controls.

"The design of Cheniere's LNG terminals is complex, and the subject turbines are located on elevated pedestals with limited space for installing control equipment," Cheniere's law firm Bracewell said in a letter emailed to EPA Administrator Michael Regan on March 8.

"Potentially imposing significant costs and operational disruption on the U.S. LNG industry at the same time the administration is focused on Europe's strategic need to break its reliance on Russian gas is counterproductive," it said.

A separate Cheniere email dated March 9, sent to other EPA officials, said design and engineering work to evaluate the feasibility of retrofitting all 62 turbines at its facilities would likely take "several years", making it impossible to meet the federal pollution standard on time.

The company asked the EPA to reverse its decision to subject gas-fired turbines to the NESHAP rule, or exempt the specific design used by Cheniere, according to the documents. Company representatives later met with senior EPA staff, including Principal Deputy Assistant Administrator Joseph Goffman and Deputy EPA Administrator Janet McCabe, to discuss the issue, according to the documents.

The EPA confirmed that Cheniere, through its law firm Bracewell, had made the request for relief from the regulation and that agency staff and officials met with the company in March and April to discuss it.

"At this time we have not made a decision to lift the stay or issue an exemption," the EPA said in a statement.

Cheniere's request could carry some weight in the Biden administration as one of a handful of companies that advises a White House and EU-backed task force developing a plan to wean EU countries off Russian gas.

TWO-DECADE REPRIEVE

The EPA first imposed the standard for stationary combustion turbines under NESHAP in 2004, but issued a “stay” temporarily excusing two types of gas-fired turbines commonly used by the energy industry after business groups petitioned to keep them out of the regulation - arguing that the pollution they create is "negligible."

The EPA kept that stay in place for 18 years, but never formally delisted the turbines because of a 2007 decision by the D.C. Circuit Court of Appeals saying it had no authority to do so.

In February 2020, after environmental groups threatened to sue the agency for inaction, Biden’s EPA announced it would finally lift the stay and require operators to meet the standard.

Under the rule, these turbines will have to comply with an emissions limit of 91 parts per billion for formaldehyde within 180 days. That level that for formaldehyde is meant to ensure lower levels of emissions for other dangerous chemicals too, according to the EPA.

Frank Maisano of Bracewell told Reuters that Cheniere is awaiting a formal response from the EPA on the company’s request for relief from the rule.

Neither Maisano nor Cheniere would comment to Reuters on why the company used a turbine design at its facilities that could not easily accommodate equipment that might be needed if the regulatory stay on gas turbines were lifted.

In its correspondence with the EPA, Cheniere said its facilities were built in accordance with regulations in effect at the time. The Sabine Pass facility, which produces about 30 million tonnes per annum (MTPA) of LNG, started operating in 2016, while the 15-MTPA Corpus Christi plant entered into service in June 2018.

Cheniere approved last month a major expansion at its Corpus Christi facility that would add seven liquefaction trains to produce around 10.5 MTPA of LNG. read more A Cheniere spokesperson told Reuters the company will use electric turbines for the new trains, instead of gas-fired turbines.

Reporting by Valerie Volcovici; additional reporting by Nichola Groom Editing by Marguerita Choy

Our Standards: The Thomson Reuters Trust Principles.

https://www.shell.com/business-customers/trading-and-supply/trading/news-and-media-releases/shell-and-mexico-pacific-sign-long-term-lng-sales-and-purchase-agreement.html

Shell and Mexico Pacific sign long-term LNG sales and purchase agreement

Jul 12, 2022

Shell Eastern Trading (Pte) Ltd (Shell) and a subsidiary of Mexico Pacific Limited (Mexico Pacific) announced today they have signed a sales and purchase agreement for Shell to offtake 2.6 million tonnes per year (MTPA) of liquefied natural gas (LNG) from the first two trains of Mexico Pacific's anchor LNG export facility located in Puerto Libertad, Sonora, Mexico.

Under the sales and purchase agreement, Shell will purchase LNG on a free on-board basis over a term of 20 years. When fully operational, the facility will have three trains and a combined capacity of 14.1 MTPA. The facility is expected to commence commercial operations in 2026.

"We are delighted to welcome Shell as a foundation customer at our anchor LNG facility", said **Douglas Shanda, President and Chief Executive Officer of Mexico Pacific**. "Their recognition of the advantages our location offers, including access to low-cost Permian gas, avoidance of the Panama Canal to ensure a shorter shipping distance to Asia, and lower landed pricing, demonstrates the value of West Coast North American LNG

Delfin Midstream Signs LNG Sale and Purchase Agreement With Vitol Inc.
2022-07-13 04:00:00.12 GMT

Delfin Midstream Signs LNG Sale and Purchase Agreement With Vitol Inc.

15-year binding SPA for LNG Supply from Delfin Deepwater Port LNG Export Facility Represents Major Milestone for Company

Vitol has Completed a Strategic Investment Agreement with Delfin

HOUSTON, July 13, 2022 (GLOBE NEWSWIRE) -- Delfin Midstream Inc. (“Delfin”) has finalized a binding liquified natural gas (“LNG”) sale and purchase agreement (“SPA”) with Vitol Inc. (“VIC”), the Americas-based affiliate of Vitol, which is the world’s largest independent trader of energy. In addition to the SPA, Vitol has finalized a strategic investment in the company.

Under the SPA, Delfin will supply 0.5 million tonnes per annum (“mtpa”) on a free on-board (“FOB”) basis at the Delfin Deepwater Port 40 nautical miles off the coast of Louisiana to VIC for a 15-year period. The SPA is indexed to Henry Hub benchmark. The agreement is valued at approximately $3 billion in revenue over 15 years.

“Recent events have only accelerated the need for a wider array of potential buyers to source reliable low-cost energy from the safety of the U.S. at compelling prices and Delfin is perfectly positioned to serve this growing need. After evaluating multiple projects and running an extensive diligence process, Vitol’s decisions to invest demonstrates the strong trust they have in our ability to deliver a reliable source of LNG,” Dudley Poston, CEO of Delfin, said.

In addition to the VIC agreement, Delfin has signed other HOAs and Term Sheets that are being finalized into fully termed agreements. As a modular project requiring only 2.0 to 2.5 MTPA of long-term contracts to begin construction, Delfin is on schedule to make Final investment Decision on the first FLNG vessel by the end of this year.

Wouter Pastoor, COO of Delfin, added: “Delfin has completed permitting work with a positive Record of Decision from the Maritime Administration with a 13 MTPA Non-FTA DoE export license. In addition, Delfin has completed Front End Engineering and Design with Samsung Heavy Industries and Black & Veatch which puts us on pace to execute our project this year and to commence operations in 2026.”

Pablo Galante Escobar, Global Head of LNG and European Gas & Power at Vitol, said: “We are delighted to conclude this agreement with Delfin. Global LNG demand is experiencing tremendous growth and Vitol continues to strengthen its position to safely and reliably deliver cost effective, flexible solutions to our customers around the world. Vitol’s commitment and investment grade rating will help Delfin on its path to financial close of this exciting project.”

Carlos Wheelock, Head of LNG Americas for VIC, added: “We have seen extensive changes to the global energy landscape this year, further underscoring the importance of US liquefaction in meeting the world energy needs. Delfin’s innovative solution provides a reliable, low cost alternative for the world’s LNG needs.”

About Delfin Midstream Inc.

Delfin Midstream Inc. (“Delfin”) is a leading LNG export infrastructure development company utilizing low-cost Floating LNG technology solutions. Delfin is the parent company of the Delfin LNG LLC (“Delfin LNG”) and Avocet LNG LLC. Delfin LNG is a brownfield Deepwater Port requiring minimal additional infrastructure investment to support up to four FLNG Vessels producing up to 13 million tonnes of LNG per annum. Delfin purchased the UTOS pipeline, the largest natural gas pipeline in the Gulf of Mexico. Delfin LNG received a positive Record of Decision from MARAD and approval from the Department of Energy for long-term exports of LNG to countries that do not have a Free Trade Agreement with the United States for up to 13 MTPA. Further information is available at www.delfinmidstream.com.

About Vitol

Vitol is a leader in the energy sector with a presence across the spectrum: from oil through to power, renewables and carbon. It trades 7.6 million barrels per day of crude oil and products, and charters circa 6,200 ship voyages every year.

Vitol’s clients include national oil companies, multinationals, leading industrial companies and utilities. Founded in Rotterdam in 1966, today Vitol serves clients from some 40 offices worldwide and is invested in energy assets globally including: 16 m m3 of storage globally, 500 k b/d of refining capacity, over 6,800 service stations and a growing portfolio of transitional and renewable energy assets. Revenues in 2021 were $279 billion.

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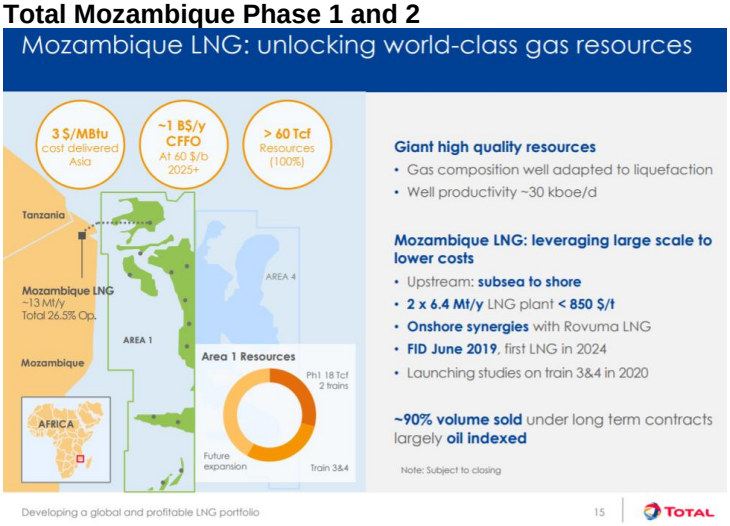
Multiple Brownfield LNG FIDs Now Needed To Fill New LNG Supply Gap From Mozambique Chaos? How About LNG Canada Phase 2?

Posted Wednesday April 28, 2021. 9:00 MT

The next six months will determine the size and length of the new LNG supply gap that is hitting harder and faster than anyone expected six months ago. Optimists will say the Mozambique government will bring sustainable security and safety to the northern Cabo Delgado province and provide the confidence to Total to quickly get back to LNG development such that its LNG in-service delay is a matter of months and not years. We hope so for Mozambique's domestic situation, but will it be that easy for Total's board to quickly look thru what just happened? Total suspended LNG development for 3 months, restarted development on March 25, but then 3 days of violence led it to suspend development again on March 28, and announce force majeure on Monday April 26. Even if the optimists are right, Mozambique LNG is counted on for LNG supply and the major LNG supply project that are in LNG supply forecasts are now all delayed – Total Phase 1 of 1.7 bcf/d and its follow on Phase 2 of 1.3 bcf/d, and Exxon's Rozuma Phase 1 of 2.0 bcf/d. It is important to remember this 5.0 bcf/d of major LNG supply is being counted in LNG supply forecasts and starting in 2024. At a minimum, we think the more likely scenario is a delay of at least 2 years in this 5.0 bcf/d from the pre-Covid timelines. And this creates a much bigger and sooner LNG supply gap starting ~2025 and stronger outlook for LNG prices. Thermal coal in Asia will play a role in keeping a lid on LNG prices. But there will be the opportunity for LNG suppliers to at least review the potential for brownfield LNG projects to fill the growing supply gap. The thought of increasing capex was a non-starter six months ago, but there is a much stronger outlook for global oil and gas prices. Oil and gas companies are pivoting from cutting capex to small increases in 2021 capex and expecting for higher capex in 2022. We believe this sets the stage for looking at potential FID of brownfield LNG projects before the end of 2021 to be included in 2022 capex budgets. Mozambique is causing an LNG supply gap that someone will try to fill. And if brownfield LNG is needed, what about Shell looking at 1.8 bcf/d brownfield LNG Canada Phase 2? Cdn natural gas producers hope so as this would mean more Cdn natural gas will be tied to Asian LNG markets and not competing in the US against Henry Hub.

Total declares force majeure on Mozambique LNG, Yesterday, Total announced [LINK] "*Considering the evolution of the security situation in the north of the Cabo Delgado province in Mozambique, Total confirms the withdrawal of all Mozambique LNG project personnel from the Afungi site. This situation leads Total, as operator of Mozambique LNG project, to declare force majeure. Total expresses its solidarity with the government and people of Mozambique and wishes that the actions carried out by the government of Mozambique and its regional and international partners will enable the restoration of security and stability in Cabo Delgado province in a sustained manner".* Total is working Phase 1 is ~1.7 bcf/d (Train 1 + 2, 6.45 mtpa/train) and was originally expected to being LNG deliveries in 2024. There was no specific timeline for Phase 2 of 1.3 bcf/d (Train 3 + 4, 5.0 mtpa/train), but was expected to follow Phase 1 in short order to keep capital costs under control with a continuous construction process with a potential onstream shortly after 2026.

Total Mozambique Phase 1 and 2



Source: Total Investor Day September 24, 2019

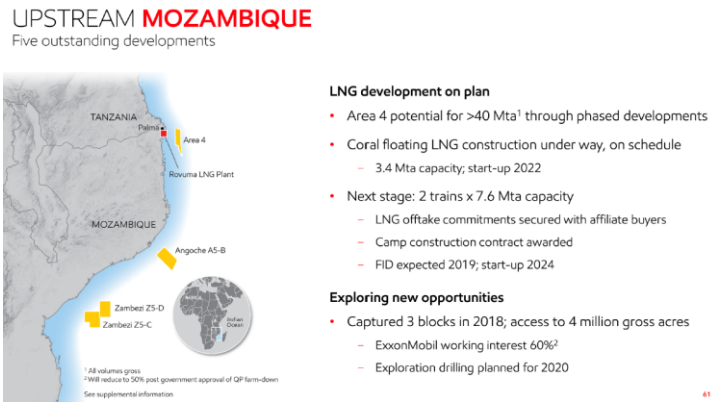
Total's Mozambique force majeure is no surprise, especially the need to the restoration of security and stability "in a sustained manner". Yesterday, Total announced [LINK] "*Considering the evolution of the security".* No one should be surprised by the force majeure or the sustained manner caveat. SAF Group posts a weekly Energy Tidbits research memo [LINK], wherein we have, in multiple weekly memos, that Total had shut down development in December for 3 months due to the violent and security risks. It restarted development on Wed March 24, violence/attacks immediately resumed for 3 consecutive days, and then Total suspended development on Sat March 27. Local violence/attacks shut development down in Dec, the situation gets settled enough for Total to restart in March, only to be shut down 3 days thereafter. No one should be surprised especially with Total's need to see security and stability "in a sustained manner".

Does anyone really think Total will risk another quick 2-3 month restart or even in 2021? The Mozambique government will be working hard to convince Total to restart soon. We just find it hard to believe Total board will risk a replay of March 24-27 in 2021. Unfortunately, Mozambique has had internal conflict for years. It reached a milestone to the positive in August 2019. Our SAF Group August 11, 2019 Energy Tidbits memo [LINK] highlighted the signing of a peace pact between Mozambique President Nyusi and leader of the Renamo opposition Momade. This was the official end to a 2013 thru 2016 conflict following a failure to hold up the prior peace pact. At that time, FT reported [LINK] "Mr Nyusi has said that "*the government and Renamo will come together and hunt" rebels who fail to disarm. The government has struggled to stem the separate insurgency in the north, which has killed or displaced hundreds near the gas-rich areas during the past two years. While the roots of the conflict remain murky, it is linked to a local Islamist group and appears to be drawing on disaffection over sharing gas investment benefits, say analysts*." This is just a reminder this is not a new issue. LNG is a game changer to Mozambique's economic future. It is, but also has been, a government priority to have the security and safety for Total and Exxon to move on their LNG developments. Its hard to believe the Mozambique government will be able to quickly convince Total and Exxon boards that they can be comfortable there is a sustained security/safety situation and they can send their people back in to develop the LNG. Total's board would allow any resumption of development before year end 2021. The last thing Total wants is a replay of March 24-27. The first question is how long will it take before the Total board is convinced its safe to restart. Could you imagine them doing a replay of what just happened? Wait three months, restart development and have to stop again right away? We have to believe that could lead the Total board to believe it is unfixable for years. We just don't think they are to prepared to risk that decision in 3 months. Its why we have to think there isn't a restart approval until at least in 2022 at the earliest ie. why we think the likely scenario is a delay of 2-3 years, and not a matter of months.

Mozambique's security issues pushes back 5.0 bcf/d of new LNG supply at least a couple years. The global LNG issue is that 5 bcf/d of new Mozambique LNG supply (apart from the Eni Coral FLNG of 0.45 bcf/d) won't start up in 2024 and

continuing thru the 2020s. And we believe all LNG forecasts included this 5.0 bcf/d to be in service in the 2020s as Mozambique had been considered the best positioned LNG supply to access Asia after Australia and Papua New Guinea. (i) Eni Coral Sul (Rovuma Basin) FLNG of 0.45 bcf/d planned in service in 2022. [LINK] This is an offshore floating LNG vessel that is still expected to be in service in 2022. (ii) Total Phase 1 to add 1.7 bcf/d with an in service originally planned for 2024. We expect the in service data to be pushed back to at least 2026 assuming Total gives a development restart approval in Dec 2021. In theory, this would only be a 1 year loss of time. However, Total has let services go, the project will be idle for 9 months, it isn't clear if the need to get people out quickly let them do a complete put the project on hold, and how many people will be on site maintaining the status of the development during the force majeure. Also what new procedures and safety will be put in place for a restart. These all mean there will be added time needed to get the project back to where it was when force majeure was declared ie. why we think a 12 month time delay will be more like an 18 month project delay. (iii) Exxon's Rozuma Phase 1 LNG will add 2.0 bcf/d and, pre-Covid, was expected to be in service in 2025. We believe the delays related to security and safety at Total are also going to impact Exxon. We find it highly unlikely the Exxon board would take a different security and safety decision than Total. Pre-pandemic, Exxon's March 6, 2019 Investor Day noted their operated Mozambique Rovuma LNG Phase 1 was to be 2 trains each with 1.0 bcf/d capacity for total initial capacity of 2.0 bf/d with FID expected in 2019 and first LNG deliveries in 2024. The 2019 FID expectation was later pushed to be expected just before the March 2020 investor day. But the pandemic hit, and on March 21, 2020, we tweeted [LINK] on the Reuters story "*Exclusive: Coronavirus, gas slump put brakes on Exxon's giant Mozambique LNG plan"* [LINK] that noted Exxon was expected to delay the Rovuma FID. There was no timeline, but the expectation was that FID would now be in 2022 (3 years later than original timeline0 and that would push first LNG likely to 2027. (iv) Total Phase 2 was to add 1.3 bcf/d. There was no firm in service date but it was expected to follow closely behind Phase 1 to maintain services. That would have put it originally in the 2026/2027 period. But if Phase 1 is pushed back 2 years, so will Phase 2 so more likely 2028/2029.. (v) Total Phase 1 + 2 and Exxon Rozuma Phase 1 total 5.0 bcf/d and would have been (and still are) in all LNG supply forecasts for the 2020s. (vi) We aren't certain if the LNG supply forecasts include Exxon Rozuma Phase 2 ,which would be an additional 2.0 bcf/d on top of the 5.0 bcf/d noted above. Exxon Rozuma has always been expected to be at least 2 Phases. This has been the plan since the Anadarko days given the 85 tcf size of the resource on Exxon's Area 4. There was no firm in service data for Phase 2, but it was expected they would also closely follow Phase 1 to maintain services. We expect that original timeline would have been 2026/2027 and that would not be pushed back to 2029/2030. (vii) It doesn't matter if its only 5 bcf/ of Mozambique that is delayed 2 to 3 years, it will cause a bigger LNG supply gap and sooner. The issue for LNG markets is this is taking projects that are in development effectively out of the queue for some period.

Exxon Mozambique LNG



Source: Exxon Investor Day March 6, 2019

Won't LNG and natural gas get hit by Biden's push for carbon free electricity? Yes, in the US. For the last 9 months, we have warned on Biden's climate change plan that were his election platform and now form his administration's energy transition map. We posted our July 28, 2020 blog "*Biden To Put US On "Irreversible Path to Achieve Net-Zero Emissions, Economy-Wide" Is a Major Negative To US Natural Gas in 2020s* "[LINK] on Biden's platform "*The Biden Plan to Build a Modern, Sustainable Infrastructure and an Equitable Clean Energy Future*" [LINK]. Biden's new American Jobs Plan

[LINK] lines up with his campaign platform including to put the US "*on the path to achieving 100 percent carbon-free electricity by 2035*.". Our July 28, 2020 blog noted that it would require replacing ~60% of US electricity generation with more renewable and it could eliminate ~40% (33.5 bcf/d) of 2019 US natural gas consumption. If Biden is 25% successful by 2030, it would replace ~6.3 bcf/d of natural gas demand. It would be a negative to US natural gas and force more US natural gas to export markets. The wildcard when does US natural gas start to decline if producers are faced with the reality of natural gas being phased out for electricity. The other hope is that when Biden says "carbon-free", its not what ends up in the details of any formal policy statement ie. carbon electricity will be allowed with Biden's push for CCS.

Will Cdn natural gas be similarly hit by if Trudeau move to "emissions free" and not "net zero emissions" electricity? Yes and No. Our SAF Group April 25, 2021 Energy Tidbits memo [LINK] was titled ""*Bad News For Natural Gas, Trudeau's Electricity Goal is Now 100% "Emissions Free" And Not "Net Zero Emissions*". On Thursday, PM Trudeau spoke at Biden's global climate summit [LINK] and looks like he slipped in a new view on electricity than was in last Monday's budget and his Dec climate plan. Trudeau said "*In Canada, we've worked hard to get to over 80% emissions-free electricity, and we're not going to stop until we get to 100%."* Speeches, especially ones made on a global stage are checked carefully so this had to be deliberate. Trudeau said "*emissions free*" and not net zero emissions electricity. It seems like this language is carefully written to exclude any fossil fuels as they are not emissions free even if they are linked to CCS. Recall in Liberals big Dec 2020 climate announcement [LINK], Liberals said ""*Work with provinces, utilities and other partners to ensure that Canada's electricity generation achieves net-zero emissions before 2050*." There is no way Trudeau changed the language unless he meant to do so. And this is a major change as it would seem to indicate his plan to eliminate all fossil fuels used for electricity. If so this would be a negative to Cdn natural gas that would be stuck within Western Canada and/or continuing to push into the US when Biden is trying to switch to carbon free electricity. We recognize that there is still some ambiguity in what will be the details of policy and the Liberals aren't changing to no carbon sourced electricity at all. Let's hope so. But let's also be careful that politicians don't change language without a reason or at least with a view to setting up for some future hit. Plus Trudeau had a big warning in that same speech saying "*we will make it law to respect our new 2030 target and achieve net-zero emissions by 2050*". They plan to make it the law that Canada has to be on track for the Liberals 2030 emissions targets. This means that the future messaging will be that the Liberals have no choice but to take harder future emissions actions as it is the law. They will be just obeying the law as they will be obligated to obey the law. Everyone knows the messaging will be we have to do more get to Net Zero, that in itself will inevitably mean it will be the law if he actually does move to eliminate any carbon based electricity. So yes it's a negative, that is unless more Cdn natural gas can be exported via LNG to Asia. We believe this would be a plus to be priced against global LNG instead of Henry Hub.

Biden's global climate summit reminded there is too much risk to skip over natural gas as the transition fuel. Apart from the US and Canada, we haven't seen a sea shift to eliminating natural gas for power generation, especially from energy import dependent countries. There is a strong belief that hydrogen and battery storage will one day be able to scale up at a competitive cost to lead to the acceleration away from fossil fuels. But that time isn't yet here, at least not for energy import dependent countries. One of the key themes from last week's leader's speeches at the Biden global climate summit – to get to Net Zero, the world is assuming there wilt be technological advances/discoveries that aren't here today and that have the potential to immediately ramp up in scale. IEA Executive Director Faith Birol was blunt in his message [LINK] saying "*Right now, the data does not match the rhetoric – and the gap is getting wider*." And "*IEA analysis shows that about half the reductions to get to net zero emissions in 2050 will need to come from technologies that are not yet ready for market. This calls for massive leaps in innovation. Innovation across batteries, hydrogen, synthetic fuels, carbon capture and many other technologies.* US Special Envoy for Climate John Kerry said a similar point that half of the emissions reductions will have to come from technologies that we don't yet have at scale. UK PM Johnson [LINK] didn't say it specifically, but points to this same issue saying "*To do these things we've got to be constantly original and optimistic about new technology and new solutions whether that's crops that are super-resistant to drought or more accurate weather forecasts like those we hope to see from the UK's new Met Office 1.2bn supercomputer that we're investing in*." It may well be that the US and other self sufficient energy countries are comfortable going on the basis of assuming technology developments will occur on a timely basis. But, its clear that countries like China, India, South Korea and others are not prepared to do so. And not prepared to have the confidence to rid themselves of coal power generation. This is why there hasn't been any material change in the LNG demand outlook

We expect the IEA's blunt message that the gap is getting wider will be reinforced on May 18. We have had a consistent view on the energy transition for the past few years. We believe it is going to happen, but it will take longer, be a bumpy road and cost more than expected. This is why we believe the demise of oil and natural gas won't be as easy and fast as hoped for by the climate change side. The IEA's blunt warning on the gap widening should not be a surprise as they warned on this in June 2020. Birol's climate speech also highlighted that the IEA will release on May 18 its roadmap for how the global energy sector can reach net zero by 2050. Our SAF Group June 11, 2020 blog "*Will The Demise Of Oil Take Longer, Just Like Coal? IEA and Shell Highlight Delays/Gaps To A Smooth Clean Energy Transition*" [LINK] feature the IEA's June 2020 warning that the critical energy technologies needed to reduce emissions are nowhere near where they need to be. In that blog, we said "there was an excellent illustration of the many significant areas, or major pieces of the puzzle, involved in an energy transition by the IEA last week. The IEA also noted the progress of each of the major pieces and the overall conclusion is that the vast majority of the pieces are behind or well behind where they should be to meet a smooth timely energy transition. It is important to note that these are just what the IEA calls the "*critical energy technologies*" and does not get into the wide range of other considerations needed to support the energy transition. The IEA divides these "critical energy technologies "into major groupings and then ranked the progress of each of these pieces in its report "*Tracking Clean Energy Progress"* [LINK] by on track, more efforts needed, or not on track". Our blog included the below IEA June 2020 chart.

IEA's Progress Ranking For "Critical Energy Technologies" For Clean Energy Transition

Power	Renewable Power	Geothermal
	Solar PV	Ocean Power
	Onshore Wind	Nuclear Power
	Offshore Wind	Natural Gas-Fired Power
	Hydropower	Coal-Fired Power
	Bioenergy Power Generation	CCUS in Power
	Concentrating Solar Power	
Fuel Supply	Methane Emissions from O&G	Flaring Emissions
Industry	Chemicals	Pulp and Paper
	Iron and Steel	Aluminum
	Cement	CCUS in Industry and Transformation
Transport	Electric Vehicles	Transport Biofuels
	Rail	Aviation
	Fuel Consumption of Cars and Vans	International Shipping
	Trucks and Busses	
Buildings	Building Envelopes	Lighting
	Heating	Appliances and Equipment
	Heat Pumps	Data Centres and Data Transmission Networks
	Cooling	
Energy Integration	Energy Storage	Demand Response
	Hydrogen	Direct Air Capture
	Smart Grids	

Source: IEA

On Track More Efforts Needed Not on Track

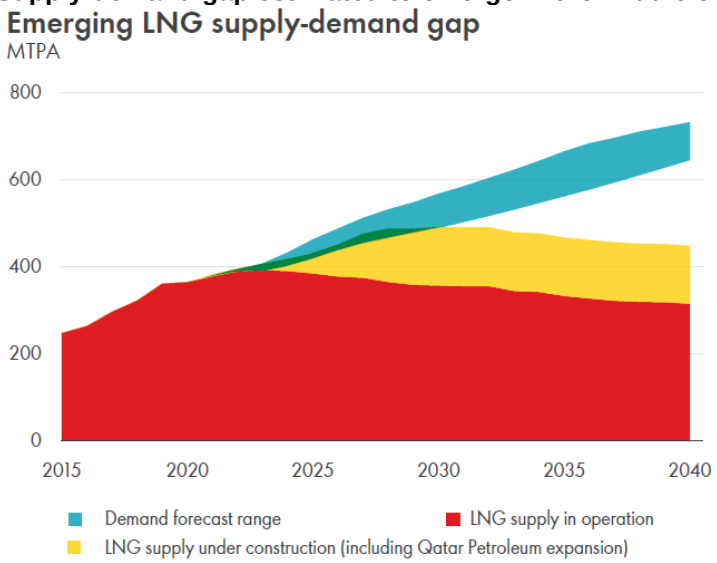
Source: IEA Tracking Clean Energy Progress, June 2020

We are referencing Shell's long term outlook for LNG We recognize there are many different forecasts for LNG, but are referencing Shell' LNG Outlook 2021 from Feb 25, 2021 for a few reasons. (i) Shell's view on LNG is the key view for when and what decision will be made for LNG Canada Phase 2. (ii) Shell is one of the global leaders in LNG supply and trading. (iii) Shell provides on the record LNG outlooks every year so there is the ability to compare and make sure the outlook fits the story. It does. (iv) Shell, like other supermajors, has had to make big capex cuts post pandemic and that certainly wouldn't put any bias to the need for more capex.

Shell's March 2021 long term outlook for LNG demand was basically unchanged vs 2020 and leads to a LNG supply gap in mid 2020s Shell does not provide the detailed numbers in their Feb 25, 2021 LNG forecast. We would assume they

would have reflected some delay, perhaps 1 year, at Mozambique but would be surprised if they put a 2-3 year delay in for the 5 bcf/d from Total Phase 1 +2 and Exxon Rozuma Phase 1. Compared to their LNG Outlook 2020, it looks like there was no change for their estimate of global natural gas demand growth to 2040, which looked relatively unchanged at approx. 5,000 bcm/yr or 484 bcf/d. Similarly, long term LNG demand looked unchanged to 2040 of ~700 mm tonnes (92 bcf/d) vs 360 mm tonnes (47 bcf/d) in 2020. In the 2021 outlook, Shell highlighted that the pandemic delayed project construction timelines and that the "*lasting impact expected on LNG supply not demand"*. And that Shell sees a LNG "*supply-demand gap estimated to emerge in the middle of the current decade as demand rebounds*". Comparing to 2020, it looks like the supply-demand gap is sooner.

Supply-demand gap estimated to emerge in the middle of the current decade



Source: Shell LNG Outlook 2021, Feb 25, 2021

Mozambique delays are redefining the LNG markets for the 2020s: Delaying 5 bcf/d of Mozambique new LNG supply 2-3 years means a much bigger supply gap starting in 2025.. Even if the optimists are right, there are now delays to all major Mozambique LNG supply from LNG supply forecasts. We don't have the detail, but we believe all LNG forecasts, including Shell's LNG Outlook 2021, would have included Total's Phase 1 and Phase 2 and Exxon Rozuma Phase 1. As noted earlier, we believe that the likely impact of the Mozambique security concerns is that these forecasts would likely have to push back 1.7 bcf/d from Total Phase 1 to at least 2026, 2.0 bcf/d Exxon Rozuma Phase 1 to at least 2027, and 1.3 bcf/d Total Phase 2 to at least 2028/2029 with the real risk these get pushed back even further. 5.0 bcf/d is equal to 38 mtpa. These delays would mean there is an increasing LNG supply gap in 2025 and increasingly significantly thereafter. And even if a new greenfield LNG project is FID's right away, it wouldn't be able to step in to replace Total Phase 1 prior startup timing for 2024 or likely the market at all until at least 2027. Its why the decision on filling the gap will fall on brownfield LNG projects.

And does this bigger, nearer supply gap force LNG players to look at what brownfield LNG projects they could advance? A greenfield LNG project would likely take at least until 2027 to be in operations. Its why we believe the Mozambique delays will effectively force major LNG players to look to see if there are brownfield LNG projects they should look to advance. Prior to the just passed winter, no one would think Shell or other major LNG players would be considering any new LNG FIDs in 2021. All the big companies are in capital reduction mode and debt reduction mode. But Brent oil is now solidly over $60 and LNG prices hit record levels in Jan and the world's economic and oil and gas demand outlook are increasing with vaccinations. And we are starting to see companies move to increasing capex with the higher cash flows. We would not expect any major LNG players to move to FID right away. But we see them watching to see if 2021 plays out to still support this increasing LNG supply gap. And unless new mutations prevent vaccinations from returning the world to normal, we suspect that major LNG players, like other oil and gas companies, will be looking to increase

capex as they approve 2022 budgets. The outlook for the future has changed dramatically in the last 5 months. The question facing Shell and others, should they look to FID new LNG brownfield projects in the face of an increasing LNG supply gap that is going to hit faster and harder than expected a few months ago. We expect these decisions to be looked at before the end of 2021. LNG prices will be stronger, but we expect the limiting cap in Asia will be that thermal coal will be used to mitigate some LNG price pressure.

Back to Shell, does increasing LNG supply gap provide the opportunity to at least consider a LNG Canada Phase 2 FID over the next 9 months? Shell is no different than any other major LNG supplier in always knowing the market and that the oil and gas outlook is much stronger than 6 months ago. No one has been or is talking about this Mozambique impact and how it will at least force major LNG players to look at if they should FID new brownfield LNG projects to take advantage of this increasing supply gap. We don't have any inside contacts at Shell or LNG Canada, but that is no different than when we looked at the LNG markets in September 2017 and saw the potential for Shell to FID LNG Canada in 2018. We posted a September 20, 2017 blog *"China's Plan To Increase Natural Gas To 10% Of Its Energy Mix Is A Global Game Changer Including For BC LNG*" [LINK]. Last time, it was a demand driven supply gap, this time, it's a supply driven supply gap. We have to believe any major LNG player, including Shell, will be at least looking at their brownfield LNG project list and seeing if they should look to advance FID later in 2021. Shell has LNG Canada Phase 2, which would add 2 additional trains or approx. 1.8 bcf/d. And an advantage to an FID would be that Shell would be able to commit to its existing contractors and fabricators for a continuous construction cycle following on LNG Canada Phase 1 ie. to help keep a lid on capital costs. No one is talking about the need for these new brownfield LNG projects, but, unless Total gets back developing Mozambique and keeps the delay to a matter of months, its inevitable that these brownfield LNG FID internal discussions will be happening in H2/21. Especially since the oil and gas price outlook is much stronger than it was in the fall and companies will be looking to increase capex in 2022 budgets

A LNG Canada Phase 2 would be a big plus to Cdn natural gas. A LNG Canada Phase 2 FID would be a big plus for Cdn natural gas. It would allow another ~1.8 bcf/d of Cdn natural gas to be priced against Asian LNG prices and not against Henry Hub. And it would provide demand offset versus Trudeau if he moves to make electricity "emissions free" and not his prior "net zero emissions". Mozambique may be in Africa, but, unless sustained peace and security is attained, it is a game changer to LNG outlook creating a bigger and sooner LNG supply gap. And with a stronger tone to oil and natural gas prices in 2021, the LNG supply gap will at least provide the opportunity for Shell to consider FID for its brownfield LNG Canada Phase 2 and provide big support to Cdn natural gas for back half of the 2020s. And perhaps if LNG Canada is exporting 3.6 bcf/d from two phases, it could help flip Cdn natural gas to a premium to US natural gas especially if Biden is successful in reducing US domestic natural gas consumption for electricity. The next six months will be very interesting to watch for LNG markets.

Asian LNG Buyers Abruptly Change and Lock in Long Term Supply – Validates Supply Gap, Provides Support For Brownfield LNG FIDs

Posted 11am on July 14, 2021

The last 7 days has shown there is a sea change as Asian LNG buyers have made an abrupt change in their LNG contracting and are moving to lock in long term LNG supply. This is the complete opposite of what they were doing pre-Covid when they were trying to renegotiate Qatar LNG long term deals lower and moving away from long term deals to spot/short term sales. Why? We think they did the same math we did in our April 28 blog "*Multiple Brownfield LNG FIDs Now Needed To Fill New LNG Supply Gap From Mozambique Chaos? How About LNG Canada Phase 2?*" and saw a much bigger and sooner LNG supply gap driven by the delay of 5 bcf/d of Mozambique LNG that was built into most, if not all LNG supply forecasts. Asian LNG buyers are committing real dollars to long term LNG deals, which we believe is the best validation for the LNG supply gap. Another validation, Shell, Total and others are aggressively competing to invest long term capital to partner in Qatar Petroleum's massive 4.3 bcf/d LNG expansion despite plans to reduce fossil fuels production in the 2020s. And even more importantly to LNG suppliers, the return to long term LNG contracts provides the financing capacity to commit to brownfield LNG FIDs. The abrupt change by Asian LNG buyers to long term contracts is a game changer for LNG markets and sets the stage for brownfield LNG FIDs likely as soon as before year end 2021. It has to be brownfield LNG FIDs if the gap is coming bigger and sooner. And we return to our April 28 blog point, if brownfield LNG is needed, what about Shell looking at 1.8 bcf/d brownfield LNG Canada Phase 2? LNG Canada Phase 1 at 1.8 bcf/d capacity is already a material positive for Cdn natural gas producers. A FID on LNG Canada Phase 2 would be huge, meaning 3.6 bcf/d of Cdn natural gas will be tied to Asian LNG markets and not competing in the US against Henry Hub. And with a much shorter distance to Asian LNG markets. This is why we focus on global LNG markets for our views on the future value of Canadian natural gas.

Sea change in Asian LNG buyers is also the best validation of the LNG supply gap and big to LNG supply FIDs. Has the data changed or have the market participants changed in how they react to the data? We can't recall exactly who said that on CNBC on July 12, it's a question we always ask ourselves. In the LNG case, the data has changed with Mozambique LNG delays and that has directly resulted in market participants changing and entering into long term contracts. We can't stress enough how important it is to see Asian LNG buyers move to long term LNG deals. (i) Validates the sooner and bigger LNG supply gap. We believe LNG markets should look at the last two weeks of new long term deals for Asian LNG buyers as being the validation of the LNG supply gap that clearly emerged post Total declaring force majeure on its 1.7 bcf/d Mozambique LNG Phase 1 that was under construction and on track for first LNG delivery in 2024. Since then, markets have started to realize the Mozambique delays are much more than 1.7 bcf/d. They have seen major LNG suppliers change their outlook to a more bullish LNG outlook and, most importantly, are now seeing Asian LNG buyers changing from trying to renegotiate long term LNG deals lower to entering into long term LNG deals to have security of supply. Asian LNG buyers are cozying up to Qatar in a prelude to the next wave of Asian buyer long term deals. What better validation is there than companies/countries putting their money where their mouth is. (ii) Provides financial commitment to help push LNG suppliers to FID. We believe these Asian LNG buyers are doing much more than validating a LNG supply gap to markets. The big LNG suppliers can move to FID based on adding more LNG supply to their portfolio, but having more long term deals provides the financial anchor/visibility to long term capital commitment from the buyers. Long term contracts will only help LNG suppliers get to FID.

It was always clear that the Mozambique LNG supply delay was 5.0 bcf/d, not just 1.7 bcf/d from Total Phase 1. LNG markets didn't really react to Total's April 26 declaration of force majeure on its 1.7 bcf/d Mozambique LNG Phase 1. This was an under construction project that was on time to deliver first LNG in 2024. It was in all LNG supply forecasts. There was no timeline given but, on the Apr 29 Q1 call, Total said that it expected any restart decision would be least a year away. If so, we believe that puts any actual construction at least 18 months away. There will be work to do just to get back to where they were when they were forced to stop development work on Phase 1. Surprisingly, markets didn't look the broader implications, which is why we posted our 7-pg Apr 28 blog "*Multiple Brownfield LNG FIDs Now Needed To Fill New LNG Supply Gap From Mozambique Chaos? How About LNG Canada Phase 2?*" [LINK] We highlighted that Mozambique LNG delays were actually 5 bcf/d, not 1.7 bcf/d. And this 5 bcf/d of Mozambique LNG supply was built into most, if not all, LNG supply forecasts. The delay in Total Phase 1 would lead to a commensurate delay in its Mozambique LNG Phase 2 of 1.3 bcf/d. Total Phase 2 was to add 1.3 bcf/d. There was no firm in service date, but it was expected to

follow closely behind Phase 1 to maintain services. That would have put it originally in the 2026/2027 period. But if Phase 1 is pushed back at least 2 years, so will the follow on Phase 2, so more likely, it will be at least 2028/2029. The assumption for most, if not all, LNG forecasts was that Phase 2 would follow Phase 1. Exxon Rozuma Phase 1 of 2.0 bcf/d continues to be pushed back in timeline especially following Total Phase 1. Exxon's Mozambique Rozuma Phase 1 LNG will add 2.0 bcf/d and, pre-Covid, was originally expected to be in service in 2025. The project was being delayed and Total's force majeure has added to the delays. Rozuma onshore LNG facilities are right by Total. On June 20, we tweeted [LINK] on the Reuters report "*Exclusive: Galp says it won't invest in Rovuma until Mozambique ensures security*" [LINK]. Galp is one of Exxon's partners in Rozuma. Reuters reported that Galp said they won't invest in Exxon's Rozuma LNG project until the government ensures security, that this may take a while, they won't be considering the project until after Total has reliably resumed work on its Phase 1, which likely puts any Rozuma decision until at least end of 2022 at the earliest. Galp has taken any Rozuma Phase 1 capex out of their new capex plans thru 2025 and will have to take out projects in their capex plan if Rozuma does come back to work. This puts Rozuma more likely 2028 at the earliest as opposed to before the original expectations of before 2025. Pre-pandemic, Exxon's March 6, 2019 Investor Day noted their operated Mozambique Rovuma LNG Phase 1 was to be 2 trains each with 1.0 bcf/d capacity for total initial capacity of 2.0 bf/d with FID expected in 2019 and first LNG deliveries sometime before 2025. LNG forecasts had been assuming Exxon Rozuma would be onstream around 2025. The 2019 FID expectation was later pushed to be expected just before the March 2020 investor day. But the pandemic hit, and on March 21, 2020, we tweeted [LINK] on the Reuters story "*Exclusive: Coronavirus, gas slump put brakes on Exxon's giant Mozambique LNG plan"* [LINK] that noted Exxon was expected to delay the Rovuma FID. There was no timeline, but now, any FID is not expected until late 2022 at the earliest, that would push first LNG likely to at least 2028. What this means is that the Mozambique LNG delays are not 1.7 bcf/d but 5.0 bcf/d of projects that were in all, if not most, LNG supply forecasts. There is much more in our 7-pg blog. But Mozambique is what is driving a much bigger and sooner LNG supply gap starting ~2025 and stronger outlook for LNG prices

<u>One of the reasons why it went under the radar is that major LNG suppliers played stupid on the Mozambique impact.</u> It makes it harder for markets to see a big deal when the major LNG suppliers weren't making a big deal of Mozambique or playing stupid in the case of Cheniere in their May 4 Q1 call. In our May 9, 2021 Energy Tidbits memo, we said we had to chuckle when we saw Cheniere's response in the Q&A to its Q1 call on May 4 that they only know what we know from reading the Total releases on Mozambique and its impact on LNG markets. It's why we tweeted [LINK] "*Hmm! $LNG says only know what we read on #LNG market impact from $TOT $XOM MZ LNG delays. Surely #TohokuElectric & other offtake buyers are reaching out to #Cheniere. MZ LNG delays is a game changer to LNG in 2020s, see SAF Group blog. Thx @olympe_mattei @TheTerminal #NatGas".* How could they not be talking to LNG buyers for Total and /or Exxon Mozambique LNG projects. In the Q1 Q&A, mgmt was asked about Mozambique and didn't know any more than what you or I have read. Surely, they were speaking to Asian LNG buyers who had planned to get LNG supply from Total Mozambique or Exxon Rozuma Mozambique or both. Mgmt is asked "*wanted to just kind of touch on the color use talking about for these supply curve. And are you able to kind of provide any thoughts on the Mozambique and a deferral with the project of that size on 13 and TPA being deferred by we see you have you noticed any impact to the market has is there any impact for stage 3 with that capacity? Thanks*." Mgmt replies "*No. Look, I only know about the Mozambique delay with what I read as well as what you read that from total and an Exxon. And it's a sad situation and I hope everybody is safe and healthy that were there to experience that unrest but no I don't think it's, again it's a different business paradigm than what we offer. So, we offer a full value product, the customer doesn't have to invest in equity, customer doesn't have to worry about the E&P side of the business because, we've been able to both the by at our peak almost 7 Dee's a day of US NAT gas from almost a 100 different producers on 26 different pipelines and deliver it to our to facilities. So we take care of a lot of what the customer needs".*

<u>There are other LNG supply delays/interruptions beyond Mozambique.</u> There have been a number of other smaller LNG delay or existing supply interruptions that add to Asian LNG buyers feeling less secure about the reliability of mid to long term LNG supply. Here are just a few examples. (i) Total Papua LNG 0.74 bcf/d. On June 8, we tweeted [LINK] *"Timing update Papua #LNG project. $OSH June 8 update "2022 FEED, 2023 FID targeting 2027 first gas". $TOT May 5 update didn't forecast 1st gas date. Papua is 2 trains w/ total capacity 0.74 bcf/d."* We followed the tweet saying [LINK] *"Bigger #LNG supply gap being created >2025. Papua #LNG originally expected FID in 2020 so 1st LNG is 2 years delayed.*

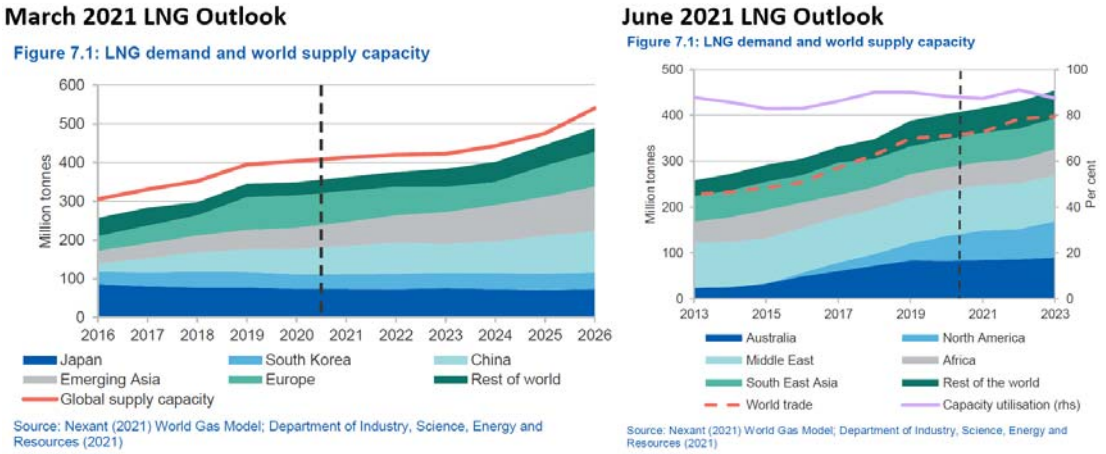
Common theme - new LNG supply is being delayed ie. [Total] Mozambique. Don't forget need capacity>demand due to normal maintenance, etc. Positive for LNG." (ii) Chevron's Gorgon. A big LNG story in H2/20 was the emergence of weld quality issues in the propane heat exchangers at Train 2, which required additional downtime for repair. Train 2 was shut on May 23 with an original restart of July 11, but the repairs to the weld quality issues meant it didn't restart until late Nov. The same issue was found in Train 1 but repairs were completed. However extended downtime for the trains led to lower LNG volumes. Gorgon produced ~2.3 bcf/d in 2019 but was down to 2.0 bcf/d in 2020. (iii) Equinor's Melkoeya 0.63 bcf/d shut down for 18 months due to a fire. A massive fire led to the Sept 28, 2020 shutdown of the 0.63 bcf/d Melkoeya LNG facility in Norway. On April 26, Equinor released "*Revised start-up date for Hammerfest LNG*" [LINK] with regard to the 0.63 bcf/d Melkoeya LNG facility. The original restart date was Oct 1, 2021 (ie. a 12 month shut down), but Equinor said "*Due to the comprehensive scope of work and Covid-19 restrictions, the revised estimated start-up date is set to 31 March 2022".* When we read the release, it seemed like Equinor was almost setting the stage for another potential delay in the restart date. Equinor had two qualifiers to this March 31, 2022 restart date. Equinor said "*there is still some uncertainty related to the scope of the work*" and "*Operational measures to handle the Covid-19 situation have affected the follow-up progress after the fire. The project for planning and carrying out repairs of the Hammerfest LNG plant must always comply with applicable guidelines for handling the infection situation in society. The project has already introduced several measures that allow us to have fewer workers on site at the same time than previously expected. There is still uncertainty related to how the Covid-19 development will impact the project progress."*

Cheniere stopped the game playing the game on June 30. Our July 4, 2021 Energy Tidbits memo noted that it looks like Cheniere has stopped playing stupid with respect to the strengthening LNG market in 2021. We can't believe they thought they were fooling anyone, especially their competitors. Bu that week, they came out talking about how commercial discussions have picked up in 2021 and it's boosted their hope for a Texas (Corpus Christi) LNG expansion. On Wednesday, Platts reported "*Pickup in commercial talks boosts Cheniere's hopes on mid-scale LNG project*" [LINK] Platts wrote "*Cheniere Energy expects to make a "substantial dent" by the end of 2022 in building sufficient buyer support for a proposed mid-scale expansion at the site of its Texas liquefaction facility, Chief Commercial Officer Anatol Feygin said June 30 in an interview." " As a result, he said, " The commercial engagement, I think it is very fair to say, has really picked up steam, and we are quite optimistic over the coming 12-18 months to make a substantial dent in that Stage 3 commercialization."* Platts also reported that Cheniere noted this has been a tightening market all year (ie would have been known by the May 4 Q1 call). Platts wrote "*We obviously find ourselves at the beginning of this year and throughout in a very tight market where prices today into Asia and into Europe are at levels that we frankly haven't seen in a decade-plus," Feygin said. "We've surpassed the economics that the industry saw post the Fukushima tragedy in March 2011, and that's happened in the shoulder period."* It's a public stance as to a more bullish LNG outlook

But we still see major LNG suppliers like Australia hinting but not outright saying that LNG supply gap is coming sooner. We have to believe Australia will be unveiling a sooner LNG supply gap in their September forecast. On June 28, we tweeted [LINK] on Australia's Resources and Energy Quarterly released on Monday [LINK] because there was a major change to their LNG outlook versus their March forecast. We tweeted "*#LNGSupplyGap. AU June fcast now sees #LNG mkt tighten post 2023 vs Mar fcast excess supply thru 2026. Why? $TOT Mozambique delays. See below SAF Apr 28 blog. Means brownfield LNG FID needed ie. like #LNGCanada Phase 2. #OOTT #NatGas".* Australia no longer sees supply exceeding demand thru 2026. In their March forecast, Australia said "*Nonetheless, given the large scale expansion of global LNG capacity in recent years, demand is expected to remain short of total supply throughout the projection period."* Note this is thru 2026 ie. a LNG supply surplus thru 2026. But on June 28, Australia changed that LNG outlook and now says the LNG market may tighten beyond 2023. Interestingly, the June forecast only goes to 2023 and not to 2026 as in March. Hmmm! On Monday, they said "*Given the large scale expansion of global LNG capacity in recent years, import demand is expected to remain short of export capacity throughout the outlook period. Beyond 2023, the global LNG market may tighten, due to the April 2021 decision to indefinitely suspend the Mozambique LNG project, in response to rising security issues. This project has an annual nameplate capacity of 13 million tonnes, and was previously expected to start exporting LNG in 2024*." 13 million tonnes is 1.7 bcf/d so they are only referring to Total Mozambique LNG Phase 1. So no surprise the change is Mozambique LNG driven but we have to believe the reason why they cut their forecast off this time at 2023 is that they are looking at trying to figure out what to forecast beyond 2023 in addition to Total Phase 1. And, importantly, we believe they will be changing their LNG forecast for more than Mozambique ie. India

demand that we highlight later in the blog. They didn't say anything else specific on Mozambique but, surely they have to also be delaying the follow on Total Phase 2 of 1.3 bcf/d and Exxon Rozuma Phase 1 of 2.0 bcf/d.

Australia's LNG Outlook: March 2021 vs June 2021 Forecasts

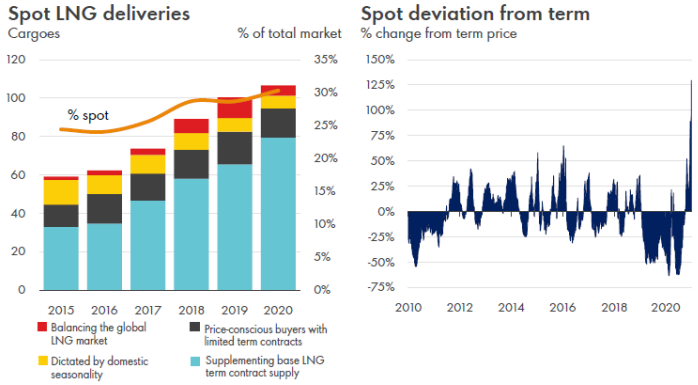


Source: Australia Resources and Energy Quarterly

Clearly Asian LNG buyers did the math, saw the new LNG supply gap and were working the phones in March/April/May trying to lock up long term supply. We wrote extensively on the Total Mozambique LNG situation before the April 26 force majeure as it was obvious that delays were coming to a project counted on for first LNG in 2024. Total had shut down Phase 1 development in December for 3 months due to the violence and security risks. It restarted development on Wed March 24, violence/attacks immediately resumed for 3 consecutive days, and then Total suspended development on Sat March 27. That's why no one should have been surprised by the April 26 force majeure. Asian LNG buyers were also seeing this and could easily do the same math we were doing and saw a bigger and sooner LNG supply gap. They were clearly working the phones with a new priority to lock up long term LNG supply. Major long term deals don't happen overnight, so it makes sense that we started to see these new Asian long term LNG deals start at the end of June.

A big pivot from trying to renegotiate down long term LNG deals or being happy to let long term contracts expire and replace with spot/short term LNG deals. This is a major pivot or abrupt turn on the Asian LNG buyers contracting strategy for the 2020s. There is the natural reduction of long term contracts as contracts reach their term. But with the weakness in LNG prices in 2019 and 2020, Asian LNG buyers weren't trying to extend long term contracts, rather, the push was to try to renegotiate down its long term LNG deals. The reason was clear, as spot prices for LNG were way less than long term contract prices. And this led to their LNG contracting strategy – move to increase the proportion of spot LNG deliveries out of total LNG deliveries. Shell's LNG Outlook 2021 was on Feb 25, 2021 and included the below graphs. The spot LNG price derivation from long term prices in 2019 and 2020 made sense for Asian LNG buyers to try to change their contract mix. Yesterday, Maeil Business News Korea reported on the new Qatar/Kogas long term LNG deal with its report "*Korea may face LNG supply cliff or pay hefty price after long-term supplies run out*" [LINK], which highlighted this very concept – Korea wasn't worried about trying to extend expiring long term LNG contracts. Maeil wrote "*Seoul in 2019 secured a long-term LNG supply contract with the U.S. for annual 15.8 million tons over a 15-year period. But even with the latest two LNG supply contracts, the Korean government needs extra 6 million tons or more of LNG supplies to keep up the current power pipeline. By 2024, Korea's long-term supply contracts for 9 million tons of LNG will expire - 4.92 million tons on contract with Qatar and 4.06 million tons from Oman, according to a government official who asked to be unnamed."*

Spot LNG deliveries and Spot deviation from term price



Source: Shell LNG Outlook 2021 on Feb 25, 2021

Asian LNG buyers moving to long term LNG deals provide financing capacity for brownfield LNG FIDs. We believe this abrupt change and return to long term LNG deals is even more important to LNG suppliers who want to FID new projects. The big LNG players like Shell can FID new LNG supply without new long term contracts as they can build into their supply options to fill their portfolio of LNG contracts. But that doesn't mean the big players don't want long term LNG supply deals, as having long term LNG contracts provide better financing capacity for any LNG supplier. It takes big capex for LNG supply and long term deals make the financing easier.

Four Asian buyer long term LNG deals in the last week. It was pretty hard to miss a busy week for reports of new Asian LNG buyer long term LNG deals. There were two deals from Qatar Petroleum, one from Petronas and one from BP. The timing fits, it's about 3 months after Total Mozambique LNG problems became crystal clear. And as noted later, there are indicators that more Asian buyer LNG deals are coming.

> Petronas/CNOOC is 10 yr supply deal for 0.3 bcf/d. On July 7, we tweeted [LINK] on the confirmation of a big positive to Cdn natural gas with the Petronas announcement [LINK] of a new 10 year LNG supply deal for 0.3 bcf/d with China's CNOOC. The deal also has special significance to Canada. (i) Petronas said "*This long-term supply agreement also includes supply from LNG Canada when the facility commences its operations by middle of the decade*". This is a reminder of the big positive to Cdn natural gas in the next 3 to 4 years – the start up of LNG Canada Phase 1 is ~1.8 bcf/d capacity. This is natural gas that will no longer be moving south to the US or east to eastern Canada, instead it will be going to Asia. This will provide a benefit for all Western Canada natural gas. (ii) First ever AECO linked LNG deal. It's a pretty significant event for a long term Asia LNG deal to now have an AECO link. Petronas wrote "*The deal is for 2.2 million tonnes per annum (MTPA) for a 10-year period, indexed to a combination of the Brent and Alberta Energy Company (AECO) indices. The term deal between PETRONAS and CNOOC is valued at approximately USD 7 billion over ten years.*" 2.2 MTPA is 0.3 bcf/d. (iii) Reminds of LNG Canada's competitive advantage for low greenhouse gas emissions. Petronas said "*Once ready for operations, the LNG Canada project paves the way for PETRONAS to supply low greenhouse gas (GHG) emission LNG to the key demand markets in Asia."*
>
> Qatar Petroleum/CPC (Taiwan) is 15 yr supply deal for 0.16 bcf/d. Pre Covid, Qatar was getting pressured to renegotiate lower its long term LNG contract prices. Now, it's signing a 15 year deal. On July 9, they entered in a new small long term LNG sales deal [LINK], a 15-yr LNG Sale and Purchase Agreement with CPC Corporation in Taiwan to supply it ~0.60 bcf/d of LNG. LNG deliveries are set to begin in January 2022. H.E. Minister for Energy Affairs & CEO of Qatar Petroleum Al-Kaabi said *"We are pleased to enter into this long term LNG SPA, which is another milestone in our relationship with CPC, which dates back to almost three decades. We look forward to commencing deliveries under this SPA and to continuing our supplies as a trusted and reliable global LNG provider."* The pricing was reported to be vs a basket of crudes.

BP/Guangzhou Gas, a 12-yr supply deal for 0.13 bcf/d. On July 9, there was a small long term LNG supply deal with BP and Guangzhou Gas (China). Argus reported [LINK] BP had signed a 12 year LNG supply deal with Guangzhou Gas (GG), a Chinese city's gas distributor, which starts in 2022. The contract prices are to be linked to an index of international crude prices. Although GG typically gets its LNG from the spot market, it used a tender in late April for ~0.13 bcf/d starting in 2022. BP's announcement looks to be for most of the tender, so it's a small deal. But it fit into the trend this week of seeing long term LNG supply deals to Asia. This was intended to secure deliveries to the firm's Xiaohudao import terminal which will become operational in August 2022.

Qatar/Korea Gas is a 20-yr deal to supply 0.25 bcf/d. On Monday, Reuters reported [LINK] "*South Korea's energy ministry said on Monday it had signed a 20-year liquefied natural gas (LNG) supply agreement with Qatar for the next 20 years starting in 2025. South Korea's state-run Korea Gas Corp (036460.KS) will buy 2 million tonnes of LNG annually from Qatar Petroleum".* There was no disclosure of pricing.

More Asian buyer long term LNG deals (ie. India) will be coming. There are going to be more Asian buyer long term LNG deals coming soon. Our July 11, 2021 Energy Tidbits highlighted how India's new petroleum minister Hardeep Singh Puri (appointed July 8) hit the ground running with what looks to be a priority to set the stage for more India long term LNG deals with Qatar. On July 10, we retweeted [LINK] "*New India Petroleum Minister hits ground running. What else w/ Qatar but #LNG. Must be #Puri setting stage for long term LNG supply deal(s). Fits sea change of buyers seeing #LNGSupplyGap (see SAF Apr 28 blog http://safgroup.ca) & wanting to tie up LNG supply. #OOTT".* It's hard to see any other conclusion after seeing what we call a sea change in LNG buyer mentality with a number of long term LNG deals this week. Puri tweeted [LINK] "*Discussed ways of further strengthening mutual cooperation between our two countries in the hydrocarbon sector during a warm courtesy call with Qatar's Minister of State for Energy Affairs who is also the President & CEO of @qatarpetroleum HE Saad Sherida Al-Kaabi".* As noted above, we believe there is a sea change in LNG markets that was driven by the delay in 5 bcf/d of LNG supply from Mozambique (Total Phase 1 & Phase 2, and Exxon Rozuma Phase 1) that was counted on all LNG supply projections for the 2020s. Puri's tweet seems to be him setting the stage for India long term LNG supply deals with Qatar.

Supermajors are aggressively competing to commit 30+ year capital to Qatar's LNG expansion despite stated goal to reduce fossil fuels production. It's not just Asian LNG buyers who are now once again committing long term capital to securing LNG supply, it's also supermajors all bidding to be able to commit big capex to part of Qatar Petroleum's 4.3 bcf/d LNG expansion. Qatar Petroleum received a lot of headlines following the their June 23 announcement on its LNG expansion [LINK] on how they received bids for double the equity being offered. And there were multiple reports that these are on much tougher terms for Qatar's partners. Qatar Petroleum CEO Saad Sherida Al-Kaabi specifically noted that, among the bidders, were Shell, Total and Exxon. Shell and Total have two of the most ambitious plans to reduce fossil fuels production in the 2020's, yet are competing to allocate long term capital to increase fossil fuels production. And Shell and Total are also two of the global LNG supply leaders. It has to be because they are seeing a bigger and sooner LNG supply gap.

Remember Qatar's has a massive expansion but India alone needs 3x the Qatar expansion LNG capacity. In addition to the competition to be Qatar Petroleum's partners, we remind that, while this is a massive 4.3 bcf/d LNG expansion, India alone sees its LNG import growing by ~13 bcf/d to 2030. The Qatar announcement reminded they see a LNG supply gap and continued high LNG prices. We had a 3 part tweet. (i) First, we highlighted [LINK] "*1/3. #LNGSupplyGap coming. big support for @qatarpetroleum expansion to add 4.3 bcf/d LNG. but also say "there is a lack of investments that could cause a significant shortage in gas between 2025-2030" #NatGas #LNG".* This is after QPC accounts for their big LNG expansion. The QPC release said "*However, His Excellency Al-Kaabi voiced concern that during the global discussion on energy transition, there is a lack of investment in oil and gas projects, which could drive energy prices higher by stating that "while gas and LNG are important for the energy transition, there is a lack of investments that could cause a significant shortage in gas between 2025-2030, which in turn could cause a spike in the gas market."* (ii) Second, this is a big 4.3 bcf/d expansion, but India alone has 3x the increase in LNG import demand. We tweeted [LINK] "*2/3. Adding 4.3 bcf/d is big, but dwarfed by items like India. #Petronet gave 1st specific forecast for what it means if #NatGas is to be 15%*

of energy mix by 2030 - India will need to increase #LNG imports by ~13 bcf/d. See SAF Group June 20 Energy Tidbits memo." (iii) Third, Qatar's supply gap warning is driven by the lack of investments in LNG supply. We agree, but note that the lack of investment is in great part due to the delays in both projects under construction and in FIDs that were supposed to be done in 2019. We tweeted [LINK] "3/*3. #LNGSupplyGap is delay driven. $TOT Mozambique Phase 1 delay has chain effect, backs up 5 bcf/d. See SAF Group Apr 28 blog Multiple Brownfield LNG FIDs Now Needed To Fill New #LNG Supply Gap From Mozambique Chaos? How About LNG Canada Phase 2? #NatGas*."

Seems like many missed India's first specific LNG forecast to 2030. Our June 20, 2021 Energy Tidbits memo highlighted the first India forecast that we have seen to estimate the required growth in natural gas consumption and LNG imports if India is to meet its target for natural gas to be 15% of its energy mix by 2030. India will need to increase LNG imports by ~13 bcf/d or 3 times the size of the Qatar LNG expansion. Our June 6, 2021 Energy Tidbits noted the June 4 tweet from India's Energy Minister Dharmendra Pradhan [LINK] reinforcing the 15% goal "*We are rapidly deploying natural gas in our energy mix with the aim to increase the share of natural gas from the current 6% to 15% by 2030."* But last week, Petronet CEO AK Singh gave a specific forecast. Reuters report "*LNG's share of Indian gas demand to rise to 70% by 2030: Petronet CEO"* [LINK] included Petronet's forecast if India is to hit its target for natural gas to be 15% of energy mix by 2030. Singh forecasts India's natural gas consumption would increase from current 5.5 bcf/d to 22.6 bcf/d in 2030. And LNG shares would increase from 50% to 70% of natural gas consumption ie. an increase in LNG imports of ~13 bcf/d from just under 3 bcf/d to 15.8 bcf/d in 2030. Singh did not specifically note his assumption for India's natural gas production, but we can back into the assumption that India natural gas production grows from just under 3 bcf/d to 6.8 bcf/d. It was good to finally see India come out with a specific forecast for 2030 natural gas consumption and LNG imports if India is to get natural gas to 15% of its energy mix in 2030. Petronet's Singh forecasts India natural gas consumption to increase from 5.5 bcf/d to 22.6 bcf/d in 2030. This forecast is pretty close to our forecast in our Oct 23, 2019 blog "*Finally, Some Visibility That India Is Moving Towards Its Target For Natural Gas To Be 15% Of Its Energy Mix By 2030*". Here part of what we wrote in Oct 2019. "*It's taken a year longer than we expected, but we are finally getting visibility that India is taking significant steps towards India's goal to have natural gas be 15% of its energy mix by 2030. On Wednesday, we posted a SAF blog [LINK] "Finally, Some Visibility That India Is Moving Towards Its Target For Natural Gas To Be 15% Of Its Energy Mix By 2030".* Our 2019 blog estimate was for India natural gas demand to be 24.0 bcf/d in 2030 (vs Singh's 22.6 bcf/d) and for LNG import growth of +18.4 bcf/d to 2030 (vs Singh's +13 bcf/d). The difference in LNG would be due to our Oct 2019 forecast higher natural gas consumption by 1.4 bcf/d plus Singh forecasting India natural gas production +4 bcf/d to 2030. Note India production peaked at 4.6 bcf/d in 2010.

Bigger, nearer LNG supply gap + Asian buyers moving to long term LNG deals = LNG players forced to at least look at what brownfield LNG projects they could advance and move to FID. All we have seen since our April 28 blog is more validation of the bigger, nearer LNG supply gap. And now market participants (Asian LNG buyers) are reacting to the new data by locking up long term supply. Cheniere noted how the pickup in commercial engagement means they "*are quite optimistic over the coming 12-18 months to make a substantial dent in that Stage 3 commercialization."* Cheniere can't be the only LNG supplier having new commercial discussions. It's why we believe the Mozambique delays + Asian LNG buyers moving to long term deals will effectively force major LNG players to look to see if there are brownfield LNG projects they should look to advance. Prior to March/April, no one would think Shell or other major LNG players would be considering any new LNG FIDs in 2021. Covid forced all the big companies into capital reduction mode and debt reduction mode. But Brent oil is now solidly over $70, and LNG prices are over $13 this summer and the world's economic and oil and gas demand outlook are increasing with vaccinations. And we are starting to see companies move to increasing capex with the higher cash flows. The theme in Q3 reporting is going to be record or near record oil and gas cash flows, reduced debt levels and increasing returns to shareholders. And unless new mutations prevent vaccinations from returning the world to normal, we suspect that major LNG players, like other oil and gas companies, will be looking to increase capex as they approve 2022 budgets. The outlook for the future has changed dramatically in the last 8 months. The question facing major LNG players like Shell is should they look to FID new LNG brownfield projects in the face of an increasing LNG supply gap that is going to hit faster and harder and Asian LNG buyers prepared to do long term deals. We expect these decisions to be looked at before the end of 2021 for 2022 capex budget/releases. One wildcard that could force these decisions sooner is the already stressed out global supply chain. We have to believe that discussion there will be pressure for more Asian LNG buyer long term deals sooner than later.

For Canada, does the increasing LNG supply gap provide the opportunity to at least consider a LNG Canada Phase 2 FID over the next 6 months? Our view on Shell and other LNG players is unchanged since our April 28 blog. Shell is no different than any other major LNG supplier in always knowing the market and that the oil and gas outlook is much stronger than 9 months ago. Even 3 months post our April 28 blog, we haven't heard any significant talks on how major LNG players will be looking at FID for new brownfield LNG projects. We don't have any inside contacts at Shell or LNG Canada, but that is no different than when we looked at the LNG markets in September 2017 and saw the potential for Shell to FID LNG Canada in 2018. We posted a September 20, 2017 blog *"China's Plan To Increase Natural Gas To 10% Of Its Energy Mix Is A Global Game Changer Including For BC LNG*" [LINK]. Last time, it was a demand driven supply gap, this time, it's a supply driven supply gap. We have to believe any major LNG player, including Shell, will be at least looking at their brownfield LNG project list and seeing if they should look to advance FID later in 2021. Shell has LNG Canada Phase 2, which would add 2 additional trains or approx. 1.8 bcf/d. And an advantage to an FID would be that Shell would be able to commit to its existing contractors and fabricators for a continuous construction cycle following on LNG Canada Phase 1 ie. to help keep a lid on capital costs. We believe maintaining a continuous construction cycle is even more important given the stressed global supply chain. No one is talking about the need for these new brownfield LNG projects, but, unless some major change in views happen, we believe its inevitable that these brownfield LNG FID internal discussions will be happening in H2/21. Especially since the oil and gas price outlook is much stronger than it was in the fall and companies will be looking to increase capex in 2022 budgets.

A LNG Canada Phase 2 would be a big plus to Cdn natural gas. LNG Canada Phase 1 is a material natural gas development as its 1.8 bcf/d capacity represents approx. 20 to 25% of Cdn gas export volumes to the US. The EIA data shows US pipeline imports of Cdn natural gas as 6.83 bcf/d in 2020, 7.36 bcf/d in 2019, 7.70 bcf/d in 2018, 8.89 bcf/d in 2017, 7.97 bcf/d in 2016, 7.19 bcf/d in 2015 and 7.22 bcf/d in 2014. A LNG Canada Phase 2 FID would be a huge plus for Cdn natural gas. It would allow another ~1.8 bcf/d of Cdn natural gas to be priced against pricing points other than Henry Hub. And it would provide demand offset versus Trudeau if he moves to make electricity "emissions free" and not his prior "net zero emissions". Mozambique has been a game changer to LNG outlook creating a bigger and sooner LNG supply gap. And with a stronger tone to oil and natural gas prices in 2021, the LNG supply gap will at least provide the opportunity for Shell to consider FID for its brownfield LNG Canada Phase 2 and provide big support to Cdn natural gas for the back half of the 2020s. And perhaps if LNG Canada is exporting 3.6 bcf/d from two phases, it could help flip Cdn natural gas to a premium vs US natural gas especially if Biden is successful in reducing US domestic natural gas consumption for electricity. The next six months will be very interesting to watch for LNG markets and Cdn natural gas valuations. Imagine the future value of Cdn natural gas is there was visibility for 3.6 bcf/d of Western Canada natural gas to be exported to Asia.

Shell Scraps Prelude LNG Cargoes for July After Strike Extended
2022-07-14 15:41:07.818 GMT

By Stephen Stapczynski
(Bloomberg) -- Shell canceled several liquefied natural gas cargoes scheduled to load in July from the Prelude LNG export plant in Australia after a workers' strike extended an outage at the facility, according to people with knowledge of the matter.

* Strike was extended by a week until July 28, the people said
* At least two LNG cargoes planned for loading in July were scrapped
* Shell wasn't immediately available for comment outside of normal business hours
* NOTE: Shell shut the Prelude facility on July 11 due to the ongoing strike

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Offshore Alliance
July 9 at 2:38 AM ·

The oil and gas Operators spend an inordinate amount of time in cyber surveillance of employees and their contractor workforce. It's ironic that they're on par with the CPP in regard to their monitoring of social media and emails. One of our Shell Prelude members, Kim Grace, has give us permission to publish an email he sent to Shell Prelude management earlier this week.

Great work Kim - it is long overdue for the culture of the oil and gas Operators (and Shell in particular) to be stripped bare.

This is Kim's analyis (and email to Shell Management) of the toxic management culture on the Prelude FLNG. We thank Kim for speaking up, speaking out and telling the truth about what is wrong with Shell's management of the Prelude.

Thank you for the emails re your EBA proposal over the past week, but I have questions that no one has ever bothered to answer.

Why has it taken Shell years and years to come up with this sudden supposed 'generosity' after previously ignoring our pleas to improve systems, equipment, processes, years of chopping and changing your OPPM when it suited you - an OPPM that none of us agreed to - years of being on the same pay, pay much lower than our neighbours across the way, while trying to reduce our job security and conditions whenever you saw the opportunity to do so?

Years of creating a disastrous situation of your own making?

Years of busted lifts, busted equipment, inadequate maintenance responses, minimal control of band aid solutions, poor illogical decisions by a few poor managers, a culture created onboard by a few toxic managers to bully and influence other decent managers?

Why have you allowed these few destructive 'managers' to destroy our culture and great crews so that all most people want to do is NOT be with such a company and on such a facility, a facility that now has the worst reputation in the industry, and NOT because of the efforts of its crew may I add?

Why did you allow these managers to destroy so many HSRs, peer supporters and just good people who were brave enough, community minded enough, safety conscious enough, to speak up?

It seems you will get your unspoken wish and the experienced will leave in droves, if they are not already, and you will have a crew of yes-men and inexperienced impersonators who just make the place less safe.

You could not even keep the last group of Operators because Shell treated them so poorly, or they were completely unsuitable.

Why do you think I wont go back even though I miss my mates?

Because of the destructive environment you have created, because the chronic state of unease is constant and unrelenting, because I do not trust some of those managers to do the right or safe thing, because some of your chosen replacements out in the field and on the panels could not be trusted.

How safe will your OIMs feel while they sit behind the blast wall knowing that all the knowledge and experience and passion and hard work and close knit mate ships with the associated trust have all gone, replaced by their cheap sometimes sycophantic choices who did not build it, commission it, start it up and kept the worst facility at sea going, against all odds?

Will they speak up when their gut feeling says this is not right, this is unsafe, this may get me a PIP, this will piss the boss off, this may get me a letter saying bugger off? Good luck with that.

Why have you allowed a couple of narcissistic overly ambitious managers to pick and choose who stays and who goes when it should have been those managers who went, who are the root cause of these problems and the toxic culture you have allowed to fester?

Is it because you are not getting all the information or the feedback because there are deliberate blockages in your management structure?

Are you being deceived, lied to, buttered up, just so they can keep their jobs?

I keep thinking that must be it because it is the only explanation that would explain why such intelligent, experienced upper managers have let this absolute circus go on.

Have you actually listened to what we have all been telling you for years and years?

All those sheets of butchers paper, all those pit stops, all those chats and visits offshore asking for the truth, what a complete waste of time, what a sham.

Why has it taken our Union action to get you off your backsides after so many incidents, close calls, just so many 'what if' moments that we have been lucky to get away with?

This email you have sent and this dodgy vote show a complete disrespect and disregard for our long term real concerns, and the fair, legal processes we have been following with a Union that has been listening to us and trying to work their way through Shell's less than honourable tactics, seemingly conducted by a specialist in Union bashing and denigration.

Why did you not listen to us when you had the opportunity and do something about it?

This shows your total contempt for our crew representatives, as you did for our HSRs, total utter contempt to people who acted in good faith and worked hard to get results.

Where in your lolly list is the real job security?

Do you think it is just a matter of waving a bit more money at us, knowing that a few self-interested, greedy people may take the bait?

Are you saying that for the past two years your so-called attempts at negotiation were all a sham, because it certainly looks like it?

Can you not even be honest about this? Your offer is just the current OPPM with some shiny beads thrown in.

What is wrong that you cannot see the truth? That you cannot appreciate what a brilliant crew you have, and try to treat them with respect?

That you allow a couple of arrogant, ambitious but inept managers to run their own agendas and empires?

Are you completely blind to what the rest of us know and have known since before we left Korea?

Ask yourselves this; after all the upper managers we have had, all the comings and goings over the past nearly 5 years on station to sort this all out, what are the only common denominators still left, still creating mayhem, still undermining their own crew and facility and in the process, their own company.

Ask yourselves that, and then work out the solution we already know.

Why don't you do your jobs and actually look after your people, honestly and sincerely; that is the ONLY way you will ever get loyalty and respect in return, not by throwing a few coins our way and undermining any trust we ever had in Shell's supposed good faith in negotiations.

It is really very simple, but somehow a few managers always seem to make it difficult and chaotic.

Anyone who makes a list divided into Champions and Blockers and then tells their crew what they did should never have a manager’s job on an offshore bathtub let alone a facility like Prelude.

They should never have been employed by this project, let alone given more power. What is wrong that you cannot see the truth?

Why do you employ toxic managers and give them free reign to cause chaos? Or maybe that is what Shell wants, no one knows anymore.

Put me down as a big fat NO to your dolled up OPPM version 23.7.

It lacks honesty and reeks of all the other stop-gap reactions so far tried to resolve a very simple problem.

At a time when the world is screaming out for the products Prelude produces and when the profits on those products are so great, many of the actions, threats and decisions being made lately are both incomprehensible and irresponsible.

https://www.ft.com/content/fb57864b-5d1c-450a-bf8d-a4a0807a38c9

Shell chief warns Europe may have to ration energy during winter

Head of oil major says prices will rise 'significantly' if Russia continues to limit supply

Tom Wilson 2 HOURS AGO

Shell chief executive Ben van Beurden has warned that Europe may need to ration access to energy this winter, as he predicted "significantly" higher prices if Russia continues to choke the supply of gas into the EU.

The head of Europe's largest oil and gas company said Russian president Vladimir Putin had shown he was "able and willing to weaponise energy supplies" and that a complete suspension of Russian gas exports to Europe could not be ruled out.

"I think we will be facing a really tough winter in Europe," van Beurden told an energy conference in Oxford on Thursday.

"Maybe some countries will fare better than others, but I think we will all be facing very significantly escalating pricing, so there will be a lot of pressure on industry and therefore there will be a lot of pressure on the economy," he added. "In the worst case, we will be in a situation where we have to ration."

Russia's main gas pipeline to Germany went offline for scheduled maintenance on Monday, prompting fears that the flow of gas might not resume after the repairs are completed.

Putin last week threatened "catastrophic consequences" for world energy markets if western powers impose further sanctions on Moscow over Russia's invasion of Ukraine.

Other senior figures in the energy industry, including Fatih Birol, head of the International Energy Agency, have also warned Europe to prepare for the possibility of a complete shutdown of gas supplies from Russia this winter.

Birol told the Financial Times last month that measures already taken by European countries to reduce gas demand, such as firing up old coal-fired power stations, were justified by the scale of the crisis despite concerns about rising carbon emissions. European countries should also look to keep ageing nuclear power stations open and seek other ways to cut demand, he added.

Van Beurden said on Thursday that such measures, specifically the renewed reliance on coal, meant that Europe would have to "backtrack" on its energy transition plans, at least initially.

"We will take a few steps backwards before we are able to make a few steps forwards," he said.

But he added that the fallout from Russia's invasion of Ukraine had been a wake-up call for policymakers that would ultimately help accelerate Europe's energy transition in order to reduce dependence on imported fuels.

"We had sufficient ambition but this time I think we will have sufficient conviction," he said.

Germany Starts Pulling Gas From Storage Amid Lower Supplies (1)
2022-07-14 13:13:57.889 GMT

By Vanessa Dezem
(Bloomberg) -- Germany started to pull natural gas from stockpiles that it's been building up for winter, with declining flows from Russia tightening available supply.
Gas withdrawals are exceeding injections into storage sites, leaving inventories 64.5% full, according to data from Germany's federal network agency. That shows the country's supply situation has worsened since Russia cut flows via the key Nord Stream pipeline by 60% last month.
Germany is aiming to have storage facilities 90% full by November to ensure it can meet demand in the following months. The country raised its gas risk level to the second-highest "alarm" phase in June following a steep drop in Russian supplies, and has indicated that further cuts may trigger emergency measures.
Germany has warned that the Nord Stream link, currently halted for maintenance, may not fully return once the works end later in July. Russia's deliveries via Ukraine have also been curtailed for weeks.
The tightening supply situation has forced Uniper SE, Germany's largest buyer of Russian gas, to signal that it has no choice but to pull volumes from storage to meet contractual commitments.
"We cannot store more for now, something that we would like to do and the legislation provides for," Uniper Chief Executive Officer Klaus-Dieter Maubach said on Friday. The company is "focused on complying with the gas contracts we have with our clients."

Soaring Costs

German gas buyers have had to buy costly supplies on the spot market to replace Russian flows. European gas futures have jumped 90% since the start of June.
A decision by Germany to trigger emergency measures could mean rationing supplies to industry, and would significantly increase the risk of a deep recession in Europe's largest economy, creating ripple effects across the continent.
"The situation is tense and a worsening cannot be ruled out," the network agency said in a statement, adding that "Germany's security of supply is currently guaranteed."

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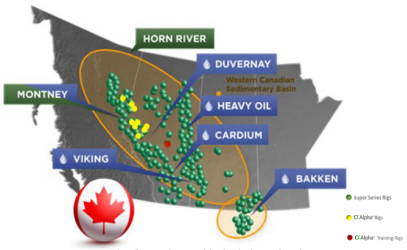
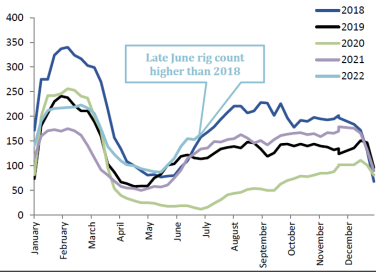
CANADIAN FUNDAMENTALS STRONGEST IN NEARLY A DECADE

- Precision is an integral service provider in every oil and gas basin in Western Canada
  - Achieved average market share of 33% in 2021
  - Operates fleet of 109 drilling rigs, including 28 AC Super Triple rigs and 56 Super Single rigs
  - Precision's AC Triple is the preferred rig in Montney region and Super Single is preferred rig in oil sands and Clearwater heavy oil plays, with expected full utilization of both fleets in 2H 2022
- Existing High-Performance fleet, operating scale and minimal growth capital requirements support operating leverage and cash flow generation from Precision's Canadian operations
- Canadian industry rig count reflecting strong customer demand with late April active rigs higher than 2018
  - Expectations for Q3 industry levels to exceed Q1 activity

Precision Canada Activity[1]



Canada Industry Rig Count[2]

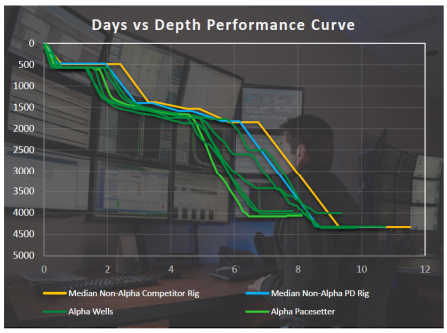


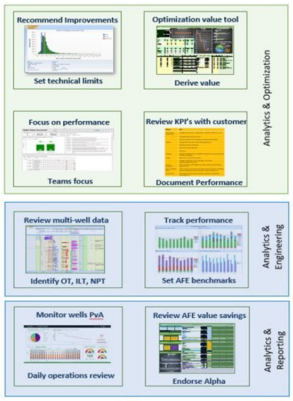
1. Dots on map representative of areas where Precision has had operations since 2017.
2. Baker Hughes as of July 01, 2022.

ALPHA™ SETS NEW BENCHMARK

CASE STUDY #20-08: MONTNEY DRILLING PROGRAM

AlphaAutomation™ AlphaAnalytics™ AlphaApps™





3 DAYS — IMPROVEMENT OVER OPERATOR TARGET

$165K — AVG AFE SAVINGS PER WELL FOR THE OPERATOR

27% — PRODUCTIVITY IMPROVEMENT OVER NON-ALPHA OFFSETS

$74K — ALPHA™ GENERATED REVENUE

AlphaAutomation™ RECORD PERFORMANCE

CASE STUDY #20-06: Delaware Basin

AlphaAutomation™

6 DAYS — IMPROVEMENT OVER OPERATOR TARGET

$147K — AVG AFE SAVINGS PER WELL FOR THE OPERATOR

55% — PRODUCTIVITY IMPROVEMENT OVER NON-ALPHA OFFSETS

$65K — ALPHA™ GENERATED REVENUE

Oil Market Highlights

Crude Oil Price Movements

Crude oil spot prices rose in June, extending the previous month's increase. Higher futures prices and strong physical crude market fundamentals drove the increase, amid higher crude demand from refiners and several supply disruptions. The OPEC Reference Basket rose $3.85, or 3.4%, to settle at $117.72/b. The ICE Brent front month increased by $5.54, or 4.9%, in June to average $117.50/b and NYMEX WTI rose by $5.08, or 4.6%, to average $114.34/b. The Brent/WTI futures spread widened by 46¢ to an average of $3.16/b. The market structure of all three major crude benchmarks – ICE Brent, NYMEX WTI and DME Oman – strengthened further in June and prompt time spreads moved into deeper backwardation. Hedge funds and other money managers cut net long positions by nearly 11% in the two major futures contracts.

World Economy

World economic growth in 2022 remains broadly unchanged at 3.5%, while the initial forecast for 2023 expects global growth of 3.2%. US GDP growth for 2022 remains unchanged at 3.0%, followed by 2.1% growth in 2023. Euro-zone economic growth for 2022 is unchanged at 3.0%, while growth in 2023 is forecast at 2%. Japan is expected to growth by 1.7% in 2023, following growth of 1.6% in 2022, unchanged from the previous report. China's 2022 growth remains at 5.1% and GDP growth in 2023 is seen slightly lower at 5%. India's GDP growth remains at 7.1% in 2022 and is expected to grow by 6% in 2023. Brazil's economic growth forecast for 2022 remained unchanged at 1.2%, increasing to 1.5% in 2023. For Russia, the 2022 GDP growth forecast is unchanged, showing a contraction of 6.0%, while growth is anticipated to recover to 1.2% in 2023. Consumption remains robust, especially in the advanced economies, with an expected continued recovery particularly in the contact-intensive services sector, which includes travel and transportation activity, leisure and hospitality. However, significant downside risks exist, stemming from ongoing geopolitical tensions, the continued pandemic, rising inflation, aggravated supply chain issues, high sovereign debt levels in many regions, and expected monetary tightening by central banks in the US, the UK, Japan and the Euro-zone.

World Oil Demand

World oil demand growth in 2022 remains unchanged from the previous month's assessment at 3.4 mb/d. Oil demand in the OECD is estimated to increase by 1.8 mb/d, while non-OECD is seen growing by 1.6 mb/d. Total oil demand is projected to average 100.3 mb/d. The first quarter of this year was revised higher, amid better-than-anticipated oil demand in the main OECD consuming countries. However, with the resurgence of COVID-19 in China and ongoing geopolitical uncertainties, oil demand in 2Q22 is revised lower. For 2023, world oil demand growth is expected to reach 2.7 mb/d to average 103.0 mb/d, with the OECD growing by 0.6 mb/d and non-OECD growth forecast at 2.1 mb/d. Oil demand in 2023 is expected to be supported by a still solid economic performance in major consuming countries, as well as improved geopolitical developments and containment of COVID-19 in China.

World Oil Supply

Non-OPEC liquids supply growth in 2022 remains broadly unchanged from the previous month's assessment, despite upward revisions to China and Canada, and is now expected to grow by 2.1 mb/d to average 65.7 mb/d. The main drivers of liquids supply growth for the year are expected to be the US, Canada, Brazil, China, Kazakhstan and Guyana, while production is expected to decline mainly in Russia, Indonesia and Thailand. In 2023, non-OPEC liquids production is projected to grow by 1.7 mb/d to average 67.4 mb/d. Liquids supply in the OECD is forecast to increase by 1.4 mb/d in 2023, while non-OECD is seen growing by 0.2 mb/d. The main drivers for 2023 are expected to be the US, with growth of 1.1 mb/d, followed by Norway, Brazil, Canada and Guyana. However, uncertainty regarding the operational aspects of US production and from ongoing geopolitical developments remains high. OPEC NGLs and non-conventional liquids are forecast to grow by 0.1 mb/d in 2022 to average 5.39 mb/d and by 50 tb/d to average 5.44 mb/d in 2023. OPEC-13 crude oil production in June increased by 234 tb/d m-o-m to average 28.72 mb/d, according to available secondary sources.

Product Markets and Refining Operations

Refinery margins at all main trading hubs continued to increase in June, supported by stronger product fundamentals despite rising product output levels, as refiners continued to increase processing rates following peak maintenance season. Rising transport fuel requirements in line with seasonal trends led to robust gains at the top and middle sections of the barrel. Meanwhile, naphtha and fuel oil came under pressure due to subdued demand and unfavourable economics. Going forward, refinery intakes are expected to rise further to accommodate a seasonal pick up in fuel consumption and allow a much-needed stock build.

Tanker Market

Dirty tanker spot freight rates in June recovered some of the losses seen the previous month. The tanker market continued to improve following the poor performance in 2021, although gains varied across sectors. Suezmax and Aframax markets have benefited from the rerouting of longstanding trade patterns resulting in longer voyages, while VLCCs have seen less momentum from these shifts, with lower flows on longer haul routes such as from the Americas to Asia. Suezmax rates rose 20% m-o-m and Aframax rates increased 11%, while VLCC rates were up 8% on average. Clean rates continued to see strong m-o-m growth, up 21% on average amid tight product markets and increased demand for longer haul routes.

Crude and Refined Products Trade

US crude imports remained broadly unchanged in June at 6.4 mb/d, while US crude exports slipped from the high levels seen the month before to average 3.4 mb/d. China's crude imports averaged 10.8 mb/d in May, continuing to increase from the weak performance in February, with flows heading to inventories as refineries continued to cut runs. India's crude imports fell back from an exceptional high the month before to average 4.6 mb/d in May, despite a surge in Russian inflows. Tanker tracking data shows India's crude imports and product exports moving higher in June. Japan's crude imports fell back from the previous month's highs, averaging 2.6 mb/d in May. Recent estimates show OECD Europe's imports strengthening in May and June, with increased y-o-y inflows from West Africa and the Middle East, partially offset by declines in North Africa.

Commercial Stock Movements

Preliminary May data sees total OECD commercial oil stocks up 10.5 mb m-o-m. At 2,680 mb, inventories were 253 mb less than the same time a year ago, 312 mb lower than the latest five-year average, and 276 mb below the 2015–2019 average. Within components, crude stocks fell by 10.1 mb m-o-m, while product stocks rose 20.6 mb over the same period. At 1,307 mb, OECD crude stocks were 103 mb below the same time a year ago, 176 mb lower than the latest five-year average, and 177 mb below the 2015–2019 average. OECD product stocks stood at 1,373 mb, representing a deficit of 150 mb with the same time a year ago, 136 mb lower than the latest five-year average, and 97 mb below the 2015–2019 average. In terms of days of forward cover, OECD commercial stocks fell 0.7 days m-o-m in May to stand at 57.3 days. This is 7.0 days below May 2021 levels, 7.6 days less than the latest five-year average and 4.6 days lower than the 2015–2019 average.

Balance of Supply and Demand

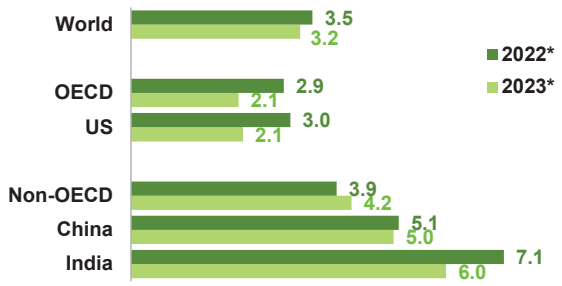
Demand for OPEC crude in 2022 remains unchanged from the previous month's assessment to stand at 29.2 mb/d, which is around 1.1 mb/d higher than in 2021. Based on the initial forecasts for world oil demand and non-OPEC supply in 2023, demand for OPEC crude is expected to reach 30.1 mb/d, 0.9 mb/d higher than the 2022 level.

Feature Article

The outlook for the oil market in 2023

World GDP growth in 2023 is forecast at 3.2%. This assumes that the ramifications of the pandemic, geo-political developments in Eastern Europe and global financial tightening amid rising inflation do not negatively impact the 2023 growth dynamic to a major degree. It also assumes that major economies revert back towards their growth potentials. However, downside risk exists. Global inflation continues to be a major concern, along with the consequence of further monetary tightening measures by key central banks. The continuation of the pandemic into 2023 is another risk that could curb growth depending on the extent of measures taken to reduce contagion. While labour markets are forecast to remain tight, supply chain bottlenecks may not be resolved in the short term and high debt levels across the globe may persist. In the OECD, GDP growth is expected at 2.1% in 2023, from 2.9% in 2022. In the non-OECD, 2023 GDP growth is forecast at 4.2%, compared to 3.9% in 2022.

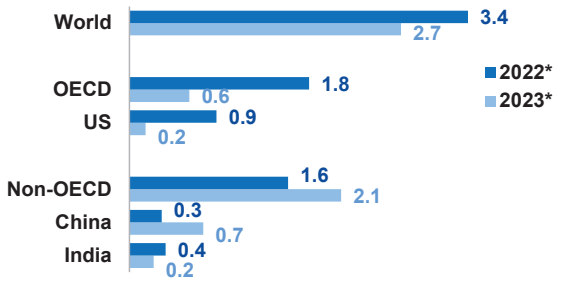
Graph 1: GDP growth forecast, y-o-y changes, %



*Note: * 2022-2023 = Forecast. Source: OPEC.*

Better-than-expected containment of COVID-19 and expected firm global economic growth are projected to support global oil demand in 2023, which is forecast to grow by 2.7 mb/d y-o-y. Within the regions, OECD oil demand is forecast to rise by 0.6 mb/d and non-OECD oil demand is projected to show an increase of 2.1 mb/d, mostly in China and India. This is supported by a recovery in transportation fuels and firm industrial fuels demand, including petrochemical feedstock.

Graph 2: World oil demand growth forecast, y-o-y changes, mb/d

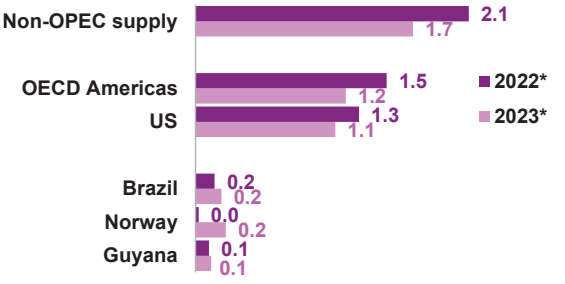


*Note: * 2022-2023 = Forecast. Source: OPEC.*

In terms of fuels, gasoline and diesel are expected to lead oil demand growth in 2023, on increasing mobility in major consuming countries, such as the US, China and India. Both on-road diesel, including trucking, as well as increasing industrial, construction and agricultural activities in OECD America, Europe and China will support diesel demand. Light distillates will be supported by capacity additions – NGL plants in the US, Propane Dehydrogenation (PDH) plants in China, and steady petrochemical margins. Jet fuel will continue to recover, as domestic and international air travel pick up, but business travel is expected to continue to lag. Uncertainties remain, including COVID-19-related challenges, particularly in China, as well as geopolitical uncertainties and their impact on oil demand.

Non-OPEC oil supply is forecast to grow by 1.7 mb/d y-o-y in 2023, supported by stronger demand. Upstream investment in non-OPEC countries is expected at around $415 billion (bn), broadly the same level as in 2022 and 18% more than in 2021. However, this level is still only half of the $755 bn seen in back 2014. New production by projects sanctioned up to 2023 is forecast at around 19.7 mb/d, up by 10% compared to the 17.8 mb/d seen in 2022. Liquids production growth in the US is forecast at 1.1 mb/d, mainly from US Permian crude and non-conventional NGLs, as well as from the Gulf of Mexico. Oil production in Norway, Brazil, Guyana, Kazakhstan, and Argentina is forecast to increase through new field start-ups and ramp-ups of existing projects. Moreover, non-OPEC processing gains and OPEC NGLs are forecast to grow by 70 tb/d and 50 tb/d, respectively, y-o-y.

Graph 3: Non-OPEC supply growth forecast, y-o-y changes, mb/d



*Note: * 2022-2023 = Forecast. Source: OPEC.*

Looking ahead to 2023, strong world oil demand growth, along with the increase in non-OPEC supply, are forecast to lead to demand for OPEC crude to increase by 0.9 mb/d y-o-y to average 30.1 mb/d. Nevertheless, uncertainty to the forecast remain to the downside, with much depending on the course of the pandemic and related measures, global financial tightening in the light of growing inflation, and the resolution of the ongoing geo-political issues in Eastern Europe.

World Oil Demand

For 2022, world oil demand is foreseen to rise by 3.4 mb/d, unchanged from last month's estimate despite some regional revisions. Total oil demand is projected to average 100.3 mb/d. In 1Q22, demand was revised up amid strong economic growth in most consuming countries and a lower baseline. In the OECD region, oil demand is anticipated to rise by 1.8 mb/d to reach 46.6 mb/d. This is nearly 1.2 mb/d lower than total demand in 2019, mainly due to a limited recovery in transportation fuel, especially jet fuel. OECD Americas demand is anticipated to rise the most in 2022, led by the US on the back of recovering gasoline and diesel demand. Light distillates are also projected to support demand growth this year. In the non-OECD region, total oil demand is anticipated to rise by 1.6 mb/d to reach 53.7 mb/d in 2022. That is nearly 1.28 mb/d higher than 2019 total demand. A steady increase in industrial and transportation fuel demand, supported by a recovery in economic activity, is projected to boost demand in 2022.

In 2023, expectations for healthy global economic growth amidst improvements in geopolitical developments, combined with expected improvements in the containment of COVID-19 in China, are expected to boost consumption of oil. World oil demand is anticipated to rise by 2.7 mb/d y-o-y, while total world oil demand is projected to reach 103.0 mb/d In the OECD, oil demand is anticipated to rise by 0.6 mb/d, as OECD Americas is expected to climb firmly, with US oil demand above 2019 levels mainly due to the recovery in transportation fuels and light distillates demand. OECD Europe and the Asia Pacific will grow above 2019 consumption levels. In the non-OECD, oil demand is projected to show an increase of 2.1 mb/d with, with the largest growth seen in China and India, supported by a recovery in transportation fuels and firm industrial fuel demand, including petrochemical feedstock. Other regions such as Other Asia, Latin America and the Middle East are also expected to see decent gains, supported by a positive economic outlook. In terms of fuels, gasoline and diesel are assumed to lead oil demand growth next year.

Table 4 - 1: World oil demand in 2022*, mb/d

							Change 2022/21	
World oil demand	**2021**	**1Q22**	**2Q22**	**3Q22**	**4Q22**	**2022**	**Growth**	**%**
Americas	24.28	24.84	24.99	25.49	25.76	25.27	1.00	4.11
of which US	*19.93*	*20.38*	*20.57*	*20.99*	*21.21*	*20.79*	*0.86*	*4.34*
Europe	13.08	13.09	13.31	14.29	14.15	13.71	0.63	4.81
Asia Pacific	7.41	7.91	7.19	7.25	7.93	7.57	0.16	2.16
Total OECD	**44.77**	**45.83**	**45.49**	**47.03**	**47.84**	**46.55**	**1.79**	**3.99**
China	14.94	14.67	14.96	15.42	15.97	15.26	0.32	2.14
India	4.77	5.18	4.95	5.01	5.39	5.13	0.36	7.53
Other Asia	8.63	9.09	9.54	8.93	8.95	9.12	0.50	5.77
Latin America	6.23	6.32	6.28	6.53	6.42	6.39	0.16	2.63
Middle East	7.79	8.06	7.82	8.32	8.09	8.07	0.28	3.59
Africa	4.22	4.51	4.15	4.23	4.54	4.36	0.14	3.23
Russia	3.61	3.67	3.28	3.45	3.54	3.48	-0.13	-3.58
Other Eurasia	1.21	1.22	1.15	1.01	1.24	1.15	-0.06	-4.71
Other Europe	0.75	0.79	0.71	0.73	0.80	0.76	0.01	1.01
Total Non-OECD	**52.15**	**53.50**	**52.85**	**53.62**	**54.93**	**53.73**	**1.58**	**3.03**
Total World	**96.92**	**99.33**	**98.33**	**100.65**	**102.77**	**100.29**	**3.36**	**3.47**
Previous Estimate	96.92	99.28	98.19	100.85	102.77	100.29	3.36	3.47
Revision	0.00	0.06	0.15	-0.20	0.00	0.00	0.00	0.00

*Note: * 2022 = Forecast. Totals may not add up due to independent rounding. Source: OPEC.*

Table 4 - 2: World oil demand in 2023*, mb/d

World oil demand	2022	1Q23	2Q23	3Q23	4Q23	2023	Change 2023/22 Growth	Change 2023/22 %
Americas	25.27	25.20	25.47	26.04	26.27	25.75	0.48	1.88
of which US	*20.79*	*20.42*	*20.76*	*21.24*	*21.36*	*20.95*	*0.16*	*0.77*
Europe	13.71	13.10	13.35	14.46	14.26	13.80	0.08	0.61
Asia Pacific	7.57	7.94	7.25	7.29	7.94	7.60	0.04	0.48
Total OECD	**46.55**	**46.24**	**46.07**	**47.78**	**48.47**	**47.15**	**0.60**	**1.28**
China	15.26	15.31	15.98	16.14	16.53	15.99	0.73	4.81
India	5.13	5.38	5.20	5.27	5.63	5.37	0.24	4.68
Other Asia	9.12	9.48	9.87	9.29	9.30	9.48	0.36	3.93
Latin America	6.39	6.48	6.41	6.69	6.56	6.54	0.15	2.30
Middle East	8.07	8.43	8.10	8.65	8.38	8.39	0.32	3.91
Africa	4.36	4.70	4.34	4.42	4.73	4.55	0.19	4.31
Russia	3.48	3.68	3.30	3.62	3.72	3.58	0.10	2.73
Other Eurasia	1.15	1.22	1.15	1.02	1.25	1.16	0.01	0.72
Other Europe	0.76	0.80	0.72	0.75	0.82	0.78	0.02	2.34
Total Non-OECD	**53.73**	**55.48**	**55.05**	**55.85**	**56.92**	**55.84**	**2.10**	**3.92**
Total World	**100.29**	**101.72**	**101.12**	**103.64**	**105.40**	**102.99**	**2.70**	**2.69**

*Note: * 2022 and 2023 = Forecast. Totals may not add up due to independent rounding. Source: OPEC.*

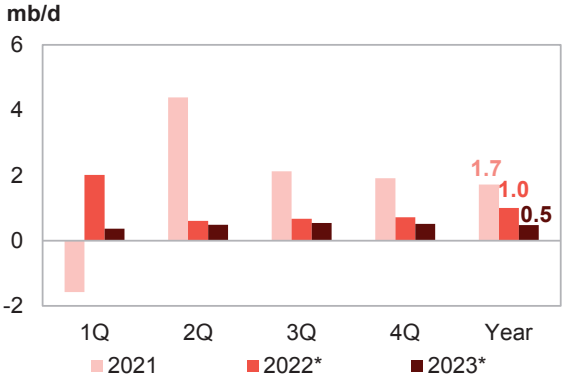
OECD

OECD Americas

Update on the latest developments

US oil demand growth weakened in **April** after strong y-o-y growth in March. According to the most recent monthly data, the US posted growth of 0.5 mb/d in April, annually, following strong y-o-y growth of 1.2 mb/d in March. The US still faces macroeconomic challenges that are weighing heavily on oil demand. Oil demand growth in April was led by liquefied petroleum gas (LPG), which grew by 0.4 mb/d, about 13% annually. On the back of a strong recovery in air traffic, jet fuel recorded growth of 0.3 mb/d annually, lower by 0.4 mb/d m-o-m. According to the International Air Transport Association's (IATA) Air Passenger Market Analysis for April 2022, the US domestic market made progress towards reaching 2019 revenue passenger kilometres (RPK) levels. The rebound in air traffic continued in April with RPKs down only 1.6% compared to the same month in 2019 (versus -3.9% y-o-y in March 2022). Residual fuel requirements recorded robust y-o-y growth of 0.2 mb/d in April, against a mere 30 tb/d annually in March.

Graph 4 - 1: OECD Americas oil demand, y-o-y change



*Note: * 2022-2023 = Forecast. Source: OPEC.*

Gasoline demand is on a declining trajectory, recording a y-o-y contraction of 40 tb/d in April for the first month since February 2021 and below 80 tb/d annual growth in March, 2022. The persistent rise in US gasoline prices and high inflation are partly responsible for weakening gasoline demand in the US. Data from the US Federal Highway Administration shows that monthly motor vehicle travel miles in the US declined by 1% in April from their March level. Diesel demand declined for two consecutive months. In April diesel contracted by 0.2 mb/d annually from the 0.1 mb/d contraction recorded in March. Both manufacturing and trucking activities declined in April on a monthly basis from March. These factors weighed on April diesel demand. Naphtha contracted by 60 tb/d annually in April.

Table 4 - 3: US oil demand, mb/d

By product	Apr 21	Apr 22	Change Growth	Apr 22/Apr 21 %
LPG	2.89	3.27	0.38	13.1
Naphtha	0.21	0.15	-0.06	-27.2
Gasoline	8.79	8.75	-0.04	-0.4
Jet/kerosene	1.29	1.54	0.25	19.6
Diesel	3.99	3.81	-0.18	-4.5
Fuel oil	0.14	0.30	0.16	112.6
Other products	2.44	2.42	-0.02	-0.8
Total	**19.75**	**20.25**	**0.50**	**2.5**

Note: Totals may not add up due to independent rounding. Sources: EIA and OPEC.

Near-term expectations

Following strong growth of 1.7 mb/d annually in 1Q22, though on top of a low historical baseline, US oil demand growth is forecast to slow in 2Q22 to settle at by 0.4 mb/d, y-o-y. The US economy is projected to slow down in this quarter. The US economy will also be impacted by high domestic inflation combined with tight monetary policy; these factors are going to weigh on oil demand in second quarter. In 3Q22, the combination of the summer driving season and higher employment in the industrial and commercial sectors as well as the decreasing impact of the COVID-19 pandemic are expected to support the demand for gasoline, diesel and jet kerosene. Gasoline demand is expected to be backed by summer driving season activity. Demand for diesel will be supported by rise in demand for trucking, home delivery and distribution of goods due to relative improvements in economic activity in the US. Therefore, during 3Q22, US oil demand growth is forecast to improve and reach 0.6 mb/d annually. Furthermore, the improvement in both domestic and international aviation travel will support jet kerosene demand. Residential and industrial demand for light distillates will support LPG and naphtha and will benefit from petrochemical feedstock requirements in 3Q22.

These improvements in the performance of the US economy in 3Q22 are anticipated to extend into 4Q22. In this quarter, the US oil demand is projected to grow by 0.7 mb/d annually.

As the US government continues to implement some monetary and fiscal policy measures to support the economy, the rise in inflation is likely to slow in 2023, and supply chain bottlenecks are expected to ease further. Consequently, the manufacturing sector and households will benefit and support oil demand growth.

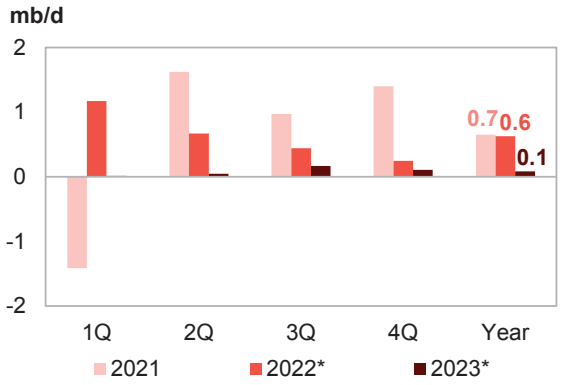
In 2023, OECD Americas is expected to grow by 0.5 mb/d y-o-y, 0.4 mb/d above the 2019 growth. The oil demand growth in the region is expected to be driven mostly by demand from the USA. Expected strong GDP growth recovery and resilient industrial sector activity are assumed to be the main divers of the growth in the region. In terms of oil products, transportation fuels, backed by strong mobility and trucking will support gasoline and transportation diesel demand in 2023. Furthermore, petrochemicals industry requirements for feedstock is anticipated to support the demand for light distillates. Finally, the continued recovery of air travel, both in terms of international and domestic travel, will support jet fuel demand in 2023.

OECD Europe

Update on the latest developments

Oil demand in OECD Europe declined slightly m-o-m in April, growing by 0.9 mb/d annually following annual growth of 1.1 mb/d in March. The gradual relaxation of travel restrictions in various European countries has boosted travel demand within the continent. This has resulted in a significant surge in international demand, with passengers ready to fly abroad once again rather than holidaying domestically. Accordingly, the demand for jet kerosene grew by 0.6 mb/d annually, slightly exceeding growth levels of 0.5 mb/d in March. Improved mobility and economic activity in the region also lent support for gasoline in April, y-o-y.

Graph 4 - 2: OECD Europe's oil demand, y-o-y change



*Note: * 2022-2023 = Forecast. Source: OPEC.*

In April, new passenger registrations in the European Union (EU) increased from 763,637 in March to 802,868 in April, marking a 5.1% rise m-o-m, although they fell by a significant 20.6% y-o-y. Demand for gasoline grew by 0.3 mb/d annually in April slightly higher than in March.

Annual diesel demand growth in OECD Europe declined y-o-y, reflecting high retail prices and challenges in securing petroleum products supply. In Germany, the mileage covered by trucks grew by 0.8% in April 2022 from the previous month. Statistics from Haver Analytics show that the index of manufacturing output in the EU countries fell from 107.90 in April 2021 to 107.50 in April 2022. On the back of these developments, diesel recorded growth of 0.2 mb/d y-o-y in April, lower than the y-o-y growth of 0.4 mb/d in March. Naphtha recorded a contraction by 0.2 mb/d y-o-y in April, comparatively larger than the corresponding 0.1 mb/d decline in March.

Table 4 - 4: Europe's Big 4* oil demand, mb/d

By product	Apr 21	Apr 22	Change Growth	Apr 22/Apr 21 %
LPG	0.45	0.43	-0.02	-4.6
Naphtha	0.60	0.46	-0.14	-22.9
Gasoline	1.00	1.18	0.18	17.8
Jet/kerosene	0.37	0.65	0.28	75.9
Diesel	3.00	3.04	0.05	1.6
Fuel oil	0.14	0.18	0.04	25.2
Other products	0.39	0.52	0.13	32.6
Total	**5.95**	**6.46**	**0.51**	**8.6**

*Note: * Germany, France, Italy and the UK. Totals may not add up due to independent rounding.*

Sources: JODI, UK Department for Business, Energy & Industrial Strategy, Unione Petrolifera and OPEC.

Near-term expectations

Looking forward, in 2Q22 y-o-y oil demand growth in OECD Europe is projected to weaken by 0.7 mb/d in the second quarter from the 1.2 mb/d recorded in 1Q22, largely affected by geopolitical developments which have fuelled manufacturing inflation and trade-related bottlenecks. In 2Q22, oil demand in OECD Europe is forecast to grow by 0.5 mb/d annually, backed by 1.5% GDP growth in the four big economies of the region during the quarter. In addition, all COVID-19 restrictions were relaxed. These factors are expected to support mobility in the region, thereby inducing gasoline demand. The gradual relaxation of air travel restrictions in various European countries will also lead to a surge in air traffic, thereby supporting jet kerosene demand in the region.

In 3Q22, the GDP in the region is expected to improve 2.3%, y-o-y, combined with expected improvements in geopolitical developments and trade-related supply chain activity, which will support manufacturing in the region. Furthermore, pent-up travel demand and the summer driving activity are expected to enhance gasoline demand in 3Q22. In 4Q22, the GDP in the region is expected to improve by 3.2%, lending support for diesel requirements in the region's manufacturing sector. Winter seasonality is expected to weigh on mobility, thereby reducing gasoline demand. In 4Q22, OECD Europe oil demand is forecast to slow at 0.2 mb/d annually.

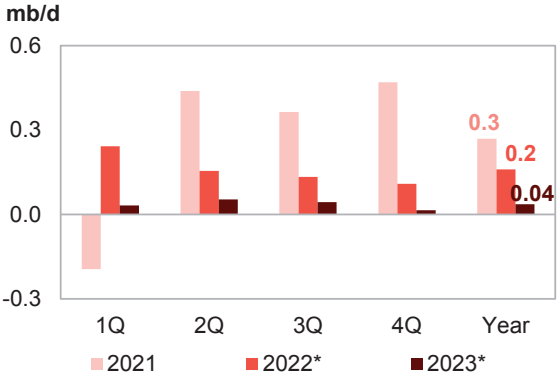
In 2023, the region is projected to post an annual growth of 0.1 mb/d, y-o-y. The oil demand growth is posed to supported by strong economic growth recovery in the four big oil consuming countries; this will support mobility and trucking to back demand for gasoline and transportation diesel. In addition, on the back of vibrant industrial and petrochemical sector requirements for distillates, diesel and other light distillates demand will significantly improve in the region. Finally, as air travel demand continue to improve in the region, jet fuel demand will improve further in 2023.

OECD Asia Pacific

Update on the latest developments

Oil demand in the Asia Pacific nosedived by 0.1 mb/d, y-o-y, in April, 2022 after rising 0.1 mb/d annually in March. Japan and South Korea, the major consuming countries in the region, recorded weakening demand for most products. The GDP of the region is still not performing very well, with 2.2% annual growth in Japan, combined with the country's COVID-19 emergency restrictions, which dented consumer spending and manufacturing activity. These factors capped the oil demand in the country. The index of manufacturing production in Japan slid from 96.7 in March to 95.4 in April. Similarly, South Korea's GDP growth is at 2.9% and manufacturing output has performed below expectation at 105.2 in April, slightly below 105.7 in March.

Graph 4 - 3: OECD Asia Pacific oil demand, y-o-y change



*Note: * 2022-2023 = Forecast. Source: OPEC.*

Furthermore, South Korea has not fully lifted all its COVID-19 restrictions. The combination of these factors weigh heavily on oil demand in the region, which fell in April compared to positive y-o-y growth in March.

The demand for light distillates – NGLs/LPG, and naphtha – recorded marginal 30 tb/d y-o-y growth in April, 0.1 mb/d lower m-o-m in March. Naphtha consumption grew by 45 tb/d y-o-y against a contraction of 0.1 mb/d in March. Similarly, residual fuel requirements recorded annual growth of 47 tb/d in April. Diesel demand shrank by 0.1 m/d in April, against annual growth of 3 tb/d in March.

Gasoline demand contracted for the second consecutive month by 0.1 mb/d y-o-y from a 60 tb/d annual decline in March. Diesel demand also contracted by 0.1 mb/d in April after an annual decline of 10 tb/d in March. Finally, jet kerosene demand nosedived by 10 tb/d in April against annual growth of 50 tb/d in March.

Table 4 - 5: Japan's oil demand, mb/d

By product	May 21	May 22	Change Growth	May 22/May 21 %
LPG	0.35	0.49	0.13	37.5
Naphtha	0.69	0.58	-0.11	-15.5
Gasoline	0.68	0.69	0.01	1.7
Jet/kerosene	0.23	0.24	0.02	6.9
Diesel	0.60	0.63	0.03	4.8
Fuel oil	0.19	0.21	0.02	12.3
Other products	0.20	0.07	-0.13	-66.7
Total	**2.93**	**2.90**	**-0.03**	**-0.9**

Note: Totals may not add up due to independent rounding. Sources: JODI, METI and OPEC.

Near-term expectations

After growth of 0.2 mb/d in 1Q22, y-o-y, the economy of the region is expected to continue with its rather slow pace of growth at an annual 2.3%. This will affect both manufacturing activity and mobility. Furthermore, the current COVID-19 containment measures are expected to impact supply chain activity.

Despite the slow economic growth and the state of the COVID-19 pandemic in the region, the gradual economic and mobility recovery in the region, combined with improvements in aviation activity could boost gasoline and jet kerosene demand and provide additional support for oil demand in 2022. Currently, South Korea's government subsidy rate hike and rapid removal of COVID-19 restrictions may lead to higher demand for the middle distillate fuels over the peak summer driving season. Similarly, the Japanese government has introduced subsidies on gasoline prices. Improvements in the aviation industry will also support the demand for jet kerosene in the region. Overall, the oil demand in the region is forecast to remain flat at 0.1 mb/d, annually in 2022.

In 2023, the region is expected to have an improvements in its COVID-19 situation and also record improvements in the economic growth in most of the major oil consuming countries in the region. Furthermore, supply chain bottlenecks are also expected to ease further. Therefore, mobility and industrial activity are expected to improve gradually; these factor combined with air travel recovery will support oil demand growth in the region in 2023. The region is forecast to grow by 40 tb/d, annually in 2023.

Non-OECD

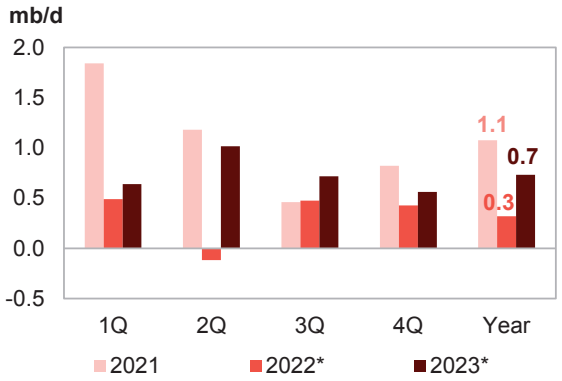
China

Update on the latest developments

Although **Chinese oil demand** started to show signs of improvement, the latest data show a contraction in oil demand for two consecutive months, April and May. In May, China's oil demand nosedived by 0.3 mb/d, about 2.2% annually. Nonetheless, it is an improvement m-o-m, when compared with 0.8 mb/d annual decline in April. Chinese diesel demand saw a minor recovery in May as Shanghai started ending city-wide lockdowns; diesel consumption grew by 70 tb/d annually in May following a contraction of 0.2 mb/d in April. Even though the lockdowns in Shanghai were relaxed, lingering mobility restrictions across the country weighed on gasoline demand in May and recorded a contraction of about 0.2 mb/d, or 6%. It is still an improvement on a monthly basis compared to the 0.3 mb/d contraction in April.

On the back of petrochemical and household requirements for light distillates, naphtha and LPG demand has marginally improved. While naphtha posted growth of 0.1 mb/d, LPG grew by 80 tb/d annually. Domestic air travel demand is slowly recovering – domestic passenger flights averaged 4,100 in May but remain far below the 10,000 flights recorded before the COVID-19 resurgence in March. Accordingly, jet kerosene demand is still yet to recover from slowdown in April. In May jet kerosene demand declined by 0.4 mb/d annually. Residual fuel oil demand y-o-y growth improved on monthly basis from 20 tb/d in April to 90 tb/d in May.

Graph 4 - 4: China's oil demand, y-o-y change



*Note: * 2022-2023 = Forecast. Source: OPEC.*

Table 4 - 6: China's oil demand*, mb/d

By product	May 21	May 22	Change Growth	May 22/May 21 %
LPG	2.27	2.35	0.08	3.5
Naphtha	1.08	1.18	0.10	8.8
Gasoline	3.32	3.14	-0.18	-5.6
Jet/kerosene	0.92	0.52	-0.41	-44.2
Diesel	3.15	3.22	0.07	2.3
Fuel oil	0.63	0.72	0.09	14.7
Other products	2.12	2.08	-0.04	-1.9
Total	**13.49**	**13.20**	**-0.29**	**-2.2**

*Note: * Apparent oil demand. Totals may not add up due to independent rounding.*
Sources: Argus Global Markets, China OGP (Xnhua News Agency), Facts Global Energy, JODI, National Bureau of Statistics China and OPEC.

Near-term expectations

China's oil demand in April and May continued to decline due to the extension of the zero-COVID-19 policy. In 2Q22, oil demand is expected to contact by 0.1 mb/d from relatively strong annual growth of 0.5 mb/d in 1Q22. Nevertheless, as China proceeds with COVID-19 containment measures, there is some hope that the situation will improve. Combined with expected improvements in GDP growth in 3Q22, the government is also keen to support the economy with stimulus packages.

Overall, mobility is expected to start improving, supply chain bottlenecks are also expected to gradually ease with the expected relaxation of mobility restrictions, thereby supporting the country's industrial sector activity. In 3Q22, oil demand is expected to improve and reach 0.5 mb/d annual growth. Demand is expected to be driven by gasoline resulting from pent-up demand due to COVID-19 lockdowns. Diesel demand is also expected to support gradual improvements in manufacturing and trucking activities during 3Q22. However, in 4Q22, oil demand growth will slow by 0.1 mb/d to 0.4 mb/d annually. In 4Q22, festivities are expected to boost requirements for diesel to support manufacturing requirements for the global market and domestically. However, risks are skewed to the downside due to uncertainties about the COVID-19 containment measures, particularly during 4Q22.

In 2023, China is projected to fully contain the menace of COVID-19, the country should also resume back to its normal economic growth trajectory; with rejuvenation of its industrial activity and ease of trade related bottlenecks. Mobility and air travels are also expected to pick up in China. By 2Q23, China is expected to record a strong oil demand growth of 1.0 mb/d, strongly supported by transportation fuels; gasoline and transportation diesel. Similarly, petrochemical feedstock and jet fuel are also going to support the oil demand recovery in 2023. In 2023, China is forecast to grow by 0.7 mb/d y-o-y, to average 16.0 mb/d.

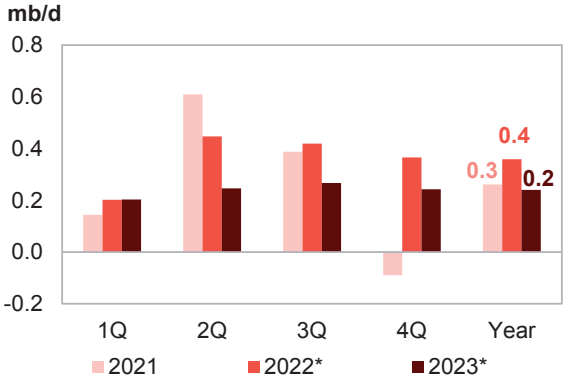
India

Update on the latest developments

India's oil demand jumped 0.8 mb/d, increasing by 22% annually in May from growth of 0.5 mb/d in April, supported by strong economic growth of 7.1% and a continuing recovery from the Omicron variant of COVID-19 as well as a relatively low baseline for the same period in 2021. Demand for diesel, the most widely used oil product in India, rose from 0.2 mb/d in April to 0.4 mb/d in May, y-o-y, the equivalent of 11%. The demand for diesel is higher due to a rise in small-scale industry requirements and the beginning of the harvest season that requires diesel for trucking. Similarly, the firmer demand for diesel was encouraged by lower retail prices after taxes were cut to curb inflation. On the back of a strong mobility recovery, gasoline demand grew by 0.3 mb/d, 48% annually in May.

Gasoline demand growth in May was comparatively higher than the growth of 0.2 mb/d recorded in April. Furthermore, demand was supported by a surge in summer travel to colder areas of the country to escape from the heat and vacations during annual breaks at educational institutions. As the aviation sector opens up, India's overall passenger traffic (both domestic and international) at airports reached 93% of pre-COVID-19 levels in May 2022. Accordingly, jet kerosene demand grew by 70 tb/d, about 32% annually – higher than the 40 tb/d annually recorded in April. However, naphtha contracted by 90 tb/d annually and LPG did not see any sign of improvement in May. Other products recorded strong growth of 0.2 mb/d annually in May.

Graph 4 - 5: India's oil demand, y-o-y change



*Note: * 2022-2023 = Forecast. Source: OPEC.*

Table 4 - 7: India's oil demand, mb/d

By product	May 21	May 22	Change Growth	May 22/May 21 %
LPG	0.93	0.93	0.00	0.1
Naphtha	0.38	0.28	-0.09	-25.1
Gasoline	0.58	0.86	0.28	48.4
Jet/kerosene	0.20	0.27	0.07	32.5
Diesel	1.22	1.62	0.40	33.1
Fuel oil	0.18	0.21	0.03	14.3
Other products	0.28	0.43	0.15	53.9
Total	**3.77**	**4.61**	**0.83**	**22.1**

Note: Totals may not add up due to independent rounding.

Sources: JODI, Petroleum Planning and Analysis Cell of India and OPEC.

Near-term expectations

With strong economic growth of 7.1%, India's oil demand has been rising steadily since the country eased pandemic lockdowns. In 2Q22 and 3Q22, oil demand is expected to be firm and healthy. In 3Q22, oil demand is expected to grow by 0.4 mb/d on the back of healthy economic growth that will lend support for the industrial and agricultural sectors. Diesel demand is expected to be the main driver of oil demand in the 3Q22. Furthermore, mobility activity will be backed by social activities and the continued preference for using personal vehicles over public transport for safety reasons and to avoid heatwaves, implying firm gasoline demand. Additionally, a possible drop in fuel prices due to cuts in fuel taxes will provide additional support for gasoline and diesel demand. Jet kerosene is projected to be supported by improvements in Indian air travel.

Requirements from the residential and industrial sectors are expected to revive demand for light distillates. In 4Q22, oil demand growth is expected to remain at 0.4 mb/d annually. Overall in 2022, the oil demand is expected to grow on average by 0.4 mb/d. Finally, there are strong prospects for oil demand growth in the near future with risks skewed slightly to the upside.

After containment of COVID-19, India is posed to continue along its growth oil demand growth trajectory in 2023. On the back of strong GDP growth and vibrant small scale industrial activities, in 2023 India is forecast to grow by 0.2 mb/d. The 2023, oil demand growth will be strongly supported by mobility driven gasoline and diesel. Light distillates requirements from petrochemical and residential sectors are also expected to play a significant role in 2023 demand growth in India. Finally improvements in air travels will boost demand for jet fuels in 2023.

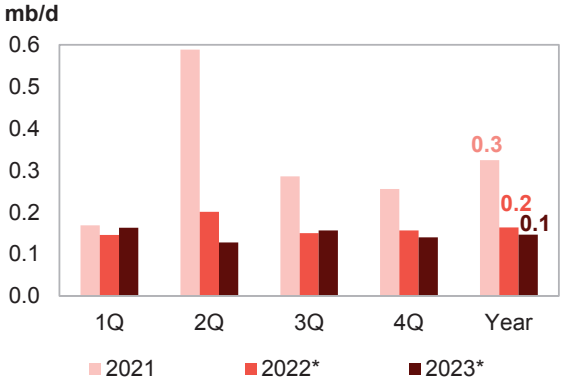
Latin America

Update on the latest developments

Latin America's oil demand increased further in April to rise by 0.3 mb/d y-o-y, above the 0.1 mb/d annually recorded in March, with transportation fuels accounting for most of the growth. April oil demand growth in the region was largely supported by gasoline and jet kerosene. Gasoline increased by 0.1 mb/d, equal to 17% annually, relatively higher than the 0.1 mb/d y-o-y growth in March. Jet kerosene demand increased by 70 tb/d in April against 40 tb/d in March 2022. On a positive note, diesel recorded growth of 10 tb/d, y-o-y in April, compared to a contraction of 10 tb/d annually in March. However, the demand for light distillates – LPG and naphtha – is still sluggish and has not yet recovered from the negative growth recorded in March. Nevertheless, LPG has improved from the 30 tb/d decline in March to a 10 tb/d contraction in April.

Demand increased the most in Brazil (0.14 mb/d y-o-y) and Argentina (0.1 mb/d y-o-y), while other countries in the region posted marginal y-o-y gains. Mobility also improved in March and April as compared to 2020 levels. The manufacturing PMI in Brazil improved from -1.4% in March to -0.5% in April. In Argentina, the manufacturing PMI increased from 3% in March to 5% in April. These factors supported oil demand growth in the Latin American region in April 2022. According to data from IATA's April 2022 Air Passenger Monthly Analysis, Latin American carriers saw appreciable growth in international RPK growth, up 263.2%. Recovery to 2019 levels is progressing in the region, with increased passenger flows coming from Europe, the Middle East and between those regions.

Graph 4 - 6: Latin America's oil demand, y-o-y change



*Note: * 2022-2023 = Forecast. Source: OPEC.*

Near-term expectations

Despite the slowdown in the momentum of economic recovery in Latin America, with current GDP growth in the region pegged at 2.2%, the oil demand recovery will be supported by the acceleration in vaccinations and signs of improvement in mobility and the manufacturing PMI in the region's big consuming countries. Accordingly, the 0.1 mb/d annual oil demand growth recorded in 1Q22 is expected to slightly improve in 2Q22 and subsequent quarters to 0.2 mb/d, annually. The demand growth in the region is expected to be supported by gasoline and jet kerosene as mobility and air travels improves. The prospects for oil demand improvements in the region largely depend on the momentum of the economic recovery and the pace of containment of COVID-19 in several countries.

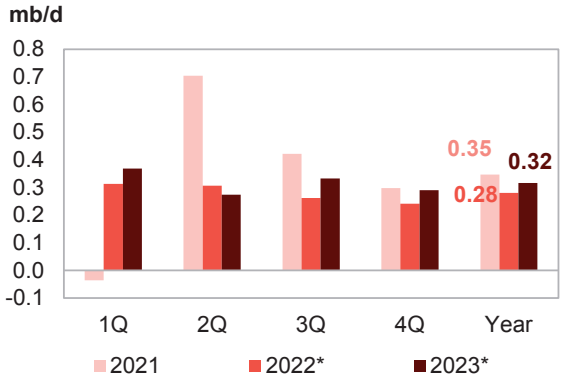
In 2023, the region is projected to improve significantly in its COVID-19 containment, economic growth in the region is also posed to improve significantly. These factors will back the mobility and industrial sector requirements for transportation fuels and other light distillates. In 1Q23, the oil demand is projected to remain at the same level of 0.2 mb/d, y-o-y growth. However, by 4Q23, the oil demand is projected to slow down to 0.1 mb/d, due to winter seasonal slow in demand in the region.

Middle East

Update on the latest developments

Oil demand in Middle East remained firm and continued to improve in April when compared to March 2022. The latest data indicates that oil demand grew by 0.5 mb/d in April, surpassing March by 0.2 mb/d. Oil demand was supported by firm GDP growth in the region's two large economies, Saudi Arabia and the United Arab Emirates (UAE). Mobility activity in the region has also improved significantly with the relaxation of COVID-19 restrictions. On the back of these developments, gasoline grew by 0.13 mb/d, 10% annual growth. The easing of COVID-19 restrictions also helped to reduce supply chain bottlenecks in region, thereby supporting construction and manufacturing activity, helping diesel to grow by 0.1 mb/d in April compared to 80 tb/d in March.

Graph 4 - 7: Middle East's oil demand, y-o-y change



*Note: * 2022-2023 = Forecast. Source: OPEC.*

Middle Eastern airlines recorded a jump in air travel demand y-o-y in April 2022, with revenue passenger kilometres, or RPKs, higher than in March 2022. Accordingly, jet fuel posted growth of 0.14 mb/d in April, compared to 60 tb/d in March. Fuel oil also benefitted from direct burning in power generation and energy-intensive industries in the region. Fuel oil recorded growth of 0.12 mb/d in April, compared to 50 tb/d in March. However, LPG demand remained at 20 tb/d, annually, the same as March. The demand for naphtha is still sluggish, recording a contraction by 20 tb/d annually.

Table 4 - 8: Saudi Arabia's oil demand, mb/d

By product	May 21	May 22	Change Growth	May 22/May 21 %
LPG	0.05	0.06	0.01	17.4
Gasoline	0.46	0.48	0.03	5.8
Jet/kerosene	0.05	0.07	0.02	52.6
Diesel	0.46	0.54	0.08	17.7
Fuel oil	0.61	0.60	-0.01	-1.5
Other products	0.52	0.68	0.16	30.4
Total	**2.15**	**2.43**	**0.28**	**13.1**

Note: Totals may not add up due to independent rounding.

Sources: JODI and OPEC.

Near-term expectations

Going forward, potential positives for oil demand projections in the Middle East are the upward possibilities for overall economic performance, which is anticipated to accelerate in 2H22. Saudi Arabia is expected to maintain strong GDP growth of 9.0% and the UAE 7.0%, GDP growth. In addition, demand is expected to be supported by the full containment of COVID-19 in the region and an expected uptick from the transportation, power and industrial sectors due to summer peak demand for gasoline and distillates. Furthermore, demand for air travel during the annual hajj, with more than 2 million pilgrims expected, will boost jet fuel and other distillates. Already, major airline operators in the region have increased their Saudi Arabian operations in response to large pilgrimage demand. In 3Q22, the demand for oil is expected to grow by 0.3 mb/d annually from 0.2 mb/d in 2Q22. Generally, the overall prospects for oil demand growth in the region are very strong, due to expected healthy GDP growth and successful COVID-19 management.

In 2023, the region is projected to continue with its current strong economic growth momentum, mobility and industrial activity will benefit immensely from the strong economic growth in the region. Furthermore, air travels activity will continue improving in the region. These factors will drive the oil demand in 2023. In 1Q23, the region is forecast to grow by 0.4 mb/d, y-o-y, however, by 2Q23 though 4Q23, the oil demand will remain on average of 0.3 mb/d, annually.

World Oil Supply

Non-OPEC liquids supply growth in 2022 (including processing gains) is forecast at 2.1 mb/d for an average of 65.7 mb/d, which is broadly unchanged from the previous assessment. The upward revisions to China and Canada were offset by downward revision to other countries. Russia's liquids production for the rest of the year poses large uncertainty. Labour, supply chain issues and cost inflation are the primary drivers of uncertainty in the US, however, the current rate of hydraulic fracturing and drilling in the major shale oil areas of the US could support production growth in the coming months. Robust growth in the US oil and gas rig count, as well as an estimated 1,000 monthly hydraulic fracturing operations have continued so far in 2022. Nevertheless, the US liquids supply growth forecast for 2022 was kept unchanged at 1.3 mb/d. The main drivers of liquids supply growth for the year are expected to be the US, Canada, Brazil, China, Kazakhstan and Guyana, while production is expected to decline mainly in Russia, Indonesia and Thailand.

Non-OPEC liquids production in 2023 is expected to grow by 1.7 mb/d to average 67.4 mb/d (including 70 tb/d in processing gains). Liquids supply in the OECD countries is forecast to increase next year by 1.4 mb/d, and the non-OECD region is forecast to grow by 0.2 mb/d. The main drivers for liquids supply growth are expected to be the US (1.1 mb/d), Norway, Brazil, Canada and Guyana, whereby the majority of the increase in the US and other countries is expected to come from current project ramp-ups. Nevertheless, uncertainty regarding the operational aspects of US production and the geopolitical situation in Eastern Europe remains high.

OPEC NGLs and non-conventional liquids production in 2022 is forecast to grow by 0.1 mb/d to average 5.39 mb/d. For 2023, it is forecast to grow by 50 tb/d to average 5.44 mb/d. OPEC-13 crude oil production in June increased by 234 tb/d m-o-m to average 28.72 mb/d, according to available secondary sources.

Preliminary non-OPEC liquids production in June, including OPEC NGLs, is estimated to have increased m-o-m by 1.1 mb/d to average 71.1 mb/d, and is up by 2.5 mb/d y-o-y. As a result, preliminary data indicates that global oil supply in June increased by 1.32 mb/d m-o-m to average 99.82 mb/d, up by 5.13 mb/d y-o-y.

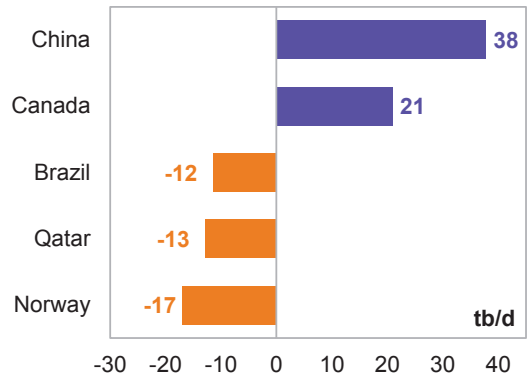
The **non-OPEC supply growth forecast for 2022** remained broadly unchanged from the previous assessment. Production declines in the Middle East and Latin America have been offset by some upward revisions in other countries. Non-OPEC supply is now expected to rise by 2.1 mb/d to average 65.7 mb/d for the year.

In the **OECD**, there have been minor upward and downward revisions in this month's assessment. The main upward adjustment was due to higher production during 2Q22 in Canada and other OECD Europe, which was partially compensated by lower output in Norway. Other OECD countries remained predominantly unchanged in terms of growth.

The **non-OECD** supply forecast for 2022 was revised down by 20 tb/d, mainly due to a downward revision for Latin America, the Middle East and other Asia. However, China accounted for the major upward revision this month.

With this, the non-OPEC liquids supply forecast for 2022 remained unchanged to average 65.7 mb/d, showing y-o-y growth of 2.1 mb/d.

Graph 5 - 1: Major revisions to annual supply change forecast in 2022*, MOMR Jul 22/Jun 22

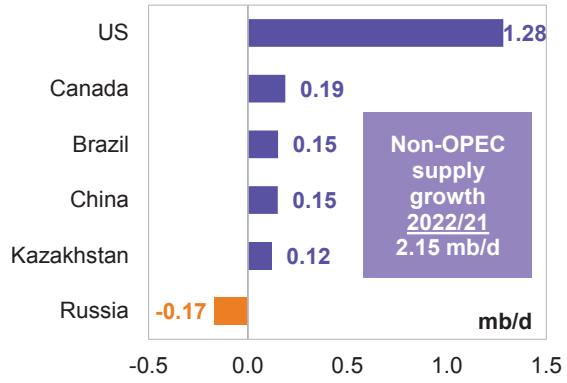


*Note: * 2022 = Forecast. Source: OPEC.*

Key drivers of growth and decline

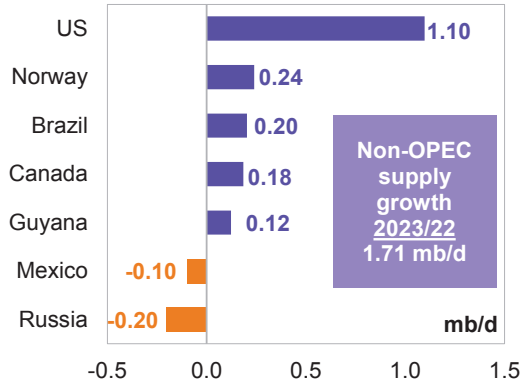
The **key drivers of non-OPEC liquids supply growth in 2022** are projected to be the US, Canada, Brazil, China, Kazakhstan and Guyana, while oil production is expected to decline mainly in Russia, Thailand and Indonesia.

Graph 5 - 2: Annual liquids production changes for selected countries in 2022*



*Note: * 2022 = Forecast. Source: OPEC.*

Graph 5 - 3: Annual liquids production changes for selected countries in 2023*



*Note: * 2023 = Forecast. Source: OPEC.*

For **2023**, the key drivers of non-OPEC supply growth are forecast to be the US, Norway, Brazil, Canada and Guyana, while oil production is projected to decline mainly in Russia, Mexico and Azerbaijan.

Non-OPEC liquids production in 2022 and 2023

Table 5 - 1: Non-OPEC liquids production in 2022*, mb/d

							Change 2022/21	
Non-OPEC liquids production	**2021**	**1Q22**	**2Q22**	**3Q22**	**4Q22**	**2022**	**Growth**	**%**
Americas	25.16	25.86	26.35	26.95	27.46	26.66	1.50	5.97
of which US	*17.75*	*18.26*	*18.94*	*19.27*	*19.67*	*19.04*	*1.28*	*7.23*
Europe	3.76	3.73	3.58	3.79	4.12	3.81	0.05	1.27
Asia Pacific	0.51	0.49	0.52	0.56	0.54	0.53	0.01	2.80
Total OECD	**29.43**	**30.08**	**30.45**	**31.30**	**32.12**	**30.99**	**1.56**	**5.31**
China	4.31	4.49	4.49	4.42	4.43	4.46	0.15	3.49
India	0.77	0.77	0.78	0.80	0.83	0.79	0.02	2.72
Other Asia	2.41	2.37	2.36	2.36	2.35	2.36	-0.05	-1.90
Latin America	5.95	6.14	6.22	6.21	6.43	6.25	0.30	4.96
Middle East	3.24	3.29	3.31	3.38	3.38	3.34	0.10	3.14
Africa	1.35	1.33	1.29	1.31	1.32	1.31	-0.03	-2.55
Russia	10.80	11.33	10.63	10.29	10.29	10.63	-0.17	-1.57
Other Eurasia	2.93	3.06	2.91	3.17	3.22	3.09	0.16	5.38
Other Europe	0.11	0.11	0.11	0.10	0.10	0.11	-0.01	-6.36
Total Non-OECD	**31.87**	**32.88**	**32.10**	**32.04**	**32.35**	**32.34**	**0.47**	**1.47**
Total Non-OPEC production	61.30	62.96	62.54	63.34	64.48	63.33	2.03	3.32
Processing gains	2.29	2.40	2.40	2.40	2.40	2.40	0.11	4.90
Total Non-OPEC liquids production	**63.59**	**65.36**	**64.94**	**65.74**	**66.88**	**65.73**	**2.15**	**3.37**
Previous estimate	63.60	65.37	64.80	65.79	67.00	65.74	2.15	3.38
Revision	-0.01	-0.01	0.14	-0.05	-0.12	-0.01	0.00	0.00

*Note: * 2022 = Forecast. Totals may not add up due to independent rounding. Source: OPEC.*

Table 5 - 2: Non-OPEC liquids production in 2023*, mb/d

Non-OPEC liquids production	2022	1Q23	2Q23	3Q23	4Q23	2023	Change 2022/21 Growth	Change 2022/21 %
Americas	26.66	27.65	27.59	27.88	28.24	27.84	1.18	4.43
of which US	*19.04*	*19.85*	*20.06*	*20.20*	*20.43*	*20.14*	*1.10*	*5.77*
Europe	3.81	4.14	4.05	3.96	4.06	4.05	0.25	6.46
Asia Pacific	0.53	0.54	0.50	0.53	0.49	0.51	-0.01	-2.20
Total OECD	**30.99**	**32.32**	**32.15**	**32.37**	**32.79**	**32.41**	**1.41**	**4.56**
China	4.46	4.51	4.50	4.47	4.47	4.49	0.03	0.64
India	0.79	0.82	0.81	0.80	0.78	0.80	0.01	1.08
Other Asia	2.36	2.36	2.32	2.29	2.27	2.31	-0.05	-1.96
Latin America	6.25	6.40	6.60	6.69	6.75	6.61	0.36	5.82
Middle East	3.34	3.37	3.39	3.40	3.40	3.39	0.05	1.49
Africa	1.31	1.32	1.34	1.35	1.37	1.35	0.04	2.69
Russia	10.63	10.42	10.41	10.42	10.46	10.43	-0.20	-1.93
Other Eurasia	3.09	3.19	3.06	3.00	3.09	3.08	-0.01	-0.27
Other Europe	0.11	0.10	0.10	0.10	0.10	0.10	0.00	-2.83
Total Non-OECD	**32.34**	**32.49**	**32.54**	**32.54**	**32.70**	**32.57**	**0.22**	**0.69**
Total Non-OPEC production	63.33	64.81	64.68	64.90	65.49	64.97	1.64	2.59
Processing gains	2.40	2.47	2.47	2.47	2.47	2.47	0.07	2.96
Total Non-OPEC liquids production	**65.73**	**67.28**	**67.15**	**67.37**	**67.96**	**67.44**	**1.71**	**2.60**
Previous estimate	65.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Revision	-0.01	67.28	67.15	67.37	67.96	67.44	1.71	2.60

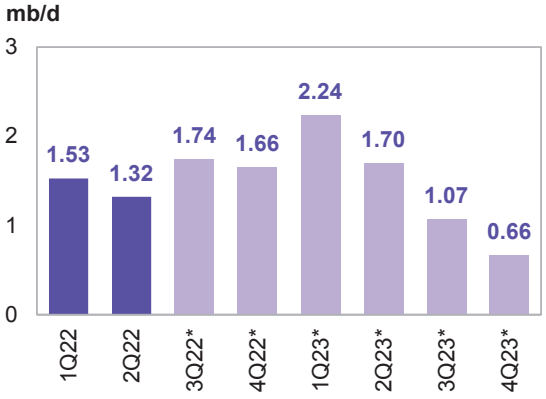
*Note: * 2022-2023 = Forecast. Totals may not add up due to independent rounding. Source: OPEC.*

OECD

OECD liquids production in 2022 is forecast to increase by 1.6 mb/d y-o-y to average 31 mb/d. This has been revised up by a minor 19 tb/d, compared to a month earlier, on the back of upward revisions for Canada and other OECD Europe, and was partially offset by lower-than-expected output in Norway. OECD Americas was revised up by a minor 22 tb/d, compared to last month's assessment.

Based on these revisions, OECD Americas is forecast to grow by 1.5 mb/d to average 26.7 mb/d. Oil production in OECD Europe and OECD Asia Pacific is anticipated to grow y-o-y by 48 tb/d and 14 tb/d to average 3.8 mb/d and 0.5 mb/d, respectively.

Graph 5 - 4: OECD quarterly liquids supply, y-o-y changes



*Note: * 3Q22-4Q23 = Forecast. Source: OPEC.*

For **2023**, oil production in the OECD is likely to grow by 1.4 mb/d to average 32.4 mb/d, with growth from OECD Americas of 1.2 mb/d to average 27.8 mb/d. Yearly oil production in OECD Europe is anticipated to grow by 0.2 mb/d to average 4.0 mb/d, while OECD Asia Pacific is expected to decline by 15 tb/d y-o-y to average 0.5 mb/d.

OECD Americas

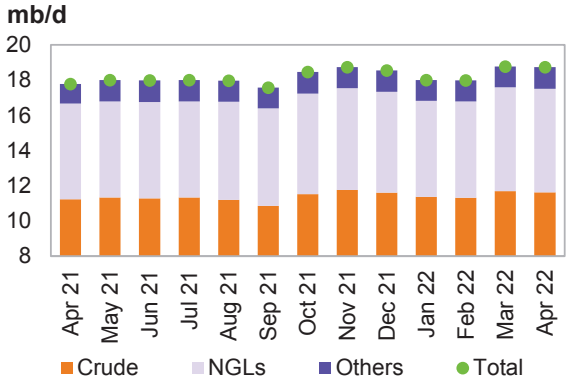
US

US liquids production declined by a minor 40 tb/d m-o-m in **April 2022** to average 18.7 mb/d and was higher by 0.9 mb/d compared with April 2021.

Crude oil and condensate production declined in **April 2022** by 60 tb/d m-o-m to average 11.6 mb/d, and was up by 0.4 mb/d y-o-y.

Regarding the **crude and condensate production breakdown by region (PADDs)**, production increased mainly in the US Gulf Coast (USGC), up by 151 tb/d to average 8.4 mb/d. The Rocky Mountains and East Coast showed slight decreases, while the West Coast remained broadly unchanged. However, declines of 195 tb/d were recorded in the Midwest (North Dakota). Production growth in the main regions was primarily due to the better weather conditions and higher drilling activities, while the April blizzards in North Dakota were the main source of production declines this month.

Graph 5 - 5: US monthly liquids output by key component



Source: OPEC.

NGL production was down by 32 tb/d m-o-m to average 5.9 mb/d in April, which was higher by 0.4 mb/d y-o-y. Production of non-conventional liquids (mainly ethanol) increased by 52 tb/d m-o-m to average 1.2 mb/d in April, according to the US Department of Energy (DoE). Preliminary estimates see non-conventional liquids averaging 1.2 mb/d in May 2022, up by 25 tb/d compared to the previous month.

Production in the Gulf of Mexico (GoM) recovered m-o-m by 72 tb/d in April to average 1.8 mb/d on the back of a partial return from maintenance in the Shell platforms, while in the **onshore lower 48**, April production decreased m-o-m by 134 tb/d to average 9.4 mb/d.

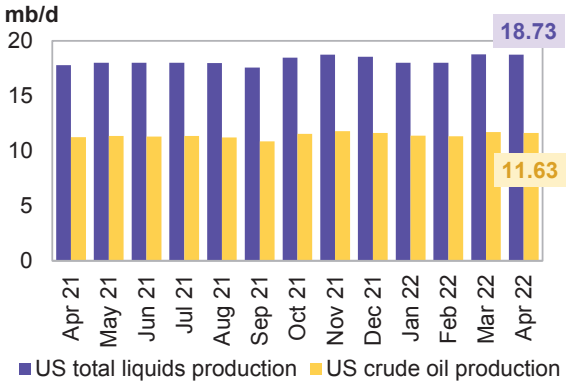
Looking at **individual states**, oil production in New Mexico increased by 39 tb/d m-o-m to average 1.5 mb/d, 333 tb/d higher than a year ago. Production in Texas was up by 35 tb/d to average 5.0 mb/d, 178 tb/d higher than a year ago. Production in North Dakota decreased by 214 tb/d m-o-m to average 0.9 mb/d, down by 143 tb/d y-o-y. Production in Oklahoma was up by 8 tb/d to average 0.4 mb/d. Oil output in Alaska remained broadly unchanged, while Colorado showed a marginal m-o-m decline of 13 tb/d.

Table 5 - 3: US crude oil production by selected state and region, tb/d

State	Apr 21	Mar 22	Apr 22	Change m-o-m	Change y-o-y
Texas	4,837	4,980	5,015	*35*	*178*
Gulf of Mexico (GOM)	1,768	1,691	1,763	*72*	*-5*
New Mexico	1,174	1,468	1,507	*39*	*333*
North Dakota	1,037	1,108	894	*-214*	*-143*
Alaska	446	440	442	*2*	*-4*
Colorado	403	434	421	*-13*	*18*
Oklahoma	399	410	418	*8*	*19*
Total	**11,230**	**11,688**	**11,628**	***-60***	***398***

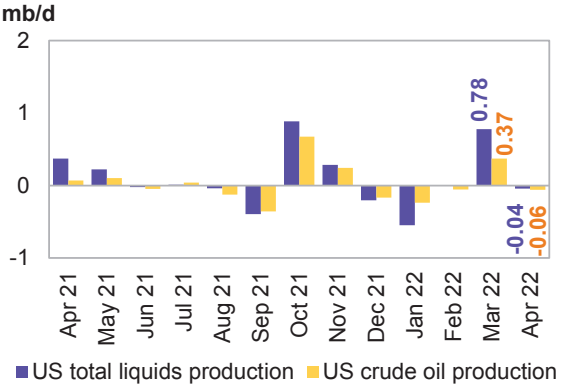
Sources: EIA and OPEC.

Graph 5 - 6: US monthly crude oil and total liquids supply



Sources: EIA and OPEC.

Graph 5 - 7: US monthly crude oil and total liquids supply, m-o-m changes



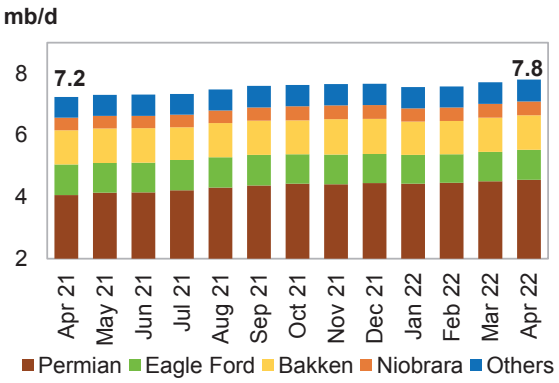
Sources: EIA and OPEC.

US tight crude output in **April 2022** increased by 85 tb/d m-o-m to average 7.8 mb/d, which was 0.6 mb/d higher than the same month a year earlier, according to EIA estimates.

The m-o-m increase from shale and tight formations through horizontal wells came mostly from the Permian, which increased by 50 tb/d to average 4.6 mb/d. This was up by 0.5 mb/d, y-o-y.

In the Williston Basin, production in the Bakken shale increased marginally by 13 tb/d to average 1.1 mb/d, up by a minor 10 tb/d, y-o-y. Tight crude output at Eagle Ford in Texas rose by 23 tb/d to average 1.0 mb/d down by 28 tb/d y-o-y, while production in Niobrara-Codell in Colorado and Wyoming was down marginally by 8 tb/d to average 0.4 mb/d.

Graph 5 - 8: US tight crude output breakdown



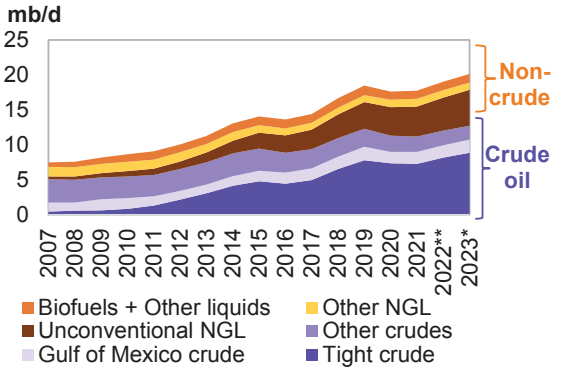
Sources: EIA, Rystad Energy and OPEC.

US liquids production in 2022, excluding processing gains, is forecast to grow y-o-y by 1.3 mb/d to average 19.0 mb/d, unchanged from the previous assessment.

The 2022 gains are due primarily to expected tight crude production growth of 0.9 mb/d, to average 8.2 mb/d, NGL growth, mainly from unconventional basins, of 0.4 mb/d, to average 5.8 mb/d, and projected growth of 0.1 mb/d in the GoM. Non-conventional liquids are projected to grow by 40 tb/d to average 1.2 mb/d.

However, the expected growth will be partially offset by natural declines in onshore conventional fields of 0.1 mb/d y-o-y.

Graph 5 - 9: US liquids supply developments by component



*Note: * 2022-2023 = Forecast.*
Source: OPEC.

Given the current pace of drilling and well completions in oil fields, **production of crude oil and condensate** is forecast to grow by 0.8 mb/d y-o-y to average 12.0 mb/d in 2022. This forecast assumes ongoing capital discipline, current inflation rates, continuing supply chain issues and the oil field service section limitations (labour and equipment).

US liquids production in 2023, excluding processing gains, is expected to grow by 1.1 mb/d y-o-y to average 20.1 mb/d, assuming the current level of drilling activities and lower supply chain issues in the prolific Permian Basin, Eagle Ford and Bakken shale sites. Crude oil output is anticipated to jump by 0.7 mb/d y-o-y to average 12.7 mb/d. At the same time, NGL production and non-conventional liquids, particularly ethanol, are projected to increase by 0.4 mb/d and 40 tb/d y-o-y to average 6.2 mb/d and 1.3 mb/d, respectively. Average tight crude output in 2023 is expected at 8.9 mb/d, up by 0.7 mb/d.

Table 5 - 4: US liquids production breakdown, mb/d

US liquids	2021	Change 2021/20	2022*	Change 2022/21	2023*	Change 2023/22
Tight crude	7.29	-0.04	8.18	0.88	8.89	0.71
Gulf of Mexico crude	1.70	0.06	1.77	0.06	1.86	0.09
Conventional crude oil	2.19	-0.11	2.10	-0.09	2.00	-0.10
Total crude	**11.19**	**-0.10**	**12.04**	**0.85**	**12.74**	**0.70**
Unconventional NGLs	4.28	0.20	4.70	0.42	5.12	0.42
Conventional NGLs	1.12	0.03	1.10	-0.02	1.04	-0.05
Total NGLs	**5.40**	**0.22**	**5.80**	**0.40**	**6.16**	**0.36**
Biofuels + Other liquids	1.17	0.02	1.21	0.04	1.25	0.04
US total supply	**17.75**	**0.15**	**19.04**	**1.29**	**20.14**	**1.10**

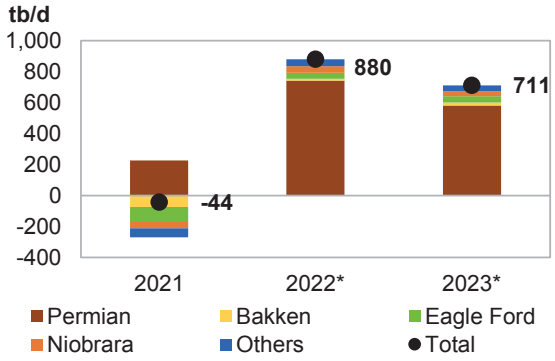
*Note: * 2022-2023 = Forecast. Sources: EIA, OPEC and Rystad Energy.*

US tight crude production in the Permian in 2022 is estimated to have increased by 0.7 mb/d to 4.9 mb/d and is forecast to grow by 0.6 tb/d y-o-y to average 5.5 mb/d in 2023.

The negative growth in Bakken shale production during 2020 and 2021 is expected to change in 2022, and is now estimated to average 1.1 mb/d in 2022, which is still lower than the pre-pandemic average output of 1.4 mb/d. For 2022, tight crude production from the Bakken shale is forecast to grow by 11 tb/d on the back of increased drilling activity in North Dakota and available DUC wells, despite the impact of spring blizzards in April. Growth of 20 tb/d for 2023 is anticipated, to average 1.1 mb/d.

The Eagle Ford output in Texas recorded at 1.2 mb/d in 2019, experienced declines in 2020 and 2021, but is forecast to expand in 2022 by 39 tb/d to average 1.0 mb/d. Quite the same growth is expected for 2023, by 40 tb/d to average 1.0 mb/d.

Graph 5 - 10: US tight crude output by shale play, y-o-y changes



*Note: * 2022-2023 = Forecast.*
Sources: EIA, Rystad Energy and OPEC.

Production in the Niobrara, is forecast to grow by 43 tb/d in 2022 and 30 tb/d in 2023, y-o-y, to average 456 tb/d and 486 tb/d, respectively. Other shale plays are expected to show marginal increases totalling 45 tb/d and 40 tb/d in 2022 and 2023, given current drilling and completion activities.

Table 5 - 5: US tight oil production growth, mb/d

US tight oil	2021	Change 2021/20	2022*	Change 2022/21	2023*	Change 2023/22
Permian tight	4.15	0.23	4.89	0.74	5.47	0.58
Bakken shale	1.11	-0.07	1.12	0.01	1.14	0.02
Eagle Ford shale	0.96	-0.10	1.00	0.04	1.04	0.04
Niobrara shale	0.41	-0.04	0.46	0.04	0.49	0.03
Other tight plays	0.67	-0.06	0.72	0.05	0.76	0.04
Total	**7.29**	**-0.04**	**8.17**	**0.88**	**8.89**	**0.71**

*Note: * 2022-2023 = Forecast. Source: OPEC.*

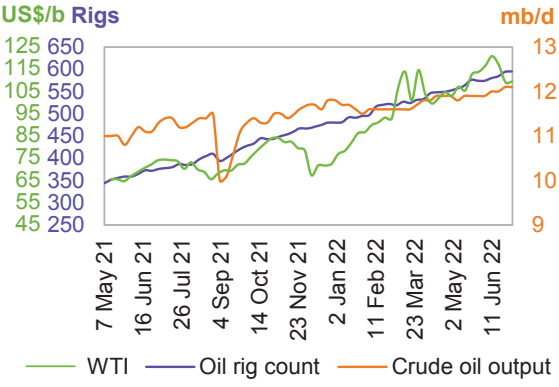
US rig count, spudded, completed, DUC wells and fracking activity

Total **US active drilling rigs** decreased by 3 units to 750 rigs in the week ending 1 July, but were up by 275 rigs compared to a year ago. The number of active offshore rigs rose by one w-o-w to 17, three rigs more than the same month in 2021. On the other hand, on shore oil and gas rigs dropped by four w-o-w to stand at 730 rigs, with three rigs in inland waters.

The **US horizontal rig count** was reduced by three rigs w-o-w to 682 rigs, compared with 429 horizontal rigs a year ago. The number of drilling rigs for oil climbed by one to 595 w-o-w, while gas drilling rigs were reduced by four to 153.

The rig count in the Permian remained unchanged w-o-w at 349 rigs. At the same time, the number of active rigs remained unchanged at 38 in the Williston basin and at 16 in the DJ-Niobrara basins. However, there were 4 fewer rigs in the Eagle Ford at 68 and 5 less in the Cana Woodford at 27. Four oil rigs have been operating in the Barnett basin.

Graph 5 - 11: US weekly rig count vs. US crude oil output and WTI price

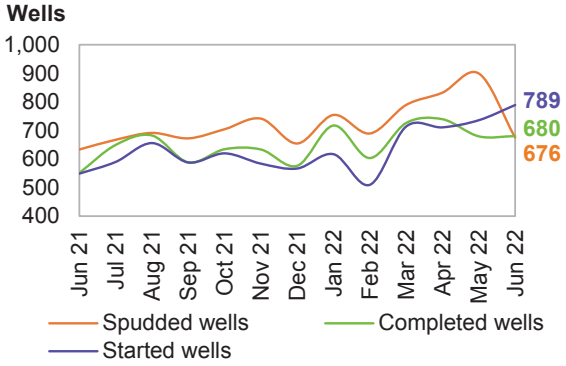


Sources: Baker Hughes, EIA and OPEC.

Drilling and completion (D&C) activities for spudded, completed and started wells in all US shale plays, based on the EIA-DPR regions, saw 863 horizontal wells spudded in May 2022 (as per preliminary data), up by 67 m-o-m, and 61% higher than in May 2021.

In May 2022, preliminary data indicates a lower number of completed wells at 679 m-o-m, but up by 15% y-o-y. Moreover, the number of started wells was estimated at 736, which is 36% higher than in May 2021. Preliminary data for June estimates 676 spudded, 680 completed and 789 started wells, according to Rystad Energy.

Graph 5 - 12: Spudded, completed and started wells in US shale plays

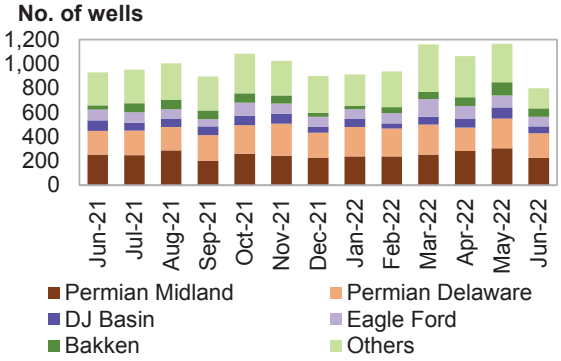


Note: May 22-Jun 22 = Preliminary data.
Sources: Rystad Energy and OPEC.

In terms of identified **US oil and gas fracking operations by region**, Rystad Energy reported that following a peak in January 2020, 1,160 well were fracked in April 2022, and 1,065 and 1,166 wells started to frack in May and June, respectively. These preliminary numbers are based on analysis of high-frequency satellite data.

Preliminary data on fracking in May shows that 305 and 243 wells were fracked in the Permian Midland Tight and Permian Delaware Tight, respectively. In comparison with April, there was a jump of 51 wells fracked in the Delaware and a rise of 23 wells fracked in the Midland tight, according to preliminary data. Data also indicated that 93 wells were fracked in the DJ Basin, 98 in the Eagle Ford and 110 in the Bakken during May.

Graph 5 - 13: Fracked wells count per month



Note: May 22-Jun 22 = Preliminary data.
Sources: Rystad Energy Shale Well Cube and OPEC.

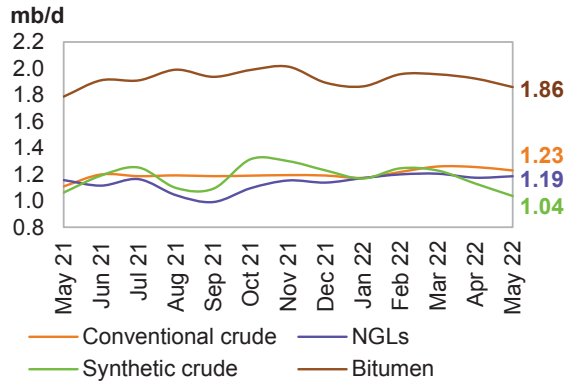
Canada

Canada's liquids production in **May** is estimated to have declined by 173 tb/d m-o-m to average 5.3 mb/d. However, this drop was less than initially expected.

Crude bitumen production and synthetic crude output decreased by 64 tb/d and 94 tb/d, respectively. Taken together, crude bitumen and synthetic crude production declined by 158 tb/d to 3.0 mb/d. At the same time, production of conventional crude decreased slightly by 26 tb/d, while NGL output increased by 11 tb/d to average 1.2 mb/d each.

Non-mining crude oil and condensate production in Alberta touched 3.2 mb/d in April on the back of robust thermal oil sands output and conventional crude, however, due to the maintenance season the output was subjected to a 0.3 mb/d decline in May. Seasonal turnarounds in the main sand mine facilities started in April and are expected to reduce total output in 2Q22. However, project ramp-ups and optimization in oil sands output are expected to drive production in 4Q22.

Graph 5 - 14: Canada's monthly liquids production development by type

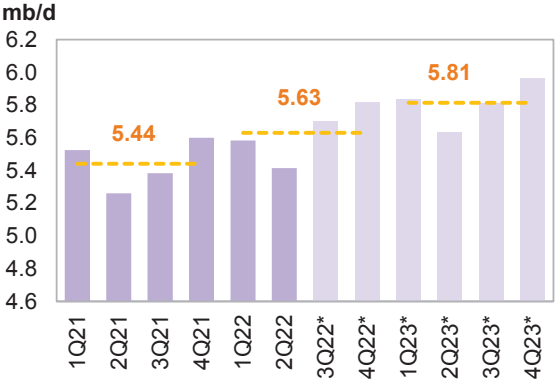


Sources: National Energy Board and OPEC.

Canadian liquids supply in **2022** is forecast to grow by 0.2 mb/d to average 5.6 mb/d, up by 20 tb/d compared to the previous assessment. Thermal oil sands projects are expected to increase output up to December, driven primarily by the return of Cenovus' Christina Lake SAGD project from maintenance in 2Q22 and continued production ramp-ups at CNOOC's Long Lake southwest expansion.

For **2023**, Canada's liquids production is forecast to gradually increase at a similar pace compared with 2022, rising by 0.2 mb/d to average 5.8 mb/d. Incremental production will come mainly from Alberta's oil sands, which saw average output of 3.1 mb/d in 1Q22 before the beginning of the turnarounds.

Graph 5 - 15: Canada's quarterly liquids production and forecast



*Note: * 3Q22-4Q23 = Forecast. Source: OPEC.*

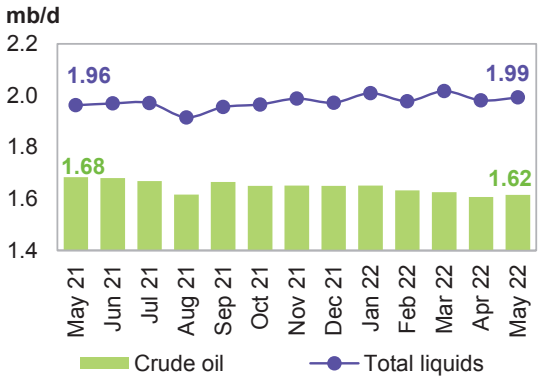
Mexico

Mexico's crude output rose slightly in **May** by 9 tb/d to average 1.6 mb/d, while NGL output increased by a minor 2 tb/d. Therefore, Mexico's total liquids output in May increased by 11 tb/d m-o-m to average 1.99 mb/d, according to national oil company Pemex.

For **2022**, liquids production in Mexico is forecast to grow by 30 tb/d to average 2.0 mb/d, unchanged from the previous month. Production from new projects like Esah and Suuk is forecast to support production ramp-ups from Ichalkil-Pokoch, Area 1, Hokchi, Hok and Mulach, all located offshore.

For **2023**, liquids production is forecast to decline by 0.1 mb/d to average 1.9 mb/d. Pemex' total crude production decline in mature fields like Ku-Maloob-Zaap, Abkatun-Pol-Chuc, and Integral Yaxche-Xanab is forecast to outweigh production ramp-ups in Area-1 and Hokchi.

Graph 5 - 16: Mexico's monthly liquids and crude production development



Sources: PEMEX and OPEC.

OECD Europe

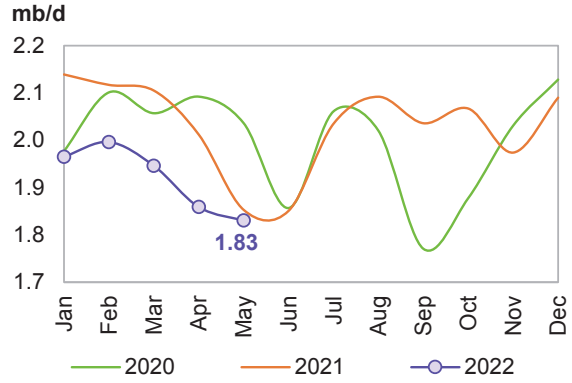
Norway

Norwegian liquids production in **May** declined by 28 tb/d m-o-m to average 1.8 mb/d. This was due to summer maintenance in offshore platforms and some operators prioritizing gas production.

Norway's crude production decreased by 43 tb/d m-o-m in May to average 1.6 mb/d, down by 49 tb/d y-o-y. Oil production in May was 2.4% lower than the Norwegian Petroleum Directorate's (NPD) forecast.

On the other hand, production of NGLs and condensates marginally increased by 15 tb/d m-o-m to average 0.2 mb/d, according to NPD data.

Graph 5 - 17: Norway's monthly liquids production development



Sources: NPD and OPEC.

For **2022**, growth forecast has been revised down by 17 tb/d m-o-m based on lower-than-expected output for 2Q22. Production is now expected to grow by 25 tb/d y-o-y and average 2.1 mb/d. Njord and Nova are two main start-ups this year that continue to ramp up gradually. Growth is expected in 4Q22 with the return from maintenance and when the second phase of the Johan Sverdrup field development starts production.

For **2023**, Norwegian liquids production is forecast to grow by 0.24 mb/d to average 2.3 mb/d. Plenty of small-to-large projects are scheduled to ramp up in 2023 in the Njord, Nova, Ringhorne, Alvheim, Oseberg and Snohvit fields, however the Johan Sverdrup is projected to be the main source of output increases for the year.

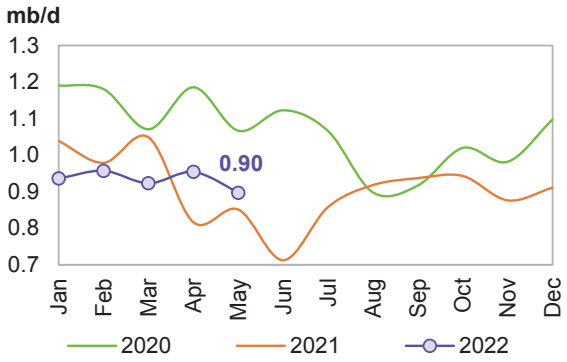
UK

UK liquids production decreased in **May** by 57 tb/d m-o-m to average 0.9 mb/d. Crude oil output decreased by 47 tb/d m-o-m to average 0.8 mb/d, according to official data, and was up by 23 tb/d y-o-y. NGL output was also down slightly by 10 tb/d to 82 tb/d.

For **2022**, UK liquids production is forecast to grow by 30 tb/d to average 0.94 mb/d, up by a minor 9 tb/d m-o-m, due to a revision to 1Q22, and following two consecutive years of heavy declines. Low investment levels, COVID-19-related delays and poor mature reservoir performance have pressured the growth forecast.

For **2023**, UK liquids production is forecast to stay steady for an average of 0.94 mb/d. Production ramp-ups will be seen in the Penguins oil field (Redevelop), ETAP, Clair, the Schiehallion quad and at some other small fields. However, lliquids production in the UK is expected to continue to face challenges, given an inadequate number of new projects and low investment levels.

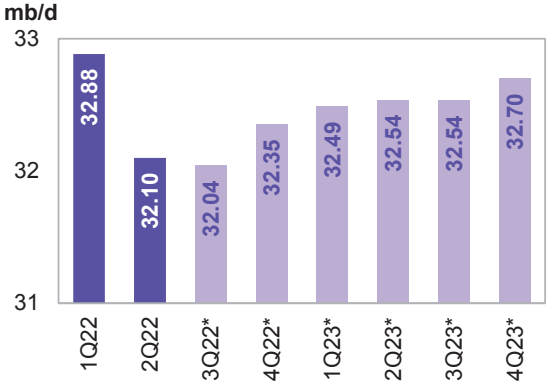
Graph 5 - 18: UK monthly liquids production development



Sources: Department of Energy & Climate Change and OPEC.

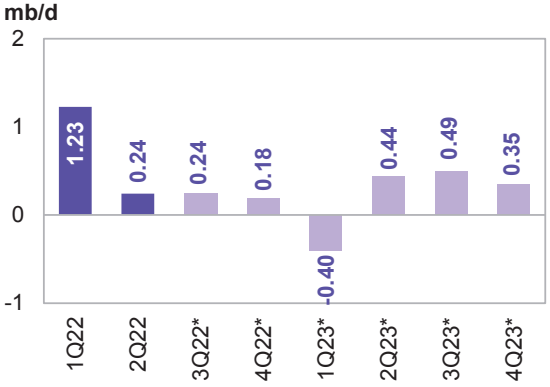
Non-OECD

Graph 5 - 19: Non-OECD quarterly liquids production and forecast



*Note: * 3Q22-4Q23 = Forecast. Source: OPEC.*

Graph 5 - 20: Non-OECD quarterly liquids supply, y-o-y changes

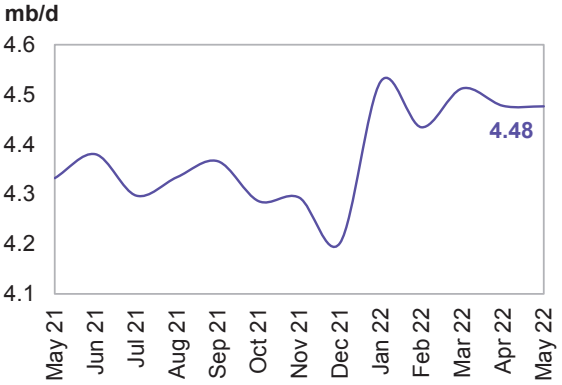


*Note: * 3Q22-4Q23 = Forecast. Source: OPEC.*

China

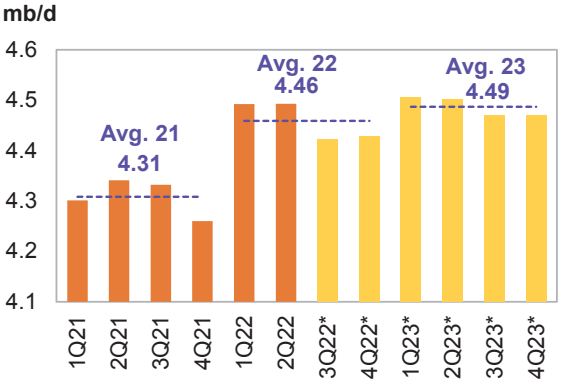
China's liquids production remained unchanged m-o-m in **May** to average 4.5 mb/d, which was up by 144 tb/d y-o-y, according to official data. Crude oil output in May averaged 4.1 mb/d, unchanged from the previous month, and higher by 127 tb/d y-o-y. Liquids production over the first five months of the year averaged 4.5 mb/d, higher by 5% compared to last year.

Graph 5 - 21: China's monthly liquids production development



Sources: CNPC and OPEC.

Graph 5 - 22: China's quarterly liquids production and forecast



*Note: * 3Q22-4Q23 = Forecast. Sources: CNPC and OPEC.*

For **2022**, growth of 150 tb/d is forecast for an average of 4.5 mb/d, revised up by 38 tb/d on higher production expectations for 2Q22 and 3Q22 compared to the previous assessment. Natural decline rates are expected to be offset by Chinese companies' investments, leading to additional in-fill wells and EOR projects.

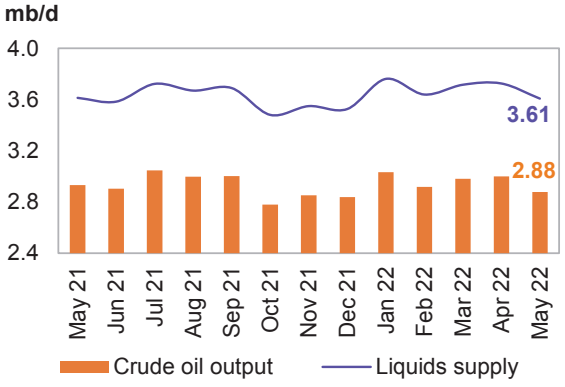
For **2023**, y-o-y growth of 30 tb/d is forecast for an average of 4.5 m/d. For the next year, Bozhong 29-6, Wushi 17-2 and Kenli 10-1N are planned to come on stream under CNOOC. At the same time, the main ramp-ups are expected from the Changqing, Jilin and Liaohe projects, which are managed by Petro China.

Latin America

Brazil

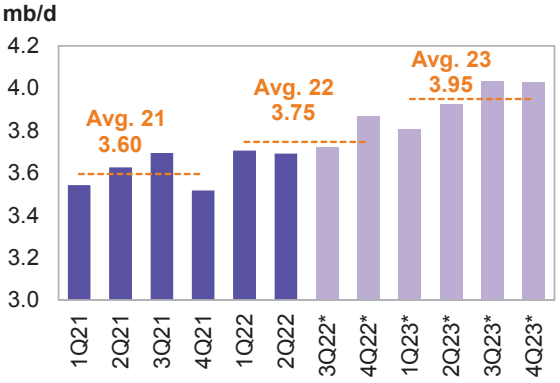
Brazil's crude output in **May** decreased by 121 tb/d m-o-m to average 2.9 mb/d. NGL production remained steady at average of 98 tb/d and is also expected to remain flat in June. Biofuel output (mainly ethanol) remained unchanged in May to average 632 tb/d, with preliminary data showing a flat trend in June as well. Therefore, in May, total liquids production decreased by 119 tb/d to average 3.6 mb/d, broadly unchanged y-o-y. This was mainly due to interruptions in offshore maintenance at the Tupi field.

Graph 5 - 23: Brazil's monthly liquids production development by type



Sources: ANP, Petrobras and OPEC.

Graph 5 - 24: Brazil's quarterly liquids production



*Note: * 3Q22-4Q23 = Forecast. Sources: ANP and OPEC.*

For **2022,** Brazil's liquids supply, including biofuels, is forecast to increase by 0.2 mb/d y-o-y to average 3.8 mb/d, revised down by 12 tb/d, due to lower production in May. Growth in 2022 will be driven by the continued ramp-up of the Sepia field, which came online in August 2021, along with the start-ups of Mero 1 and Peregrino Phase 2 in the pre-salt Santos basin. FPSO Guanabara MV31 deployed for operations at the Mero Field in the giant pre-salt region of the Santos Basin off the coast of Brazil, achieved first oil production and started charter services on 1 May, according to the Offshore Magazine.

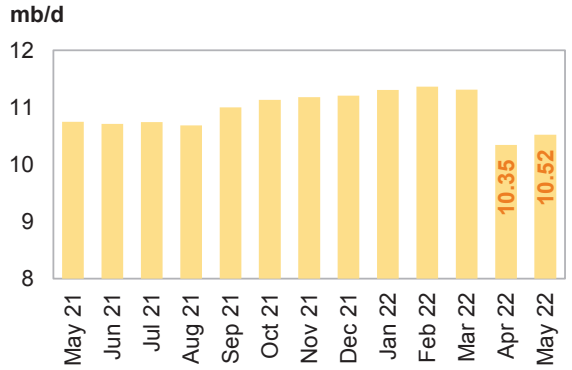
For **2023**, Brazil's liquids supply forecast, including biofuels, is forecast to increase by 0.2 mb/d y-o-y to average 3.9 mb/d. Crude oil output is expected to increase through production ramp-ups in the Mero

(Libra NW), Buzios (Franco), Tupi (Lula), Peregrino and Sepia fields. The Itapu (Florim) field discovered in 2013 in the Santos basin is expected to start up production in 2023 with peak capacity of 130 tb/d by 2025.

Russia

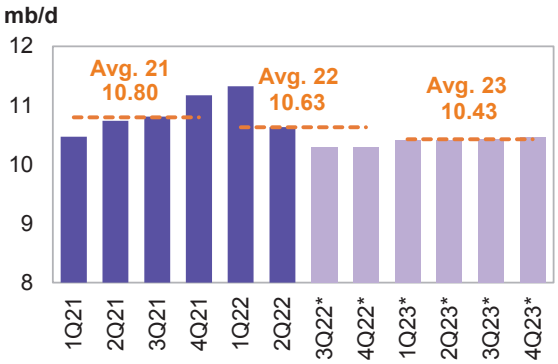
Russia's liquids production in May increased m-o-m by 175 tb/d to average 10.5 mb/d. This includes 9.3 mb/d of crude oil and condensate, and 1.3 mb/d of NGLs. A preliminary estimate for Russia's crude and condensate production in June 2022 shows an increase of 500 tb/d m-o-m for crude and condensate to average 9.8 mb/d, and around a 14 tb/d rise is expected for NGLs.

Graph 5 - 25: Russia's monthly liquids production



Sources: Nefte Compass, The Ministry of Energy of the Russian Federation and OPEC.

Graph 5 - 26: Russia's quarterly liquids production



*Note: * 3Q22-4Q23 = Forecast.*
Sources: Nefte Compass and OPEC.

Russian liquids output in **2022** is forecast to decrease by 0.2 mb/d y-o-y to average 10.6 mb/d, unchanged from the previous month's assessment.

For **2023**, Russian liquids production is forecast to decrease by 0.2 mb/d to average 10.4 mb/d. It should be noted that the Russian oil forecast is subject to high uncertainty.

Caspian

Kazakhstan & Azerbaijan

Liquids output in Kazakhstan increased by 148 tb/d to average 1.9 mb/d in **May**. Crude production rose by 109 tb/d m-o-m to average 1.5 mb/d. Production of NGLs increased by 39 tb/d m-o-m to average 0.4 mb/d.

Kazakhstan's liquids supply forecast for **2022** is forecast to grow by 120 tb/d to average 1.95 mb/d, unchanged from the previous month's assessment.

For **2023**, liquids supply is forecast to increase by 60 tb/d, mainly due to production ramp ups in the Kashagan oil field. Oil production in the Tengiz field and gas condensate output in the Karachaganak field are also expected to rise marginally.

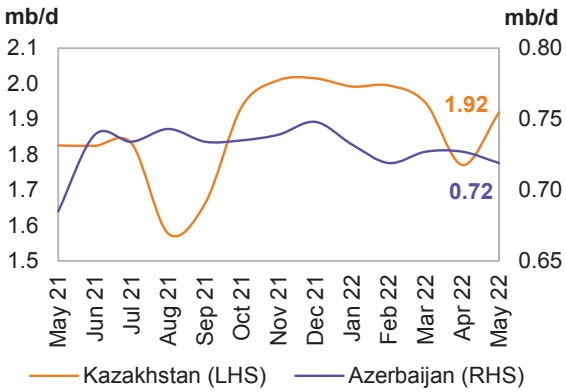
Azerbaijan's liquids production in May declined by a minor 8 tb/d m-o-m to average 0.7 mb/d, but was up by 34 tb/d y-o-y. Crude production decreased by 8 tb/d m-o-m to average 571 tb/d, while NGL output averaged unchanged at 148 tb/d, according to official sources.

No new projects are expected to come online in the country in 2022, and the main declines in the legacy fields are expected to be offset by ramp-ups in other fields, such as Shah Deniz Phase 2.

Azerbaijan's liquids production is expected to increase in June 2022 to average 0.8 mb/d, according to preliminary data.

For **2022**, liquids supply in Azerbaijan is forecast to grow by 47 tb/d y-o-y to average 0.8 mb/d.

Graph 5 - 27: Caspian monthly liquids production development by selected country



Sources: Nefte Compass and OPEC.

Azerbaijan liquids supply for **2023** is forecast to decline by 60 tb/d for an average of 0.7 mb/d. While the Absheron gas condensate project is expected to start up next year, adding approximately 7 tb/d to liquids output, however, the overall decline rate will be higher than the planned ramp-ups.

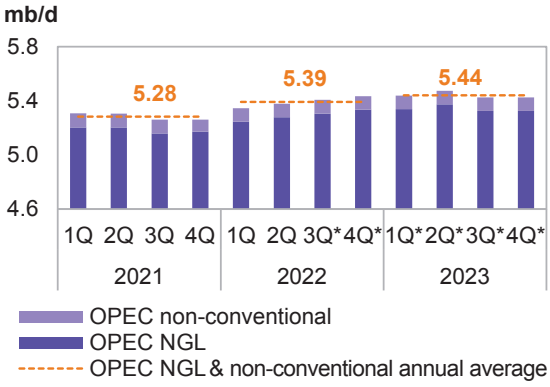
OPEC NGLs and non-conventional oils

OPEC NGLs and non-conventional liquids in 2022 are forecast to grow by 0.1 mb/d to average 5.4 mb/d, unchanged from the previous assessment.

Output of NGLs in 1Q22 is estimated to have averaged 5.2 mb/d, while OPEC non-conventionals remained steady at 0.1 mb/d.

The preliminary **2023** forecast indicates growth of 50 tb/d for an average of 5.4 mb/d. NGL production is projected to grow by 50 tb/d to average 5.3 mb/d, while non-conventional liquids are projected to remain unchanged at 0.1 mb/d.

Graph 5 - 28: OPEC NGLs and non-conventional liquids quarterly production and forecast



*Note: * 3Q22-4Q23 = Forecast. Source: OPEC.*

Table 5 - 6: OPEC NGL + non-conventional oils, mb/d

OPEC NGL and non-coventional oils	2021	Change 21/20	2022	Change 22/21	1Q23	2Q23	3Q23	4Q23	2023	Change 23/22
OPEC NGL	**5.18**	*0.12*	**5.29**	*0.11*	5.34	5.37	5.33	5.33	**5.34**	*0.05*
OPEC non-conventional	**0.10**	*0.00*	**0.10**	*0.00*	0.10	0.10	0.10	0.10	**0.10**	*0.00*
Total	**5.28**	***0.12***	**5.39**	***0.11***	**5.44**	**5.47**	**5.43**	**5.43**	**5.44**	***0.05***

Note: 2022-2023 = Forecast. Source: OPEC.

OPEC crude oil production

According to secondary sources, total **OPEC-13 crude oil production** averaged 28.72 mb/d in June 2022, higher by 234 tb/d m-o-m. Crude oil output increased mainly in Saudi Arabia, the UAE, IR Iran, Kuwait and Angola, while production in Libya and Venezuela declined.

Table 5 - 7: OPEC crude oil production based on *secondary sources*, tb/d

Secondary sources	2020	2021	4Q21	1Q22	2Q22	Apr 22	May 22	Jun 22	*Change* Jun/May
Algeria	904	913	959	984	1,013	1,004	1,013	1,021	*9*
Angola	1,247	1,117	1,124	1,152	1,173	1,180	1,155	1,182	*27*
Congo	293	265	265	264	266	263	270	265	*-5*
Equatorial Guinea	114	98	87	92	94	96	93	92	*-1*
Gabon	191	182	185	199	187	199	173	189	*16*
IR Iran	1,991	2,392	2,472	2,528	2,560	2,565	2,543	2,574	*31*
Iraq	4,076	4,049	4,240	4,286	4,428	4,433	4,416	4,434	*17*
Kuwait	2,439	2,419	2,531	2,612	2,689	2,660	2,688	2,718	*29*
Libya	366	1,143	1,111	1,063	743	893	707	629	*-78*
Nigeria	1,575	1,372	1,321	1,376	1,252	1,285	1,233	1,238	*5*
Saudi Arabia	9,204	9,113	9,879	10,164	10,458	10,364	10,425	10,585	*159*
UAE	2,804	2,727	2,861	2,954	3,047	3,015	3,044	3,083	*39*
Venezuela	512	555	662	684	716	721	720	706	*-14*
Total OPEC	**25,716**	**26,347**	**27,696**	**28,358**	**28,624**	**28,678**	**28,482**	**28,716**	***234***

Notes: Totals may not add up due to independent rounding, given available secondary sources to date. Source: OPEC.

Table 5 - 8: OPEC crude oil production based on *direct communication*, tb/d

Direct communication	2020	2021	4Q21	1Q22	2Q22	Apr 22	May 22	Jun 22	*Change* Jun/May
Algeria	899	911	958	984	1,016	1,006	1,015	1,027	*12*
Angola	1,271	1,124	1,123	1,161	1,173	1,183	1,162	1,175	*13*
Congo	300	267	260	267	..	261	261	..	..
Equatorial Guinea	114	93	79	95	91	95	89	91	*2*
Gabon	207	181	183	197	..	174	183	..	..
IR Iran	..	..	..	..	..	..	..	..	..
Iraq	3,997	3,971	4,167	4,188	4,472	4,430	4,470	4,515	*45*
Kuwait	2,438	2,415	2,528	2,612	2,694	2,664	2,694	2,639	*-55*
Libya	389	1,207	1,182	1,151	..	..	..	..	..
Nigeria	1,493	1,323	1,260	1,299	1,133	1,219	1,024	1,158	*134*
Saudi Arabia	9,213	9,125	9,905	10,224	10,542	10,441	10,538	10,646	*109*
UAE	2,779	2,718	2,854	2,949	3,042	3,011	3,032	3,083	*51*
Venezuela	569	636	817	756	745	775	735	727	*-8*
Total OPEC	..	..	..	..	..	..	..	..	..

Notes: .. Not available. Totals may not add up due to independent rounding. Source: OPEC.

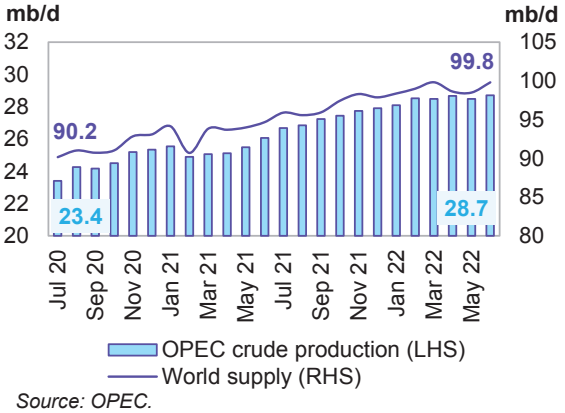
World oil supply

Preliminary data indicates that **global liquids production in June** increased by 1.32 mb/d to average 99.82 mb/d compared with the previous month.

Non-OPEC liquids production (including OPEC NGLs) is estimated to have increased in June by a minor 1.1 mb/d m-o-m to average 71.1 mb/d, and was higher by 2.5 mb/d y-o-y. Preliminary estimated increases in production during June were mainly driven by Russia and the US, by 0.7 mb/d, while Norway and Kazakhstan are expected to have seen declines in liquids output of 0.3 mb/d.

The **share of OPEC crude oil in total global production** decreased by 0.1 pp to 28.8% in June compared with the previous month. Estimates are based on preliminary data from direct communication for non-OPEC supply, OPEC NGLs and non-conventional oil, while estimates for OPEC crude production are based on secondary sources.

Graph 5 - 29: OPEC crude production and world oil supply development



Source: OPEC.

Commercial Stock Movements

Preliminary May data sees total OECD commercial oil stocks up m-o-m by 10.5 mb. At 2,680 mb, they were 253 mb less than the same time one year ago, 312 mb lower than the latest five-year average and 276 mb below the 2015-2019 average. Within the components, crude stocks fell m-o-m by 10.1 mb, while product stocks rose m-o-m by 20.6 mb.

At 1,307 mb, OECD crude stocks were 103 mb lower than the same time one year ago, 176 mb lower than the latest five-year average and 179 mb below the 2015-2019 average. OECD product stocks stood at 1,373 mb, representing a deficit of 150 mb with the same time one year ago, 136 mb lower than the latest five-year average and 97 mb below the 2015-2019 average.

In terms of days of forward cover, OECD commercial stocks fell m-o-m by 0.7 days in May to stand at 57.3 days. This is 7.0 days below May 2021 levels, 7.6 days less than the latest five-year average and 4.6 days lower than the 2015-2019 average.

Preliminary data for June showed that total US commercial oil stocks rose sharply m-o-m by 31.1 mb to stand at 1,185.8 mb. This is 85.7 mb lower than the same month in 2021 and 127.9 mb below the latest five-year average. Crude and product stocks rose by 9.1 mb and 22.0 mb, m-o-m, respectively.

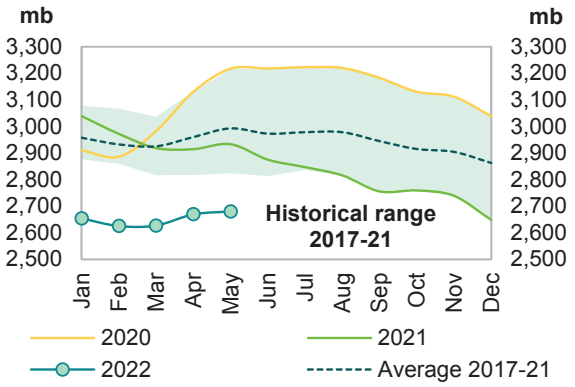
OECD

Preliminary **May** data sees **total OECD commercial oil stocks** up m-o-m by 10.5 mb. At 2,680 mb, they were 253 mb less than the same time one year ago, 312 mb lower than the latest five-year average and 276 mb below the 2015-2019 average.

Within the components, crude stocks fell m-o-m by 10.1 mb, while product stocks rose m-o-m by 20.6 mb. Total commercial oil stocks in May rose in OECD Americas and OECD Asia-Pacific while they declined in OECD Europe.

OECD commercial **crude stocks** stood at 1,307 mb in May. This is 103 mb lower than the same time a year ago and 176 mb below the latest five-year average. Compared with the previous month, OECD Americas saw a stock draw of 4.4 mb, OECD Asia Pacific fell by 0.9 mb and OECD Europe dropped by 4.8 mb.

Graph 9 - 1: OECD commercial oil stocks



Sources: Argus, EIA, Euroilstock, IEA, METI and OPEC.

Total product inventories stood at 1,373 mb in May. This is 150 mb less than the same time a year ago, and 136 mb lower than the latest five-year average. Product stocks in OECD Americas and OECD Asia Pacific rose m-o-m by 24.8 mb and 3.5 mb, respectively, while product stocks fell m-o-m by 7.7 mb in OECD Asia Pacific.

Table 9 - 1: OECD's commercial stocks, mb

OECD stocks	May 21	Mar 22	Apr 22	May 22	Change May 22/Apr 22
Crude oil	1,410	1,296	1,317	1,310	*-6.7*
Products	1,523	1,331	1,353	1,370	*17.2*
Total	**2,933**	**2,627**	**2,669**	**2,680**	***10.5***
Days of forward cover	**64.4**	**58.0**	**58.0**	**57.2**	***-0.8***

Note: Totals may not add up due to independent rounding.

Sources: Argus, EIA, Euroilstock, IEA, METI and OPEC.

In terms of **days of forward cover**, OECD commercial stocks fell m-o-m by 0.7 days in May to stand at 57.3 days. This is 7.0 days below May 2021 levels, 7.6 days less than the latest five-year average and 4.6 days lower than the 2015-2019 average. All three OECD regions were below the latest five-year average: the Americas by 7.6 days at 56.2 days, Asia Pacific by 6.8 days at 47.0 days and Europe by 8.2 days at 64.6 days.

OECD Americas

OECD Americas total commercial stocks rose by 20.4 mb m-o-m in May to settle at 1,441 mb. This is 122 mb less than the same month in 2021 and 142 mb lower than the latest five-year average.

Commercial **crude oil stocks** in OECD Americas fell m-o-m by 4.4 mb in May to stand at 732 mb, which is 68 mb lower than in May 2021 and 80 mb less than the latest five-year average. The stock draw came on the back of higher crude runs.

In contrast, **total product stocks** in OECD Americas rose m-o-m by 24.8 mb in May to stand at 709 mb. This was 54 mb lower than in the same month of 2021 and 62 mb below the latest five-year average. Lower total consumption in the region was behind the stock build.

OECD Europe

OECD Europe total commercial stocks fell m-o-m by 12.6 mb in May to settle at 900 mb. This is 109 mb less than the same month in 2021 and 113 mb below the latest five-year average.

OECD Europe's **commercial crude stocks** in May fell m-o-m by 4.8 mb to end the month at 403 mb, which is 16 mb lower than one year ago and 42 mb below the latest five-year average. The fall in crude oil inventories came despite lower m-o-m refinery throughputs in the EU-14, plus UK and Norway, which decreased by 280 tb/d to stand at 9.4 mb/d.

Europe's **product stocks** fell m-o-m by 7.7 mb to end May at 497 mb. This is 94 mb lower than a year ago and 71 mb below the latest five-year average. The fall in product stocks could be attributed to higher consumption in the region.

OECD Asia Pacific

OECD Asia Pacific's total commercial oil stocks rose m-o-m by 2.6 mb in May to stand at 339 mb. This is 22 mb lower than a year ago and 57 mb below the latest five-year average.

OECD Asia Pacific's **crude inventories** fell by 0.9 mb m-o-m to end May at 171 mb, which is 19 mb lower than one year ago and 54 mb below the latest five-year average.

In contrast, OECD Asia Pacific's **total product inventories** rose m-o-m by 3.5 mb to end May at 167 mb. This is 3.0 mb lower than the same time a year ago and 2.7 mb below the latest five-year average.

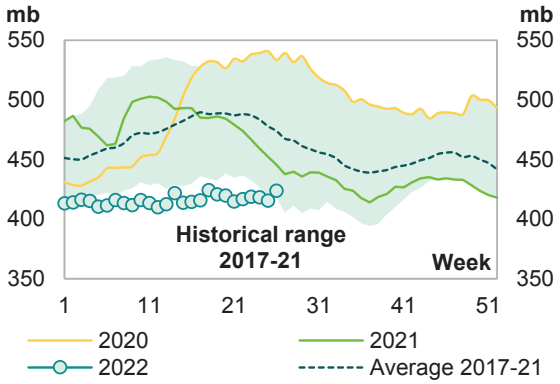
US

Preliminary data for June showed that **total US commercial oil stocks** rose sharply m-o-m by 31.1 mb to stand at 1,185.8 mb. This is 85.7 mb, or 6.7%, lower than the same month in 2021 and 127.9 mb, or 9.7%, below the latest five-year average. Crude and product stocks rose by 9.1 mb and 22.0 mb, m-o-m, respectively.

US **commercial crude stocks** in June stood at 423.8 mb. This is 24.2 mb, or 5.4%, lower than the same month of the previous year, and 48.4 mb, or 10.2%, below the latest five-year average. The monthly build in crude oil stocks can be attributed to additions from the SPR release.

Total product stocks also rose in June to stand at 762.0 mb. This is 61.6 mb, or 7.5%, below May 2021 levels, and 79.5 mb, or 9.5%, lower than the latest five-year average. The stock build was mainly driven by higher product output.

Graph 9 - 2: US weekly commercial crude oil inventories



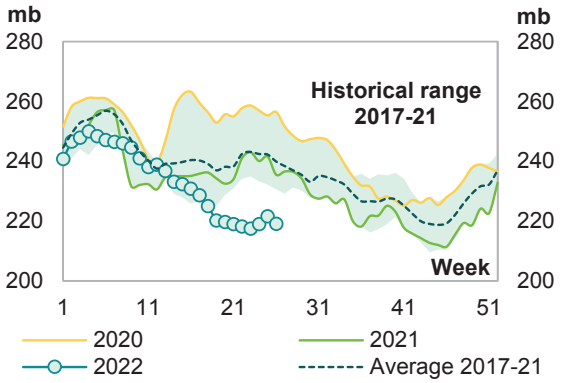
Sources: EIA and OPEC.

Gasoline stocks in June rose slightly m-o-m by 0.1 mb to settle at 219.1 mb. This is 18.1 mb, or 7.6% lower than in the same month in 2021, and 21.0 mb, or 8.8%, lower than the latest five-year average. The monthly stock draw came mainly on the back of higher gasoline production.

Distillate stocks also rose m-o-m in June by 4.7 mb to stand at 111.1 mb. This is 28.9 mb, or 20.7%, lower than the same month of the previous year, and 33.0 mb, or 22.9%, below the latest five-year average.

Residual fuel oil stocks rose by 1.5 mb m-o-m in June. At 28.4 mb, this was 2.7 mb, or 8.7%, lower than a year earlier, and 4.4 mb, or 13.5%, below the latest five-year average.

Graph 9 - 3: US weekly gasoline inventories



Sources: EIA and OPEC.

Jet fuel stocks also rose m-o-m by 0.3 mb, ending June at 39.6 mb. This is 4.8 mb, or 10.7%, lower than the same month of 2021, and 1.8 mb, or 4.4%, below the latest five-year average.

Table 9 - 2: US commercial petroleum stocks, mb

US stocks	Jun 21	Apr 22	May 22	Jun 22	Change Jun 22/May 22
Crude oil	**448.0**	**419.1**	**414.7**	**423.8**	***9.1***
Gasoline	237.2	230.1	219.0	219.1	*0.1*
Distillate fuel	140.1	106.4	106.4	111.1	*4.7*
Residual fuel oil	31.1	29.4	26.9	28.4	*1.5*
Jet fuel	44.7	37.7	39.6	39.9	*0.3*
Total products	**823.5**	**734.4**	**739.9**	**762.0**	***22.0***
Total	**1,271.5**	**1,153.5**	**1,154.7**	**1,185.8**	***31.1***
SPR	**621.3**	**547.9**	**526.6**	**492.0**	***-34.6***

Sources: EIA and OPEC.

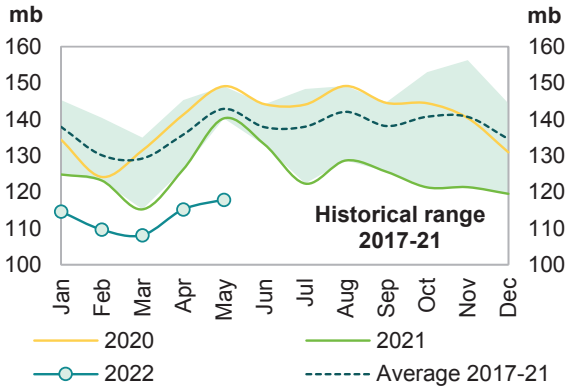
Japan

In **Japan**, **total commercial oil stocks** in May rose m-o-m by 2.6 mb to settle at 117.9 mb. This is 22.4 mb, or 16.0%, lower than the same month in 2021 and 25.0 mb, or 17.5%, below the latest five-year average. Crude stocks fell by 0.9 mb, while product stocks rose by 3.5 mb.

Japanese **commercial crude oil stocks** declined in May to stand at 63.9 mb. This is 11.7 mb, or 15.5%, lower than the same month of the previous year, and 18.8 mb, or 22.7%, lower than the latest five-year average. The drop came on the back of lower crude imports along with higher crude runs.

In contrast, Japan's **total product inventories** rose m-o-m by 3.5 mb to end May at 54.0 mb. This is 10.7 mb, or 16.6%, lower than the same month in 2021 and 6.2 mb, or 10.3%, below the latest five-year average.

Graph 9 - 4: Japan's commercial oil stocks



Sources: METI and OPEC.

Gasoline stocks remained unchanged m-o-m to stand at 10.4 mb in May. This was 4.5 mb, or 30.3% lower than a year earlier, and 1.8 mb, or 14.6%, lower than the latest five-year average. Higher gasoline sales offset lower gasoline imports, resulting in the same level of gasoline stocks as last month.

Distillate stocks rose m-o-m by 1.7 mb to end May at 22.0 mb. This is 5.5 mb, or 19.8%, lower than the same month in 2021, and 3.1 mb, or 12.5%, below the latest five-year average. Within distillate components, jet fuel stocks went down by 5.7%, while kerosene and gasoil stocks rose by 12.7% and 14.1%, respectively.

Total residual fuel oil stocks rose m-o-m by 0.7 mb to end May at 11.7 mb. This is 1.1 mb, or 8.3%, lower than in the same month of the previous year, and 1.4 mb, or 10.8%, below the latest five-year average. Within the components, fuel oil A and fuel oil B.C stocks rose by 4.1% and 8.5%, respectively.

Table 9 - 3: Japan's commercial oil stocks*, mb

Japan's stocks	May 21	Mar 22	Apr 22	May 22	Change May 22/Apr 22
Crude oil	**75.6**	**60.5**	**64.8**	**63.9**	***-0.9***
Gasoline	14.9	9.9	10.4	10.4	*0.0*
Naphtha	9.5	8.4	8.8	9.8	*1.0*
Middle distillates	27.5	19.3	20.3	22.0	*1.7*
Residual fuel oil	12.8	10.1	11.0	11.7	*0.7*
Total products	**64.7**	**47.6**	**50.4**	**54.0**	***3.5***
Total**	**140.3**	**108.2**	**115.2**	**117.9**	***2.6***

*Note: * At the end of the month. ** Includes crude oil and main products only.*

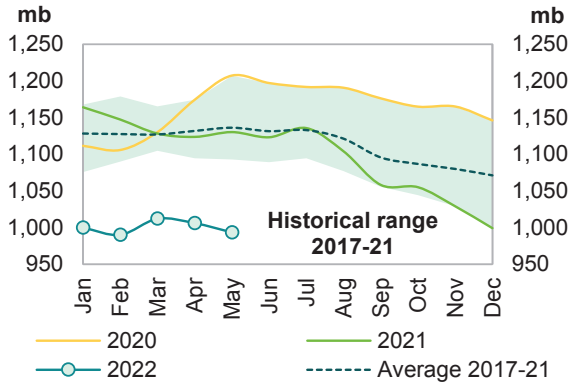
Sources: METI and OPEC.

EU-14 plus UK and Norway

Preliminary data for May showed that **total European commercial oil stocks** fell m-o-m by 12.6 mb to stand at 993.6 mb. At this level, they were 136.8 mb, or 12.1%, below the same month a year earlier, and 142.6 mb, or 12.5%, lower than the latest five-year average. Crude and product stocks fell by 4.8 mb, and 7.7 mb, respectively.

European **crude inventories** fell in May to stand at 425.0 mb. This is 39.1 mb, or 8.4%, lower than the same month in 2021, and 68.2 mb, or 13.8%, below the latest five-year average. The fall in crude oil inventories came despite lower m-o-m refinery throughputs in the EU-14, plus UK and Norway, which decreased by 280 tb/d to stand at 9.4 mb/d.

Graph 9 - 5: EU-14 plus UK and Norway's total oil stocks



Sources: Argus, Euroilstock and OPEC.

Total European product stocks also fell m-o-m by 7.7 mb to end May at 568.6 mb. This is 97.7 mb, or 14.7%, lower than the same month of the previous year, and 74.4 mb, or 11.6%, below the latest five-year average.

Gasoline stocks fell m-o-m by 1.3 mb in May to stand at 110.7 mb. At this level, they were 5.6 mb, or 4.8%, lower than the same time a year earlier, and 4.2 mb/d, or 3.7%, less than the latest five-year average.

Distillate stocks also fell m-o-m by 8.3 mb in May to stand at 368.3 mb. This is 82.6 mb, or 18.3%, below the same month in 2021, and 62.6 mb, or 14.5%, less than the latest five-year average.

In contrast, **residual fuel stocks** rose m-o-m by 1.4 mb in May to stand at 62.0 mb. This is 4.6 mb, or 6.8%, lower than the same month in 2021, and 5.6 mb, or 8.2%, below the latest five-year average.

Naphtha stocks also rose by 0.3 mb in May, ending the month at 27.6 mb. This is 5.0 mb, or 15.3 % below May 2021 levels, and 2.1 mb, or 7.0%, below the latest five-year average.

Table 9 - 4: EU-14 plus UK and Norway's total oil stocks, mb

EU stocks	May 21	Mar 22	Apr 22	May 22	Change May 22/Apr 22
Crude oil	**464.1**	**428.0**	**429.8**	**425.0**	***-4.8***
Gasoline	116.3	110.0	112.0	110.7	*-1.3*
Naphtha	32.6	24.8	27.3	27.6	*0.3*
Middle distillates	450.8	389.9	376.5	368.3	*-8.3*
Fuel oils	66.6	59.5	60.6	62.0	*1.4*
Total products	**666.3**	**584.2**	**576.3**	**568.6**	***-7.7***
Total	**1,130.4**	**1,012.2**	**1,006.1**	**993.6**	***-12.6***

Sources: Argus, Euroilstock and OPEC.

Singapore, Amsterdam-Rotterdam-Antwerp (ARA) and Fujairah

Singapore

In May, **total product stocks in Singapore** rose m-o-m by 2.7 mb to 43.0 mb. This is 6.9 mb, or 13.8%, lower than the same month in 2021.

Light distillate stocks rose m-o-m by 1.4 mb in May to stand at 15.3 mb. This is 2 mb, or 14.9%, higher than the same month of the previous year.

Middle distillate stocks also rose m-o-m by 0.4 mb in May to stand at 7.0 mb. This is 4.7 mb, or 40.2%, lower than a year earlier.

Residual fuel oil stocks also rose m-o-m by 0.9 mb, ending May at 20.7 mb. This is 4.2 mb, or 16.8%, lower than in May 2021.

ARA

Total product stocks in ARA fell m-o-m in May by 1.5 mb for the second consecutive month. At 37.2 mb, they are 9.6 mb, or 20.5%, lower than the same month in 2021.

Gasoline stocks in May fell m-o-m 1.0 mb to stand at 10.6 mb, which is 0.5 mb, or 4.9%, higher than the same month of the previous year.

Jet oil stocks also fell m-o-m by 0.3 mb to end May at 6.3 mb. This is 2.8 mb, or 30.6%, lower than the level registered one year earlier

In contrast, **fuel oil stocks** rose m-o-m by 0.5 mb in May to stand at 6.9 mb, which is 1.5 mb, or 18.0%, lower than in May 2021.

Meanwhile, **gasoil stocks** remained unchanged m-o-m at 11.2 mb. This is 5.7 mb, or 33.5%, lower than the level seen in May 2021.

Fujairah

During the week ending 27 June 2022, **total oil product stocks in Fujairah** fell w-o-w by 0.09 mb to stand at 19.37 mb, according to data from Fed Com and S&P Global Platts. At this level, total oil stocks were 3.69 mb lower than the same time a year ago.

Light distillate stocks fell by 0.37 mb w-o-w to stand at 5.44 mb in the week to 27 June 2022, which is 1.82 mb lower than the same period a year ago. **Middle distillate stocks** also fell by 0.57 mb to stand at 2.89 mb, which is 1.05 mb lower than a year ago. **Heavy distillate stocks** rose w-o-w by 0.85 mb to stand at 11.05 mb, which is 0.81 mb lower than the same time last year.

https://www.iea.org/reports/oil-market-report-july-2022

Oil Market Report - July 2022

Part of Oil Market Report
Flagship report — July 2022

About this report

The IEA Oil Market Report (OMR) is one of the world's most authoritative and timely sources of data, forecasts and analysis on the global oil market – including detailed statistics and commentary on oil supply, demand, inventories, prices and refining activity, as well as oil trade for IEA and selected non-IEA countries.

Highlights

- Higher prices and a deteriorating economic environment have started to take their toll on oil demand, but strong power generation use and a recovery in China are providing a partial offset. Global oil demand growth has been marginally reduced to 1.7 mb/d in 2022, reaching 99.2 mb/d. A further 2.1 mb/d gain is expected in 2023, led by a strong growth trajectory in non-OECD countries.

- World oil supply jumped by 690 kb/d to 99.5 mb/d in June as resilient Russian production and higher output from the US and Canada more than offset steep maintenance-related losses from Kazakhstan. Production is expected to rise by 1.8 mb/d by end-year to reach 101.3 mb/d. Global oil supply is set to average 100.1 mb/d in 2022 before hitting an annual record of 101.1 mb/d in 2023.

- Refinery throughputs rose by 500 kb/d in June, to 79.2 mb/d, 1.2 mb/d above a year ago. A number of outages and tight spare capacity outside of China meant that product supply failed to keep up with the seasonal increase in demand. Product cracks nevertheless fell from records highs observed in late May, but were on average substantially higher on a monthly basis.

- Russian oil exports in June fell by 250 kb/d m-o-m to 7.4 mb/d, the lowest since August 2021. This time, the decline was led by crude oil, while product shipments were relatively stable at 2.4 mb/d. Meanwhile, export revenues increased by $700 million m-o-m on higher oil prices, to $20.4 billion, 40% above last year's average.

- Global observed oil inventories rose by a modest 5 mb in May as a sharp increase in non-OECD crude stocks was offset by lower OECD stocks and oil on the water. OECD industry stocks rose by 15.2 mb to 2 691 mb, still 301.3 mb below the 2017-2021 average, helped by the release of 32.1 mb of government stocks. Preliminary data for June show total OECD stocks built by 22 mb.

- Benchmark crude oil futures plunged by more than $20/bbl in June as a worsening economic outlook fuelled a broad market sell-off. At the time of writing, Brent was below $100/bbl while WTI traded at around $96/bbl. Price premiums for physical barrels widened on rising seasonal demand for both crude and products while supply remains constrained.

Walking a tightrope

Rarely has the outlook for oil markets been more uncertain. A worsening macroeconomic outlook and fears of recession are weighing on market sentiment, while there are ongoing risks on the supply side. For now, weaker-than-expected oil demand growth in advanced economies and resilient Russian supply has loosened headline balances. Benchmark crude futures have tumbled by more than $20/bbl since early June, trading below $100/bbl at the time of writing. Yet, persistent physical crude price tensions and extreme refinery margins highlight underlying imbalances for crude and products supply.

In its latest update the World Bank warned that Russia's invasion of Ukraine and its effects on commodity markets, supply chains, inflation and financial conditions have accentuated the slowdown in global economic activity. The bank now expects world GDP growth to ease to 2.9% in 2022 from 5.7% in 2021. The IMF has cautioned that a recession next year cannot be ruled out, given the elevated risks.

The deceleration of economic activity is adding further uncertainties to our oil demand forecast but, for now, we have only modestly trimmed our outlook for 2022 and 2023. High fuel prices have started to dent oil consumption in the OECD, but this was largely countered by a stronger-than-expected demand rebound in emerging and developing economies led by China as it starts to emerge from Covid lockdowns. Oil demand is now expected to expand by 1.7 mb/d in 2022 and 2.1 mb/d next year, when it reaches 101.3 mb/d.

Our forecast was revised slightly higher for oil supply for the remainder of the year due to Russia's surprisingly strong performance. In June, global output rose by 690 kb/d to 99.5 mb/d, as Russia defied sanctions and the US and Canada pumped more. While world oil supply is expected to grow by roughly 1.8 mb/d through December, rising short-term risks to oil supply in Kazakhstan, Libya and elsewhere have put the spotlight on spare capacity, which now is held primarily by Saudi Arabia and the UAE. Their combined buffer could fall to just 2.2 mb/d in August with the full phase out of record OPEC+ cuts.

The OPEC+ group is due to meet on 3 August to chart strategy for September and possibly longer. Global oil inventories remain critically low, with recent builds concentrated in China, where refiners reduced runs due to weaker demand amid Covid lockdowns. OECD industry stocks have recovered somewhat thanks to sizeable government stock releases, but remain nearly 300 mb below their five-year average. As an EU embargo on Russian oil is set to come into full force at the end of the year, the oil market may tighten once again. With readily available spare capacity running low in both the upstream and downstream, it may be up to demand side measures to bring down consumption and fuel costs that pose a threat to stability, most notably in emerging markets. Without strong policy intervention on energy use, risks remain high that the world economy falls off-track for recovery.

OPEC+ crude oil production[1]
million barrels per day

	May 2022 Supply	June 2022 Supply	June 2022 Compliance	June 2022 Target	Sustainable Capacity[2]	Eff Spare Cap vs Jun[3]
Algeria	1.01	1.02	110%	1.02	1.0	0.0
Angola	1.16	1.18	728%	1.48	1.2	0.0
Congo	0.26	0.28	470%	0.32	0.3	0.0
Equatorial Guinea	0.09	0.09	925%	0.12	0.1	0.0
Gabon	0.18	0.19	-48%	0.18	0.2	0.0
Iraq	4.43	4.44	148%	4.51	4.8	0.4
Kuwait	2.67	2.65	187%	2.72	2.8	0.1
Nigeria	1.11	1.17	1156%	1.77	1.5	0.4
Saudi Arabia	10.50	10.62	113%	10.66	12.2	1.6
UAE	3.14	3.17	-2%	3.07	4.1	1.0
Total OPEC-10	**24.55**	**24.81**	**229%**	**25.86**	**28.24**	**3.5**
Iran[4]	2.51	2.57			3.8	
Libya[4]	0.77	0.63			1.2	0.6
Venezuela[4]	0.73	0.73			0.8	0.0
Total OPEC	**28.56**	**28.74**			**34.00**	**4.0**
Azerbaijan	0.57	0.52	884%	0.70	0.6	0.1
Kazakhstan	1.58	1.24	859%	1.65	1.7	0.4
Mexico[5]	1.62	1.63		1.75	1.7	0.0
Oman	0.84	0.85	105%	0.85	0.9	0.0
Russia	9.26	9.74	372%	10.66	10.2	
Others[6]	0.82	0.86	732%	1.07	0.9	0.1
Total Non-OPEC	**14.69**	**14.86**	**461%**	**16.69**	**15.88**	**0.6**
OPEC+-19 in cut deal[4]	**37.62**	**38.04**	**314%**	**40.81**	**42.46**	**4.0**
Total OPEC+	**43.25**	**43.60**			**49.88**	**4.6**

1. Excludes condensates. 2. Capacity levels can be reached with 90 days and sustained for extended period. 3. Excludes shut in Iranian, Russian crude. 4. Iran, Libya, Venezuela exempt from cuts. 5. Mexico excluded from OPEC+ compliance. Only cut in May, June 2020. 6. Bahrain, Brunei, Malaysia, Sudan and South Sudan.

IEA World Oil Supply and Demand Forecasts: Summary (Table)
2022-07-13 08:00:00.1 GMT

By Kristian Siedenburg
(Bloomberg) -- Following is a summary of world oil supply and demand forecasts from the International Energy Agency in Paris:

	4Q 2023	3Q 2023	2Q 2023	1Q 2023	4Q 2022	3Q 2022	2Q 2022	1Q 2022	2023	2022
	Demand									
Total Demand	102.7	102.0	100.8	99.8	100.2	99.4	97.8	99.3	101.3	99.2
Total OECD	46.7	46.7	46.1	46.0	46.2	45.8	45.1	45.9	46.4	45.8
Americas	25.2	25.3	25.3	24.9	25.0	24.9	24.9	24.9	25.2	24.9
Europe	13.7	14.0	13.5	13.1	13.6	13.8	13.3	13.1	13.6	13.4
Asia Oceania	7.9	7.4	7.3	8.0	7.7	7.2	7.0	7.9	7.6	7.4
Non-OECD countries	56.0	55.2	54.7	53.8	54.0	53.6	52.7	53.4	54.9	53.4
FSU	4.7	4.7	4.5	4.5	4.6	4.7	4.6	4.7	4.6	4.6
Europe	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
China	16.7	16.3	16.1	15.7	15.9	15.7	14.6	15.4	16.2	15.4
Other Asia	14.6	13.9	14.2	14.3	13.9	13.3	13.8	14.0	14.3	13.8
Americas	6.2	6.2	6.1	5.9	6.1	6.1	6.1	5.9	6.1	6.0
Middle East	8.7	9.3	8.9	8.6	8.6	9.2	8.8	8.6	8.9	8.8
Africa	4.1	4.0	4.0	4.0	4.1	3.9	4.0	4.1	4.0	4.0
	Supply									
Total Supply	n/a	n/a	n/a	n/a	n/a	n/a	98.9	98.6	n/a	n/a
Non-OPEC	66.1	66.0	65.6	64.9	66.0	66.3	64.8	64.9	65.6	65.5
Total OECD	31.6	31.1	31.0	30.7	30.6	30.0	29.1	28.8	31.1	29.6
Americas	27.6	27.3	27.2	26.8	26.7	26.3	25.5	25.0	27.2	25.9
Europe	3.5	3.3	3.4	3.4	3.4	3.2	3.1	3.3	3.4	3.3
Asia Oceania	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Non-OECD	29.1	29.1	29.1	29.2	30.1	30.7	30.4	31.4	29.1	30.7
FSU	11.7	11.6	11.7	11.9	12.8	13.5	13.4	14.4	11.7	13.5
Europe	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
China	4.2	4.3	4.3	4.3	4.2	4.2	4.3	4.2	4.3	4.2
Other Asia	2.6	2.6	2.6	2.6	2.7	2.7	2.8	2.8	2.6	2.7
Americas	5.9	5.9	5.9	5.8	5.8	5.7	5.4	5.4	5.9	5.6
Middle East	3.3	3.3	3.3	3.3	3.2	3.2	3.2	3.2	3.3	3.2
Africa	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3
Processing Gains	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.4	2.3
Total OPEC	n/a	n/a	n/a	n/a	n/a	n/a	34.1	33.8	n/a	n/a
Crude	n/a	n/a	n/a	n/a	n/a	n/a	28.7	28.5	n/a	n/a
Natural gas liquids NGLs	5.5	5.5	5.4	5.4	5.4	5.4	5.4	5.3	5.5	5.4
Call on OPEC crude and stock change *	31.1	30.5	29.8	29.5	28.9	27.7	27.6	29.1	30.2	28.3

NOTE: Figures are in million of barrels per day. (*) equals total demand minus non-OPEC supply and OPEC natural gas liquids.
IEA changed the way it measures OPEC supply, adopting the industry-standard approach of counting most of Venezuela's Orinoco heavy oil as "crude oil."
SOURCE: International Energy Agency

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IEA: June Crude Oil Production in OPEC Countries (Table)
2022-07-13 08:00:00.0 GMT

By Kristian Siedenburg
(Bloomberg) -- Following is a summary of oil production in
OPEC countries from the International Energy Agency in Paris:

	June 2022	May 2022	June MoM
Total OPEC	28.74	28.56	0.18
Total OPEC10	24.81	24.55	0.26
Algeria	1.02	1.01	0.01
Angola	1.18	1.16	0.02
Congo	0.28	0.26	0.02
Equatorial Guinea	0.09	0.09	0.00
Gabon	0.19	0.18	0.01
Iraq	4.44	4.43	0.01
Kuwait	2.65	2.67	-0.02
Nigeria	1.17	1.11	0.06
Saudi Arabia	10.62	10.50	0.12
UAE	3.17	3.14	0.03
Iran	2.57	2.51	0.06
Libya	0.63	0.77	-0.14
Venezuela	0.73	0.73	0.00

NOTE: Figures are in million of barrels per day. Monthly level change calculated by Bloomberg. Production data excludes condensates.
OPEC10 excludes Iran, Libya and Venezuela.
SOURCE: International Energy Agency

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IEA REPORT WRAP: Demand Growth Cut as Fuel Costs Hit Consumption
2022-07-13 08:24:08.413 GMT

By Bill Lehane
(Bloomberg) -- Summary including stories from IEA's monthly
Oil Market Report on Wednesday:
* Oil Prices Threaten Economy as Demand Growth Slows, IEA Says
** Oil prices pose a high risk to the global economic recovery
** Signs that fuel costs are starting to "take a toll" on demand growth
** Growth in consumption in 2022 cut to 1.7m b/d

** Outlook has rarely been more uncertain as spare capacity falls
** See summary of IEA world oil supply demand forecasts
*** Click here for detailed forecast table
* Russia Earns More Despite Lower Oil Exports in June, IEA Says
** Exports rose back above $20b, despite lower shipments
** Compared to a post-war peak level in April, total Russian oil exports in June were down 530k b/d, or 7%, but export revenues were up by $2.3 billion, or 13%
* China's Oil Demand Set to Rebound to Y/y Growth in July
** Chinese oil consumption is forecast to have recovered by 650k b/d in June, with the easing of Covid-19 restrictions and may return to y/y growth in July
* OPEC Crude Output Rose 180k B/D in June on Saudi Increase
** Output rose m/m to 28.74m b/d, led by Saudi volumes
** NOTE: On Tuesday, OPEC released its own production figures for the month, estimating its 13 members pumped 28.72m b/d
* Strong Dollar Adds to Weak Oil Demand in Emerging Markets
* IEA Still Sees Hope of Replenishing Oil Product Stockpiles in 3Q
* Naphtha Is Only Oil Product Set for Demand Drop This Year

--With assistance from Prejula Prem, Sherry Su, Grant Smith, Rachel Graham, Jack Wittels, Elena Mazneva, Brian Wingfield, James Herron, Amanda Jordan and Kristian Siedenburg.
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Oil Prices Threaten Economy as Demand Growth Slows, IEA Says
2022-07-13 08:00:00.17 GMT

By Grant Smith
(Bloomberg) -- Oil prices pose a high risk to the global economic recovery, with signs that fuel costs are starting to "take their toll" on demand growth, the International Energy Agency said.
The Paris-based adviser trimmed forecasts for oil consumption this year and next amid growing fears of a recession, warning that prices threaten stability in emerging economies. Still, the demand weakness is being offset by tightening supply as sanctions hit Russia and OPEC+'s spare capacity dwindles.
"Rarely has the outlook for oil markets been more uncertain," the agency said in its monthly market report on Wednesday. "A worsening macroeconomic outlook and fears of

recession are weighing on market sentiment, while there are ongoing risks on the supply side."

Crude prices remain near $100 a barrel despite a recent pullback, as global supplies and refining infrastructure fail to keep pace with the post-pandemic rebound in fuel use. Inventories are "critically low," and sanctions on Russia following its invasion of Ukraine threaten to disrupt energy flows significantly, the IEA said.

With gasoline prices stoking unprecedented inflation in the US, President Joe Biden is urging Middle East producers to open the taps as he embarks on a tour of the region, due to include a stop in OPEC leader Saudi Arabia.

Yet the Saudis and neighboring United Arab Emirates -- the only members of the Organization of Petroleum Exporting Countries able to raise output -- are constrained in what they have left to offer. By August, spare capacity in the two producers will be at a "razor-thin" 2.2 million barrels a day, the IEA said.

"With readily available spare capacity running low in both the upstream and downstream, it may be up to demand-side measures to bring down consumption," the agency said. "Without strong policy intervention on energy use, risks remain high that the world economy falls off-track for recovery."

Also see: Libya's Political Chaos is Worsening a Global Oil Supply Crisis

The IEA "marginally" lowered its estimates for global oil demand growth this year, to 1.7 million barrels a day, or about 1.8%. Consumption will average 99.2 million barrels a day in 2022, then surpass pre-Covid levels in 2023 with a further increase of 2.1 million a day.

With the softened outlook for demand, and stronger forecasts for supplies outside OPEC, world oil stockpiles ought to replenish somewhat in the second half of the year, the IEA said.

At the same time, the agency has considerably scaled back its expectations for the impact on Russian supplies, which it initially expected would slump by a quarter in the initial months of the assault on Ukraine. The country's output rose last month to 11.07 million barrels a day, or just 330,000 barrels a day below pre-conflict levels, the IEA said.

Nonetheless, the agency still projects that Russian production will buckle in the months ahead as sanctions take hold, plunging by about 3 million barrels a day to 8.7 million a day by the start of next year.

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IEA World Oil Supply/Demand Key Forecasts
2022-07-13 08:00:00.3 GMT

By Kristian Siedenburg
(Bloomberg) -- World oil demand 2023 forecast was revised to 101.3m b/d from 101.6m b/d in Paris-based Intl Energy Agency's latest monthly report.
* 2022 world demand was revised to 99.2 from 99.4m b/d
* Demand change in 2023 est. 2.2% y/y or 2.1m b/d
* Non-OPEC supply 2023 was unrevised at 65.6m b/d
* Call on OPEC crude 2023 was revised to 30.2m b/d from 30.5m b/d
* Call on OPEC crude 2022 was revised to 28.3 m b/d from 28.7m b/d
** OPEC crude production in June rose by 180k b/d on the month to 28.74m b/d
* Detailed table: FIFW NSN REY4KSGEZ1FK <GO>
* NOTE: Fcasts based off IEA's table providing one decimal point

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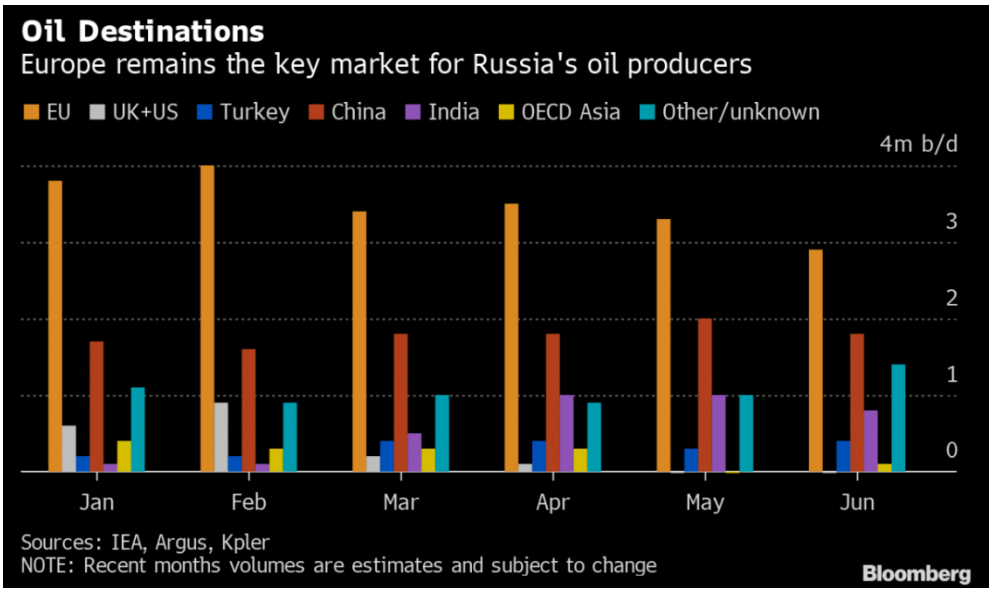
Russia Earns More Despite Lower Oil Exports in June, IEA Says
2022-07-13 08:08:33.972 GMT

By Bloomberg News
(Bloomberg) -- Russia's oil exports rose back above $20 billion in June despite lower shipments abroad because of a rally in energy prices, according to the International Energy Agency.
That was an increase by $700 million from a month earlier, even as Russia's daily exports of crude-oil and products fell by 250,000 barrels to 7.4 million barrels, the lowest since August, the IEA estimated in its monthly report published on Wednesday. Benchmark Brent averaged more than $117 a barrel last month as the global oil market remained tight. High international prices helped to partially offset the discount for Urals crude, which deepened amid the European Union's preparations to

gradually phase out seaborne oil imports from Russia in response to the invasion of Ukraine.



In June, the Urals price rose 10.7% from previous month and averaged $87.25 a barrel, according to Russia's Finance Ministry. Still, a stronger ruble meant Russia's budget, over a third of which comes from oil and gas, didn't reap the full benefits from higher crude. The ruble gained more than 15% against the dollar in June amid a flood of export revenue and lower imports.

As a result, the Kremlin's oil and gas revenue fell almost 18% from May to 717.9 billion rubles ($11.7 billion) last month, the lowest since August, according to Bloomberg calculations based on Finance Ministry data.

In June, Russia's drop in exports was led by crude oil, which fell to just above 5 million barrels a day, the IEA said. Daily flows to the EU were below 3 million barrels, the lowest since November.

Loadings to China and India fell by 175,000 barrels a day each compared to May, but higher volumes to "unknown" made the overall picture of exports to Asia unclear, the IEA said.

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Russia Continues to Earn More by Exporting Less Oil: IEA
2022-07-13 08:00:00.15 GMT

By Sherry Su
(Bloomberg) -- Russian export revenues in June rose by $700m to the $20 billion mark, despite that oil exports fell by 250k b/d m/m to 7.4m b/d, the lowest since August 2021, the IEA said in its monthly Oil Market Report, citing higher oil prices.

* Compared to a post-war peak level in April, total Russian oil exports in June were down 530k b/d, 0r 7%, but export revenues were up by $2.3 billion, or 13%
* Crude oil exports were down by 250k b/d in June to just above 5m b/d, still slightly higher than the pre-war average level
* Shipments to the EU fell below 3m b/d for the first time since November 2020, bringing the EU share of Russian oil exports to 40%, compared to 49% in January-February
* Crude oil loadings to EU destinations fell 190k b/d m/m to 1.8m b/d, partly because of lower offtake on the Druzhba pipeline due to maintenance at a Hungarian refinery in June.
* Product loadings to the European Union fell by 135k b/d to 1.13m b/d, the IEA said
* The fall in crude oil volumes came mostly from lower loadings on the Black Sea, as Rosneft's 240k b/d Tuapse refinery reportedly came back online in June after a three-month shutdown
* Total product exports out of Russia were relatively unchanged in June. Diesel exports increased slightly m/m to 825k b/d, 300k b/d lower than the pre-war average
** Diesel Loadings to EU countries ticked up to 650 kb/d, returning to January-February average levels
* READ: (July 5) Vitol-Chartered Ship Stopped by US Discharges in New Orleans

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China's Oil Demand Set to Rebound to Y/y Growth in July: IEA
2022-07-13 08:00:00.24 GMT

By Prejula Prem
(Bloomberg) -- Chinese oil consumption is forecast to have recovered by 650k b/d in June, with the easing of Covid-19 restrictions and may return to y/y growth in July, the IEA said in its monthly market report.
* China's demand climbed by 460k b/d in May as the economy began

to reopen from lockdowns
* However, average Chinese oil consumption in 2022 to see its first contraction of the 21st century reaching 15.4m b/d, due to the scale of demand loss in 2Q
* Gasoil consumption in China is expected to grow by 80k b/d in 2022
* Average jet fuel demand to be 150k b/d lower this year but will lead 2023 gains with a rebound of 230k b/d
* China had a "massive" 45.5 million barrel stockpile build in May, dominating a wider gain in non-OECD inventories and more than offsetting a drawdown among OECD nations

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OPEC Crude Output Rose 180k B/D in June on Saudi Increase: IEA
2022-07-13 08:00:00.20 GMT

By Amanda Jordan
(Bloomberg) -- OPEC's June crude output rose 180k b/d from a month earlier to 28.74m b/d, led by Saudi volumes, the IEA said in its monthly report.
* Saudi Arabia produced 10.62m b/d, up 120k b/d from May
* UAE output climbed 30k b/d to 3.17m b/d
* Iraqi production edged up to 4.44m b/d
* Kuwaiti supply slipped 20k b/d to 2.65m b/d
* Output from African members held broadly steady, though Libyan production sank 140k b/d to 630k b/d amid civil unrest
* Nigeria added 60k b/d to reach 1.17m b/d, while Angolan volumes increased by 20k b/d to 1.18m b/d
* Production in Iran -- exempt from OPEC+ cuts -- rose 60k b/d to 2.57m b/d
* OPEC's compliance with the OPEC+ deal was 229% in June
* NOTE: On Tuesday, OPEC released its own production figures for the month, estimating its 13 members pumped 28.72m b/d

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Strong Dollar Adds to Weak Oil Demand in Emerging Markets: IEA
2022-07-13 08:00:00.16 GMT

By Brian Wingfield
(Bloomberg) -- The extraordinary strength of the US dollar is adding to the worsening economic outlook in some developing countries, which "does not bode well for emerging market oil demand," the IEA said in its monthly Oil Market Report.
* Stronger dollar raises importing costs in local currencies
* In the past year, oil and dollar values have risen in parallel; Russia's invasion of Ukraine has contributed to both rallies "exacerbating the impact of record product prices for oil importers"
** Dollar has strengthened for reasons including rebound in US economy, flight to safety of US assets, Fed policy of monetary tightening
* Developing countries with major commodity-export revenues, like Brazil and Mexico, are partially insulated from surge in oil prices
* Those without significant oil revenues -- like Turkiye, Egypt, Pakistan, Tunisia and Sri Lanka -- are more exposed; the last four are in "full-blown emerging market debt crises" and negotiating IMF bailouts, with weak currencies contributing to soaring food inflation
* "If the global economy skirts a recession, a solid recovery should be seen in 2023, with emerging economies buoyed by China's post-lockdown return to growth"

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IEA Still Sees Hope of Replenishing Oil Product Stockpiles in 3Q
2022-07-13 08:00:00.23 GMT

By Jack Wittels
(Bloomberg) -- There is "still some hope" of replenishing oil product inventories in 3Q, before the usual 4Q stockpile draws, the International Energy Agency said in its monthly Oil Market Report.
* Seasonal ramp-up in refinery runs is set to continue through August, with global throughput peaking in that month at 82.2m b/d
* Still, refinery activity will remain constrained by a lack of operable spare capacity, currently concentrated in China
* The US and India are already running at very high utilization

rates
* In China, “oil trade regulations and ongoing lockdowns have capped refining activity”
** In January-May, Chinese refinery runs fell by 700k b/d y/y on average
** Despite recovering in 2H of this year, China’s refinery runs are forecast to decline by 460k b/d on average this year

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Naphtha Is Only Oil Product Set for Demand Drop This Year: IEA
2022-07-13 08:00:00.19 GMT

By Jack Wittels
(Bloomberg) -- Naphtha demand is projected to fall by 218k b/d this year, the International Energy Agency said in its monthly Oil Market Report.
* Consumption for all other major oil products is meanwhile expected to increase
* Following 18 consecutive months of annual gains, naphtha demand in March fell by 480k b/d m/m and 370k b/d y/y
** “This change in trajectory reflects a squeeze in petrochemical profitability, inter-feedstock competition, the impact of Russia’s international isolation and China’s lockdowns”
* Demand dropped by 1.1m b/d -- more than double the typical seasonal fall -- between January and May of this year
** The weaker demand, combined with high crude oil prices, saw naphtha cracks collapse to historical lows
* “Since the drop in naphtha cracks, Russian naphtha exports have recovered in recent months and China’s economy has reopened after lockdowns”
** “We now expect a gradual partial recovery in naphtha demand during 2H 2022 and 2023”
** Demand to rebound by about 270k b/d y/y in 2023, reaching 7.1m b/d

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https://www.reuters.com/business/energy/exclusive-saudi-arabia-doubles-q2-russian-fuel-oil-imports-power-generation-2022-07-14/

July 14, 202211:42 AM MDTLast Updated 9 hours ago

EXCLUSIVE Saudi Arabia doubles Q2 Russian fuel oil imports for power generation

Reuters

People walk near power plant number 10 at Saudi Electricity Company's Central Operation Area, south of Riyadh, April 27, 2012. REUTERS

- Summary

- This includes content produced in Russia, where the law restricts coverage of Russian military operations in Ukraine.
- Kingdom burns Russian fuel to free up crude for exports
- Biden travels to ask Riyadh for more oil
- Russia raises supply to Asia, Africa amid Western sanctions

MOSCOW/LONDON/DUBAI, July 14 (Reuters) - Saudi Arabia, the world's largest oil exporter, more than doubled the amount of Russian fuel oil it imported in the second quarter to feed power stations to meet summer cooling demand and free up the kingdom's own crude for export, data showed and traders said.

Russia has been selling fuel at discounted prices after international sanctions over its invasion of Ukraine left it with fewer buyers. Moscow calls the war in Ukraine a "special military operation".

The increased sales of fuel oil, used in power generation, to Saudi Arabia show the challenge that U.S. President Joe Biden faces as his administration seeks to isolate Russia and cut its energy export revenues.

While many countries have banned or discouraged purchases from Russia, China, India and several African and Middle Eastern nations have increased imports.

Biden is due to visit Saudi Arabia later this week, when he is expected to seek an increase in oil supply to global markets from the kingdom to help lower oil prices that have aggravated inflation worldwide.

There is little spare capacity for Saudi and others to increase production in the short term. Saudi Arabia has also maintained its cooperation with Russia in the alliance of global producers known as OPEC+. The two are the de facto leaders of respectively OPEC and non-OPEC producers in that group.

Data obtained by Reuters through Refinitiv Eikon ship tracking showed Saudi Arabia imported 647,000 tonnes (48,000 barrels per day) of fuel oil from Russia via Russian and Estonian ports in April-June this year. That was up from 320,000 tonnes in the same period a year ago.

For the full year 2021, Saudi Arabia imported 1.05 million tonnes of Russian fuel oil.

Saudi Arabian and Russian energy ministries declined to comment on the increased imports.

Saudi Arabia has for several years imported Russian fuel oil, which can reduce its need to refine crude for products and cut the amount of oil it needs to burn for power, leaving it with more unrefined crude to sell on international markets at higher prices.

The kingdom turns to oil to meet power needs, which typically peak as demand for cooling rises with summer temperatures. Some Saudi cities are far from natural gas fields that could provide cleaner fuel for power generation.

The volume of crude burnt is about 600,000 bpd in summer months and 300,000 bpd in winter months, figures from the Joint Organisations Data Initiative (JODI) show. Increased use of natural gas has reduced the amount from as much as 1 million bpd in 2010.

HUB IN FUJAIRAH

Saudi Arabia has also imported more Russian fuel oil via the Middle East oil hub of Fujairah in the United Arab Emirates, traders said.

Fujairah has received 1.17 million tonnes of Russian fuel oil so far this year, according to ship tracking, compared with 0.9 million in the same period last year.

An extra 0.9 million could be delivered to Fujairah in July alone, according to shiptracking, bringing the total to 2.1 million so far this year, exceeding the 1.64 million tonnes for the whole of 2021.

Much of the fuel oil in Fujairah is sold there as fuel for ships, but some of it is shipped to neighbouring countries. It is unclear how much additional Russian fuel is flowing to Saudi Arabia via Fujairah.

Saudi has expanded its refining capacity to 3.6 million bpd from 2.9 million in 2017.

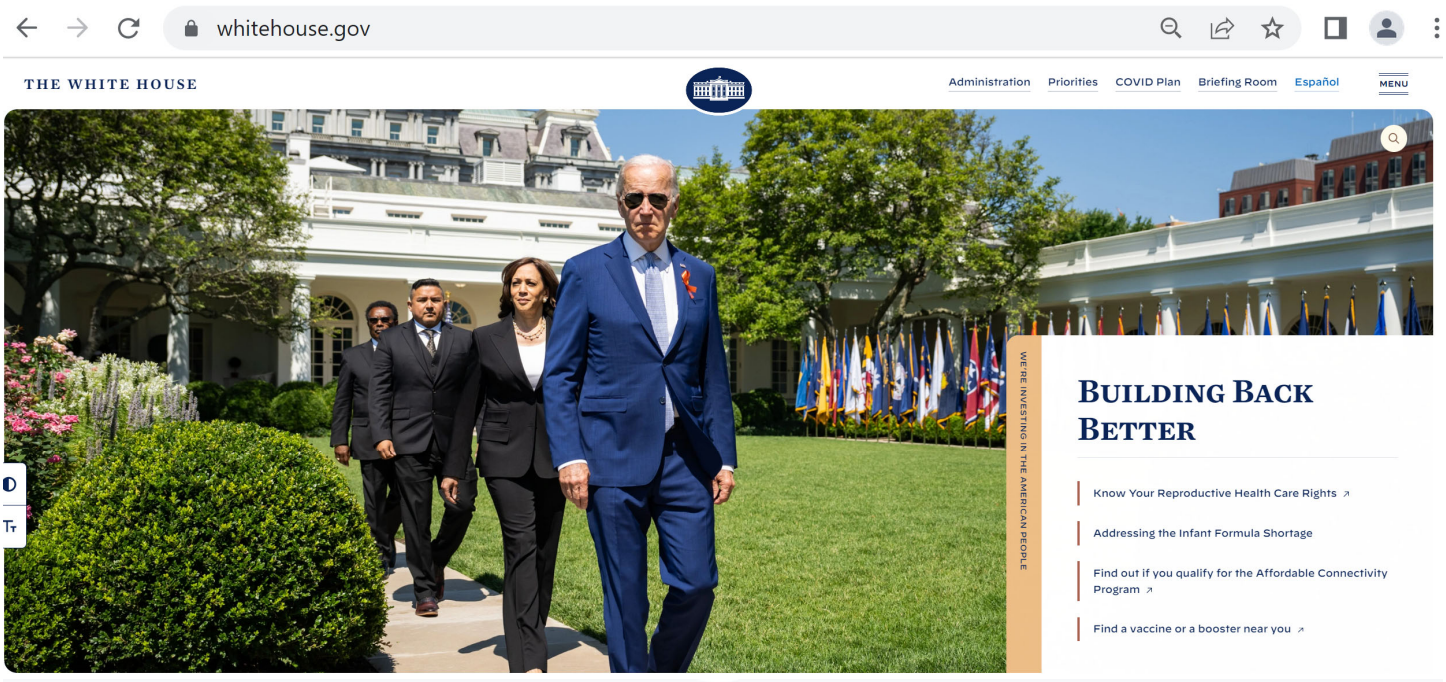
Its refining utilisation rates stood at 70%-73% in April-June this year, despite output rising to above 10 million bpd.

This compares with 75%-95% in the same periods of 2017-2019, the last time its production was not severely reduced by output cuts by the Organization of Petroleum Exporting Countries and allies (OPEC+).

Meanwhile, exports of crude and products were at or close to an all-time high 9 million bpd in February-April, JODI figures showed, with crude exports alone at or close to 7.3 million bpd.

Reporting by Reuters; Editing by Simon Webb and Barbara Lewis

Picture of White House home page at 4;28am MT on July 17, 2022



Remarks by President Biden at an Event Commemorating the Passage of the Safer Communities Act

JULY 11, 2022 • SPEECHES AND REMARKS

Joint Statement of the Leaders of India, Israel, United Arab Emirates, and the United States (I2U2)
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GLOBAL

ABSOLUTE POWER

Asked about the murder of Jamal Khashoggi, Mohammed bin Salman said, “If that’s the way we did things, Khashoggi would not even be among the top 1,000 people on the list.”

By Graeme Wood

Photographs by Lynsey Addario

A woman walks past a poster showing Crown Prince Mohammed bin Salman (*left*) with his father (*right*) and grandfather (*top*), at the old market in Taif, Saudi Arabia. (Lynsey Addario for The Atlantic)

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SHARE

MOHAMMED BIN SALMAN, the crown prince of Saudi Arabia, is 36 years old and has led his country for almost five years. His father, the 86-year-old King Salman, has rarely been seen in public since 2019, and even MBS—as he is universally known—has faced the world only a few times since the pandemic began. Once, he was ubiquitous, on a never-ending publicity tour to promote his plan to modernize his father’s kingdom. But soon after the murder of the *Washington Post* columnist Jamal Khashoggi in 2018, MBS curtailed his travel. His last interview with non-Saudi press was more than two years ago. The CIA concluded that he had ordered Khashoggi’s murder, and Saudi Arabia’s own prosecutors found that it had been conducted by some of the crown prince’s closest aides. They are thought to have dismembered Khashoggi and disintegrated his corpse.

MBS had already developed a reputation for ruthlessness. In 2017, he rounded up hundreds of members of his own family and other wealthy Saudis and imprisoned them in Riyadh’s Ritz-Carlton hotel on informal charges of corruption. The Khashoggi murder fixed a view of the crown prince as brutish, thin-skinned, and psychopathic. Among those who share a dark appraisal of MBS is President Joe Biden, who has so far refused to speak with him. Many in Washington and other Western capitals hope his rise to the throne might still be averted.

But within the kingdom, MBS's succession is understood as inevitable. "Ask any Saudi, anyone at all, whether MBS will be king," a senior Saudi diplomat told me. "If there are people in Washington who think he will not be, then I cannot help them. I am not a psychiatrist."

His father's eventual death will leave him as the absolute monarch of the birthplace of Islam and the owner of the world's largest accessible oil reserves. He will also be the leader of one of America's closest allies and the source of many of its headaches.

I've been traveling to Saudi Arabia over the past three years, trying to understand if the crown prince is a killer, a reformer, or both—and if both, whether he can be one without the other.

Even MBS's critics concede that he has roused the country from an economic and social slumber. In 2016, he unveiled a plan, known as Vision 2030, to convert Saudi Arabia from—allow me to be blunt—one of the world's weirdest countries into a place that could plausibly be called normal. It is now open to visitors and investment, and lets its citizens partake in ordinary acts of recreation and even certain vices. The crown prince has legalized cinemas and concerts, and invited notably raw hip-hop artists to perform. He has allowed women to drive and to dress as freely as they can in dens of sin like Dubai and Bahrain. He has curtailed the role of reactionary clergy and all but abolished the religious police. He has explored relations with Israel.

He has also created a climate of fear unprecedented in Saudi history. Saudi Arabia has never been a free country. But even the most oppressive of MBS's predecessors, his uncle King Faisal, never presided over an atmosphere like that of the present day, when it is widely believed that you place yourself in danger if you criticize the ruler or pay even a mild compliment to his enemies. MBS's critics—not regicidal zealots or al-Qaeda sympathizers, just ordinary people with independent thoughts about his reforms—have gone into exile. Some fear that if he keeps getting his way, the modernized Saudi Arabia will oppress in ways the old Saudi Arabia never imagined. Khalid al-Jabri, the exiled son of one of MBS's most prominent critics, warned me that worse was yet to come: "When he's King Mohammed, Crown Prince MBS is going to be remembered as an angel."

For about two years, MBS hid from public view, as if hoping the Khashoggi murder would be forgotten. It hasn't been. But the crown prince still wants to convince the world that he is saving his country, not holding it hostage—which is why he met twice in recent months with me and the editor in chief of this magazine, Jeffrey Goldberg.

In our meetings, the crown prince was charming, warm, informal, and intelligent. But even at its most affable, absolute monarchy cannot escape weirdness. For our first meeting, MBS summoned us to a remote palace by the Red Sea, his family's COVID bunker. The protocols were multilayered: a succession of PCR tests by nurses from the Royal Clinics; a Gulfstream jet in the middle of the night from Riyadh; a convoy from a deserted airstrip; a surrender of electronic devices; a stopover at a mysterious guesthouse visible in satellite photos but unmarked on Google Maps. He invited us to his palace at about 1:30 a.m., and we spoke for nearly two hours.

For the second meeting, in his palace in Riyadh, we were told to be ready by 10 a.m. It also began after midnight. The halls were astir. The crown prince had just returned after nearly two years of remote work, and aides and ministers padded red carpets seeking meetings, their first in months, with the boss. Neglected packages and documents had piled up on the desks and tables in his office, which was large but hardly opulent. The most obvious concession to high taste was an old-fashioned telescope on a tripod, its altitude set shallow enough that it appeared to be pointed not at the heavens but at Riyadh, the sprawling and unsightly desert metropolis from which the Saud family has ruled for most of the past three centuries.

At the outset of both conversations, MBS said he was saddened that the pandemic precluded giving us hugs. He apologized that we all had to wear masks. (Each meeting was attended by multiple, mainly silent princes wearing identical white robes and masks, leaving us unsure, to this day, who exactly was present.) The crown prince left his tunic unbuttoned at the collar, in a casual style now favored by young Saudi men, and he gave relaxed, nonpsychopathic answers to questions about his personal habits. He tries to limit his Twitter use. He eats breakfast every day with his kids. For fun, he watches TV, avoiding shows, like *House of Cards*, that remind him of work. Instead, he said without apparent irony, he prefers to watch series that help him escape the reality of his job, such as *Game of Thrones*.

Before the meetings, I asked one of MBS's advisers if there were any questions I could ask his boss that he himself could not. "None," he answered, without pausing—"and that is what makes him different from every crown prince who has come before him." I was told he derives energy from being challenged.

MBS said it was "obvious" he had not ordered the killing of Khashoggi. "It hurt me a lot," he said. "It hurt me and it hurt Saudi Arabia, from a feelings perspective."

During our Riyadh encounter, Jeff asked MBS if he was capable of handling criticism. "Thank you very much for this question," the prince said. "If I couldn't, I would not be sitting with you today listening to that question."

"I'd be in the Ritz-Carlton," Jeff suggested.

"Well," he said, "at least it's a five-star hotel."

Difficult questions caused the crown prince to move about jumpily, his voice vibrating at a higher frequency. Every minute or two he performed a complex motor tic: a quick backward tilt of the head, followed by a gulp, like a pelican downing a fish. He complained that he had endured injustice, and he evinced a level of victimhood and grandiosity unusual even by the standards of Middle Eastern rulers.

When we asked if he had ordered the killing of Khashoggi, he said it was "obvious" that he had not. "It hurt me a lot," he said. "It hurt me and it hurt Saudi Arabia, from a feelings perspective."

"From a feelings perspective?"

"I understand the anger, especially among journalists. I respect their feelings. But we also have feelings here, pain here."

The crown prince has told two people close to him that "the Khashoggi incident was the worst thing ever to happen to me, because it could have ruined all of my plans" to reform the country.

In our Riyadh interview, the crown prince said that his *own* rights had been violated in the Khashoggi affair. "I feel that human-rights law wasn't applied to me," he said. "Article XI of the Universal Declaration of Human Rights states that any person is innocent until proven guilty." Saudi Arabia had punished those responsible for the murder, he said—yet comparable atrocities, such as bombings of wedding parties in Afghanistan and the torture of prisoners in Guantánamo Bay, have gone unpunished.

The CIA concluded that Mohammed bin Salman ordered the murder of the *Washington Post* columnist Jamal Khashoggi. Saudi Arabia's own prosecutors found that it had been conducted by some of the crown prince's closest aides. (Moises Saman / Magnum)

The crown prince defended himself in part by asserting that Khashoggi was not important enough to kill. "I never read a Khashoggi article in my life," he said. To our astonishment, he added that if he *were* to send a kill squad, he'd choose a more valuable target, and more competent assassins. "If that's the way we did things"—murdering authors of critical op-eds—"Khashoggi would not even be among the top 1,000 people on the list. If you're going to go for another operation like that, for another person, it's got to be professional and it's got to be one of the top 1,000." Apparently, he had a hypothetical hit list, ready to go. Nevertheless, he maintained that the Khashoggi killing was a "huge mistake."

"Hopefully," he said, no more hit squads would be found. "I'm trying to do my best."

If his best is not good enough for Joe Biden, MBS said, then the consequences of running a moralistic foreign policy would be the president's to discover. "We have a long, historical relationship with America," he said. "Our aim is to keep it and strengthen it." Biden and Vice President Kamala Harris have called for "accountability" for Khashoggi's murder, as well as the humanitarian disaster in Yemen, due to war between Saudi Arabia and Iranian-backed Houthi rebels. The Americans also refuse to treat him as Biden's counterpart—Biden's peer is the king, they insist—even though the crown prince rules the country with his father's blessing. This stings. MBS has lines open to the Chinese. "Where is the potential in the world today?" he said. "It's in Saudi Arabia. And if you want to miss it, I believe other people in the East are going to be super happy."

We asked whether Biden misunderstands something about him. "Simply, I do not care," he replied. Alienating the Saudi monarchy, he suggested, would harm Biden's position. "It's up to him to think about the interests of America." He gave a shrug. "Go for it."

Also risible to the crown prince was the notion that his citizens fear speaking out against him. We need dissent, he said, "if it's objective writing, without any ideological agenda." In practice, I noted, dissent seemed to be nonexistent. In September 2017, MBS ordered a boycott of Qatar, citing the country's support for the Iranian government, the Muslim Brotherhood, al-Qaeda, and other Islamist organizations in the region. His tiny neighbor suddenly transformed from official friend into official villain, and those expressing a kind word toward it disappeared into prison.

These sentiments, apparently, did not count as objective or nonideological. Qatar, MBS said, was comparable to Nazi Germany. "What do you think [would have happened] if someone was praising and trying to push for Hitler in World War II?" he asked. "How would America take that?" Of course Saudis would react strongly to Nazi sympathizers in their midst. Three years later, however, the countries reconciled, and the Saudi government tweeted out a photo of MBS and Hitler—that is, Qatari Emir Tamim Al Thani—wearing board shorts and smiling at MBS's Red Sea palace. "Sheikh Tamim's an amazing person," MBS said. The fight between them had been no big deal, "a fight between brothers." The relationship is now "better than ever in history." The dissenters remain in prison, however, and I do not mean the Ritz-Carlton.

As for the actual Ritz-Carlton prisoners: They had it coming, the crown prince said. Overnight he'd rounded up hundreds of the most prominent Saudis, delivered them to Riyadh's most lavish hotel, and refused to let them go until they confessed and paid up. I said that sounded like he was eliminating rivals. MBS looked incredulous. "How can you eliminate people who don't have any power to begin with?" If they had power, he would not have been able to force them into the Ritz.

Does Joe Biden misunderstand something about him? “Simply, I do not care,” MBS replied. “It’s up to him to think about the interests of America.” He gave a shrug. “Go for it.”

The Ritz operation, MBS said, was a blitzkrieg against corruption, and wildly successful and popular because it started at the top and did not stop there. “Some people thought Saudi Arabia was, you know, just trying to get the big whales,” MBS said. They assumed that after the government extracted settlements from the likes of Alwaleed bin Talal, the kingdom’s richest man, corruption at lower levels would resume. MBS noted, proudly, that even the minnows had been hooked. By 2019, everyone “understood that even if you steal $100, you’re going to pay for it.” In just a few months, he claims to have recovered $100 billion directly, and says that he will recover much more indirectly, as dividends of deterrence.

MBS acknowledged that to outsiders the Ritz operation may have looked thuggish. But to him it was an elegant, and by the way nonviolent, solution to the problem of vampires feasting on the kingdom’s annual budget. (An adviser to MBS told me that one alternative his aides had suggested was executing a few prominent corrupt officials.) During the months that the Ritz served as a prison, the kingdom’s financial regulator was essentially made king pro tempore, to devote the full power of the government to bleeding the vampires dry. But the Ritz guests had not, MBS said, been placed under arrest. That would imply that they had entered the court system and faced charges. Instead, he said, they had been invited to “negotiate”—and to his pleasure, 95 percent did so. “That was a strong signal,” he said. I’m sure it was.

THE SAUDI THRONE does not, like the British throne once did, just pass to the next male heir. The king chooses his successor, and ever since the founding king of the modern Saudi state, Abdulaziz, chose his son Saud as crown prince in 1933, each king has chosen another son of Abdulaziz. (He had 36 sons—with multiple wives and concubines—who survived to adulthood.) All were old enough to remember the camels-and-tents days, before extreme wealth, and they ruled conservatively, as if to lock in their gains. Even the shrewdest and most ambitious kings accomplished little. Abdullah, who took power in 2005, began as a reformer, but much of the momentum of the first half of his reign was lost as he doddered in the second, and the royal treasury was looted. (One notorious alleged thief in the Ritz, a major figure in the Royal Court, was said to have stolen tens of billions of dollars during His Majesty’s decline.)

Salman, the current king and at 86 one of the youngest of Abdulaziz’s brood, saw the perils of unchecked gerontocracy and anointed a successor from the next generation. His choice of Mohammed was not obvious. King Salman’s sons include Faisal, 51, who has a doctorate in international relations from Oxford; and Sultan, 65, a former Royal Saudi Air Force pilot who in 1985 spent a week on the space shuttle Discovery as a payload specialist. Either of these competent and educated men, citizens of the world, might have been a natural successor. But Salman had an inkling that the next king would need a certain grit and fluency with power that cannot be acquired in a seminar or a flight simulator. The new generation, born into luxury, tended to be soft, and the next king would need to be a modern version of a desert warlord like his grandfather.

Outside the immediate family, Salman considered his nephew Mohammad bin Nayef, who is known as MBN, appointing him crown prince in 2015, when he was 55. As a spymaster and security official in the 2000s, MBN had led the country’s domestic war against al-Qaeda, and in the process had become well connected with counterparts in Washington and London. In 2009, MBN was injured when an al-Qaeda bomber packed his underpants with explosives and approached him at an event.

Foreign governments considered MBN a safe pick: old enough but not too old, a proven fighter, respected overseas. But for Salman he was merely a throne-warmer for his son. (MBS had held no high office prior to his father’s coronation and needed a couple of years as defense minister to burnish his CV.) In 2017, Salman fired MBN. When you fire a prince, you fire all those who staked their fortunes on his rise; among the opponents of MBS are foreign governments who had planned for the reign of King MBN, and Saudis whose wealth and influence flowed from him. MBN’s chief adviser, Saad al-Jabri, fled to Canada. He alleges that MBS sent a

team there to kill him. MBS's government alleges that al-Jabri stole a massive fortune and is bankrolling efforts to defame the crown prince. (Both parties deny the claims.) "MBN survived al-Qaeda," al-Jabri's son Khalid told me. "But he couldn't survive his own cousin."

Others have suggested Salman's younger brother Ahmed, a well-liked former deputy interior minister, as a throne-worthy alternative to MBS. Ahmed reportedly opposed MBS's appointment as crown prince. In 2020, he was arrested on suspicion of treason.

HAVING CONSOLIDATED POWER, MBS focused on Vision 2030. He is exasperated by the rest of the world's failure to acknowledge how well it has gone. "Saudi Arabia is a G20 country," he said. "You can see our position five years ago: It was almost 20. Today, we are almost 17." He noted strong non-oil GDP growth, and reeled off statistics about foreign direct investment, Saudi overseas investment, and the share of world trade that passes through Saudi waters. The economic success, the concerts, the social reform—these are all done deals, he said. "If we were having this interview in 2016, you would say I'm making assumptions," he said. "But we did it. You can see it now with your eyes."

He was not lying. Between my first visit to Saudi Arabia, in 2019, and this conversation two years later, I had gone to the movies in Riyadh and sat next to a Saudi woman I had never met. She wore jeans and canvas sneakers, and she bounced her bare ankle while we watched *Zombieland: Double Tap*. When I first visited, I ate at restaurants that had cinder-block walls dividing single men on one side from women and families on the other. These were sledgehammered down—a little Berlin 1989 in every restaurant—and now men and women can eat together without eliciting so much as a sideways glance from fellow diners.

Many of the crown prince's most persistent critics approve of these changes, and wish only that they had come sooner. (Khashoggi was such a critic. When I met him in London for brunch, shortly before his death, I asked him to list MBS's failings. He said "90 percent" of the reforms were prudent and overdue.) The most famous Saudi women's-rights activist, Loujain al-Hathloul, campaigned for women's right to drive, and against the Saudi "guardianship law," which prevented women from traveling or going out in public without a male relative. Al-Hathloul was thrown in prison on terrorism charges in 2018—*after* MBS and his father had announced the imminent end of both policies. In prison, her family says, she was electrocuted, beaten, and—this was just a few months before Khashoggi's murder—threatened with being chopped up and thrown in a sewer, never to be found. (The Saudi government has previously denied allegations of torturing prisoners.)

Left: Saudi Crown Prince Mohammed bin Salman is greeted by Qatar's Emir Sheikh Tamim Al Thani in Doha, Qatar, in 2021. *Center:* The Saudi activist Loujain al-Hathloul in 2021. *Right:* MBS and his father, King Salman, in 2017. (Saudi Press Agency / Reuters; Ahmed Yosri / Reuters; Saudi Press Agency / AP)

Al-Hathloul and other activists had demanded rights, and the ruler had granted them. Their error was in thinking those rights were theirs to take, rather than coming from the monarch, who deserved credit for having bestowed them. Al-Hathloul was released in February 2021, but her family says she is forbidden from traveling abroad or speaking publicly.

Another dissident, Salman al-Awda, is a preacher with a massive following. His original crime, too, was to utter publicly a thought that would later be shared by the crown prince himself. When MBS began squabbling with his counterpart in Qatar, al-Awda tweeted, “May God harmonize between their hearts, for the good of their people.” He was imprisoned, and actual harmony between the two leaders has not freed him. His son Abdullah, now in the United States, claims that his father, who is 65, is being held in solitary confinement and has been tortured.

The crown prince, one of his admirers told me, “put the Wahhabis in a cage, then he reached in with gardening shears and he cut their balls off.”

Saudi authorities say al-Awda is a terrorist and a member of the Muslim Brotherhood, which is supported by Qatar and intent on overthrowing the monarchy and replacing it with a theocracy. (The Muslim Brotherhood plays a bogeyman role in the Saudi imagination similar to the role of Communists in America during the Red Scare. Also like Communists, the Muslim Brotherhood really has worked covertly to undermine state rule, just not to the extent imagined.) Al-Awda’s defenders say he is being punished for daring to speak with a moral voice independent of the monarchy’s. He faces death by beheading.

Would MBS consider pardoning those who’d spoken out in favor of women driving and normalization with Qatar—both now the policy of the country? “That’s not my power. That’s His Majesty’s power,” MBS said. But, he added, “no king has ever used” the pardon power, and his father does not intend to be the first.

The issue, he said, is not a lack of mercy. It is a problem of balance. Yes, there are liberals and kumbaya types who have run afoul of state security—and perhaps some could be candidates for a royal pardon. But some of the others in his jails are bad hombres indeed, and pardons cannot be meted out selectively. “You have, let’s say, extreme left and extreme right,” he said. “If you give forgiveness in one area, you have to give it to some very bad people. And that will take everything backward in Saudi Arabia.”

Left: Saudi women attend a live music performance in Riyadh in January. The crown prince has legalized cinemas and concerts and permitted women to dress as freely as they can in places like Dubai and Bahrain. *Bottom:* A tenth-grade girls’ basketball team in Jeddah. Until recently, a man would have been forbidden to coach a girls’ team. (Lynsey Addario for *The Atlantic*)

On one side are liberals, tugging on the sympathies of Westerners; on the other, Islamists who are also opposed to the monarchy. Letting this latter group out would not just mean the end of rock concerts and coed dining. They would not stop until they brought down the House of Saud, seized the country’s estimated 268 billion barrels of oil and the holy cities of Mecca and Medina, and established a terrorist state. In private conversations with others, MBS has likened Saudi Arabia before the Saud family’s conquest in the 18th

century to the anarchic wasteland of the *Mad Max* films. His family unified the peninsula and slowly developed a system of law and order. Without them, it would be *Mad Max* all over again—or Afghanistan.

Still, the crown prince's argument—that if he extended forgiveness to good people who deserved it, he would have to extend it equally to bad people who did not—struck me as bizarre. Why would one require the other? Then I realized that MBS was not saying that the failure of his plan to remake the kingdom *might* lead to catastrophe. He was saying that he'd guarantee it would. Many secular Arab leaders before him have made the same dark implication: Support everything I do, or I will let slip the dogs of jihad. This was not an argument. It was a threat.

ALI SHIHABI, A Saudi financier and pro-MBS commentator, told me that the changes in Saudi Arabia could be compared to those in revolutionary France. An old order had been overturned, a priestly class crushed; a new order was struggling to be born.

The priestly class in particular interested me. The brand of conservative Islam practiced in Saudi Arabia—called Wahhabism, after the sect's 18th-century founder, Muhammad ibn Abd al-Wahhab—once wielded great power and enjoys at least some popular support. I asked Shihabi if MBS really had diminished the Wahhabis' role. "Diminished their role?" Shihabi asked me. "He put the Wahhabis in a cage, then he reached in with gardening shears"—here he made the universal *snip snip* gesture with his fingers—"and he cut their balls off."

My flight into Riyadh was packed with foreigners attending Stan Lee's Super Con. Ahead of me in the passport line I saw Lou Ferrigno, the Incredible Hulk.

In France, revolution worked out just as badly for the House of Bourbon as it did for the clergy. (Diderot famously wrote that the entrails of the priests would be woven into ropes to strangle kings.) The House of Saud wanted the anticlerical revolution while conveniently omitting the antiroyalist one. I wanted to see how that alliance between monarch and sansculottes was working.

Vision 2030 made modernization easier to observe now than it would have been just a few years ago. Until October 2019, tourist visas to Saudi Arabia did not exist. Then the Saudis realized that to attract crowds to the concerts they had legalized, they'd need to let in visitors. Overnight, a visa to Saudi Arabia went from one of the hardest in the world to get to one of the easiest. In minutes I had one valid for a whole year. My flight into Riyadh was packed with foreigners attending Stan Lee's Super Con. Ahead of me in the passport line I saw Lou Ferrigno, the Incredible Hulk, on his way to an autograph signing.

The new system arrived so fast that the first visitors were like an invasive species, an unnatural fit in the rigid social order of the kingdom. For years, almost every non-Saudi in the country had needed a document called an *iqama*. It was a sort of license to exist: Your *iqama* identified your Saudi patron, the local national whom you were visiting or working for, and who controlled your fate. Every Saudi patron had his own patron, too—sometimes a tribal leader, sometimes a regional one. Even those bigwigs paid obeisance to someone and, eventually, by the transitive property of Saudi deference, to the king himself. Saudi Arabia, MBS explained, "is not one monarchy. You have beneath it more than 1,000 monarchies—town monarchies, tribal monarchies,

semitribal monarchies.” The *iqama* guaranteed that every sentient creature fit into this scheme of Saudi society.

MBS batted away my suggestion that this system is antiquated and might be replaced with a constitutional monarchy—one where citizens have freestanding rights not granted by a monarch or a demi-monarch. “No,” he said. “Saudi Arabia is based on pure monarchy,” and he, as crown prince, would preserve the system. To remove himself from it would amount to a betrayal of all the monarchies and Saudis beneath him. “I can’t stage a coup d’état against 14 million citizens.”

But he has already forced that system to adapt. Nearly every day someone asked for my *iqama*, and I had to explain that I had none. They reacted as if I’d told them that I had no name. Renting a car, buying a train ticket, checking into a hotel—all of these interactions left some poor clerk baffled. But in the new Saudi Arabia I was free to wander, to listen, to overhear.

Left: Men talk over coffee in Riyadh. *Right:* Young women at a Formula E racing event. (Lynsey Addario for *The Atlantic*)

In Riyadh I found, effortlessly, young people thrilled by the reforms. Like the other major Saudi cities, Dammam and Jeddah, Riyadh has specialty coffee shops in abundance—little outposts of air-conditioning and caffeine, in an environment otherwise characterized by heat and boredom. Many of the Saudis I met professed a deep love for America. “I spent seven years at Cal State Northridge,” one told me, before rattling off a list of cities he had visited. He was one of several hundred thousand Saudi students who’d attended U.S. universities on government scholarships in the 2000s. “I studied finance,” he said. “But I never graduated. I had a wonderful time.” He listed his American friends, who had names like Mike and Emilio. “I drank and did too much meth, and my grades weren’t good.”

“Is it possible to do just the right amount of meth?” I asked.

“When I came back, I stopped.” He looked out the window of the coffee shop at the parched cityscape. “This country is the best rehab center on the planet.”

Now he was studying again, at a Saudi university, and planning to open his own business. He had already attended concerts, and he said his fondest wish was to listen to music in the open air and smoke a joint—just one, he promised. He asked if I thought that would happen. I said I did not think that was explicitly part of Vision 2030, but he’d probably get his wish. Later, with him in mind, I asked the crown prince whether alcohol would soon be sold in the kingdom. It was the only policy question that he refused to answer.

In another café, in the northern city of Ha'il, a man pointed to a mural, freshly painted, of the Lebanese singer Fairouz, her hair flowing beautifully over her shoulders. Next to her were her lyrics (in Arabic): "Bring me the flute and sing, for song is the secret to eternity."

"One year ago," he said, "that would not be possible." By "that," he meant pretty much everything: a woman's hair; a celebration of song; a celebration of a song about singing; and, on top of all this, the music playing in the café as we spoke. Before the rise of MBS, every component of this scene would have violated long-standing canons of Saudi morality enforcement. The religious police, known in Arabic as the *hay'a* or *mutawwi'in*, would have busted the joint. They used to show up in ankle-length white *thobes*, their beards curly and unkempt. They yelled at people for dressing immodestly, or thwacked at them with sticks to goad them to the mosque for one of the five daily prayers. For the flagrancy of the Fairouz sins, the café's managers would have been detained, questioned, and punished. "Screw those guys," the man said, in a succinct expression of the most common sentiment I heard about the religious police.

Encounters with the *hay'a* have provided many an appalling story for foreign visitors. When Maureen Dowd of *The New York Times* went to Riyadh in 2002, the *hay'a* spotted her in a shopping mall and objected to being able to see the outline of her body. Her host, the future foreign minister Adel al-Jubeir, pleaded with them, but they were unimpressed by his status as a prominent diplomat, and she fled to her hotel room. "I fretted that I was in one of those movies where an American makes one mistake in a repressive country and ends up rotting in a dungeon," Dowd wrote.

"Saudi Arabia is based on pure monarchy," MBS said. To remove himself from that system would amount to a betrayal of all the Saudis beneath him. "I can't stage a coup d'état against 14 million citizens."

I told one of MBS's advisers that the religious police had been an international PR problem. "May I be impolite?" he asked me. "I don't give a fuck about the *foreigners*. They terrorized *us*." He likened the religious police to J. Edgar Hoover's FBI, operating with unchecked authority. (The religious police's official Arabic name dates back hundreds of years, but still sounds Orwellian in English: the Committee for the Prevention of Vice and Promotion of Virtue.) Anyone who wished to drag down a professional or political rival could scrutinize him for sins, then call the religious police to set up a sting. Or the *hay'a* could flex its authority on its own, either for political reasons—toppling a prince they disliked—or for recreation.

"The religious police were the losers in school," Ali Shihabi told me. "Then they got these jobs and were empowered to go and stop the cute girls, break into the parties no one wanted them at, and shut them down. It attracted a very nasty group of people." The Saudi diplomat told me that he did not miss them, and that Saudi Arabia had needed someone with the crown prince's mettle to get rid of them. "When someone hits you because he does not like what you are wearing," he said, "that is not just a form of harassment. It is abuse."



Left: Golf at the Boulevard in Riyadh. *Right:* A couple, newly engaged, dine at a restaurant in Jeddah in January. In the recent past, many restaurants had cinder-block walls dividing single men on one side from women and families on the other. (Lynsey Addario for *The Atlantic*)

MBS ordered the religious police to stand down, and one of the enduring mysteries of contemporary Saudi Arabia is what these thwackers do, now that they are invisible on the streets. Fuad al-Amri, who runs

the *hay'a* in Mecca province, confessed to me that since the reforms, one of his main activities has been vetting his own employees, to ensure that they aren't fanatics loyal to the Muslim Brotherhood.

MBS'S GRANDFATHER KING Abdulaziz founded the modern Saudi state with the support of the clergy. But he also cracked down on them, hard, when they outlived their usefulness. MBS has recounted a famous anecdote about his grandfather. In 1921, Abdulaziz attended the funeral of the most senior religious scholar in the kingdom. The king told the assembled clerics that they were dear to his heart—in the Arabic idiom, "on my *iqal*," the black cord that holds a Najd headdress in place. But then he warned them: "I can always shake my *iqal*," he said, "and you will fall."

For the past 50 years, Abdulaziz's successors have taken a softer line with the Wahhabis. The Saudi clerical class's power grew, and their imprimatur mattered. In 1964, they sealed the fate of the inept King Saud when his brothers Faisal and Mohammed sought and received religious approval for ousting him. To oppose the religious conservatives was risky. Peter Theroux, a former National Security Council director who worked on the Saudi portfolio during the 2000s, recalls being aghast at the vicious sermons still being preached by government-paid imams years after September 11. Theroux told me he confronted a senior Saudi official about the sermons. "You know," the official apologized, "the big beards are kind of our constituency." The rulers of Saudi Arabia put almost no limits on the speech or behavior of conservative clerics, and in return those clerics exempted the rulers from criticism. "That was the drug deal that the Saudi state was based upon for many years," Theroux told me. "Until Mohammed bin Salman."

Who could resist cheering on MBS as he renegotiated this relationship? One of MBS's most persistent critics in Washington, Senator Chris Murphy, a Democrat from Connecticut, told me the concerts and Comic-Cons in Riyadh have not yet translated into defunding Wahhabi intolerance overseas. "When I'm traveling the world, I still hear story after story of Gulf money and Saudi money fueling very conservative, intolerant Wahhabist mosques," he said. A hallmark of traditional Wahhabism is hatred for non-Wahhabi Muslims, whom the Wahhabis view as even worse than unbelievers for perverting the faith. With little modification, Wahhabi teachings can lead to Osama bin Laden–style jihadism. Murphy said he thinks that isn't over. "The money that flows from Saudi Arabia into conservative Islam isn't as transparent as it was 10 years ago—much of it has been driven underground—but it still exists."

Yet after spending hours in MBS's company, and in the company of his allies and enemies, I was convinced that neutering the clergy was not just symbolic. He was fighting them avidly, and personally. "The kings have historically stayed away from religion," Bernard Haykel, a scholar of Islamic law at Princeton and an acquaintance of MBS's, told me. Outsourcing theology and religious law to the big beards was both an expedient and a necessity, because no ruler had any training in religious law, or indeed a beard of any significant size.

By contrast, MBS has a law degree from King Saud University and flaunts his knowledge and dominance over the clerics. "He's probably the only leader in the Arab world who knows anything about Islamic epistemology and jurisprudence," Haykel told me.

“In Islamic law, the head of the Islamic establishment is *wali al-amr*, the ruler,” MBS explained. He was right: As the ruler, he is in charge of implementing Islam. Typically, Saudi rulers have sought opinions from clerics, occasionally leaning on them to justify a policy the king has selected in advance. MBS does not subcontract his religion out at all.

He explained that Islamic law is based on two textual sources: the Quran and the Sunna, or the example of the Prophet Muhammad, gathered in many tens of thousands of fragments from the Prophet’s life and sayings. Certain rules—not many—come from the unambiguous legislative content of the Quran, he said, and he cannot do anything about them even if he wants to. But those sayings of the Prophet (called Hadith), he explained, do not all have equal value as sources of law, and he said he is bound by only a very small number whose reliability, 1,400 years later, is unimpeachable. Every other source of Islamic law, he said, is open to interpretation—and he is therefore entitled to interpret them as he sees fit.

The effect of this maneuver is to chuck about 95 percent of Islamic law into the sandpit of Saudi history and leave MBS free to do whatever he wants. “He’s short-circuiting the tradition,” Haykel said. “But he’s doing it in an Islamic way. He’s saying that there are very few things that are fixed beyond dispute in Islam. That leaves him to determine what is in the interest of the Muslim community. If that means opening movie theaters, allowing tourists, or women on the beaches on the Red Sea, then so be it.”

MBS rebuked me when I called this attitude “moderate Islam,” though his own government champions the concept on its websites. “That term would make terrorists and extremists happy.” It suggests that “we in Saudi Arabia and other Muslim countries are changing Islam into something new, which is not true,” he said. “We are going back to the core, back to pure Islam” as practiced by Muhammad and his four successors. “These teachings of the Prophet and the four caliphs—they were amazing. They were perfect.”

Even the Islamic law that he is bound to implement will be implemented sparingly. MBS told me a story, reported in Hadith, about a woman who commits fornication, confesses her crime to the Prophet, and begs to be executed. The Prophet repeatedly tells her to go away—implying, the crown prince said, that the Prophet preferred to give sinners every chance at lenience. (MBS did not relate the end of the tale: The woman returns with indisputable evidence of her sin—a bastard son—and the Prophet acquiesces. She is buried to her chest and stoned to death.)

Instead of hunting for sin and punishing it as a matter of course, MBS has curtailed the investigative function of the religious police, and encourages sinners to keep their transgressions between themselves and God. “We should not try to seek out people and prove charges against them,” he said. “You have to do it the way that the Prophet taught us how to do it.” The law will be enforced only against those so flagrant that they are practically demanding to take their lumps.

He also stressed that none of these laws applies to non-Muslims in the kingdom. “If you are a foreign person who’s living or traveling in Saudi Arabia, you have all the right to do whatever you want, based on your beliefs,” he said. “That’s what happened in the Prophet’s time.”

It is hard to exaggerate how drastically this sidelining of Islamic law will change Saudi Arabia. Before MBS, influential clerics issued fatwas exhibiting what might charitably be called a pre-industrial view of the world. They declared that the sun orbited the Earth. They forbade women from riding bikes (“the devil’s horses”) and from watching TV without veiling, just in case the presenters could see them through the screen. Salih al-Fawzan, the most senior cleric in the kingdom today, once issued a chillingly anti-American fatwa forbidding all-you-can-eat buffets, because paying for a meal without knowing what you’ll be eating is akin to gambling.

Some of the clerics may have given in because they were convinced by the crown prince's legal interpretations. Others appear to have succumbed to good old-fashioned intimidation. Formerly conservative clerics will look you in the eye and without hesitation or scruple speak in Stepfordlike coordination with the government's program. The minister of Islamic affairs and guidance, normally an unsmiling type, now cheerily defended the opening of cinemas and mass layoffs of Wahhabi imams. I liked him immediately. His name, Abdullatif Al Asheikh, indicates that he is descended from a long line of stern moralists going back to Muhammad ibn Abd al-Wahhab himself. I told him I had seen the *Zombieland* sequel in his country, and if Woody Harrelson reprised his role in *Zombieland 3*, I would return to Riyadh so we could go to a theater and watch it together. "Why not?" he replied.

Mohammad al-Arefe, a preacher known for his good looks and conservative views, mysteriously began promoting Vision 2030 after a meeting with MBS in 2016. Previously, he had preached that Mada'in Saleh, a spectacular pre-Islamic archaeological site in northwest Saudi Arabia, was forbidden to Muslim tourists. God had struck down the civilization that once lived there, and the place was forever to remain a reminder of his wrath. The conventional view held that Muslims should follow the Prophet's warning to stay away from Mada'in Saleh, but if they absolutely must pass through, they should cast their gaze downward and maintain a fearful demeanor toward the Almighty. Then, in 2019, al-Arefe appeared in what seemed, to me, like some sort of hostage video, filmed by the Saudi tourism authority, lecturing about the site's history and inviting all to enjoy it. If he was displaying a fearful demeanor, it was not toward the Almighty.

IN THE SMALLER CITIES it isn't clear how quickly modernization is catching on. I visited Buraydah, the capital of Qassim, the most conservative part of the country. In two days, every woman I saw wore a black, flowing abaya. I attended the opening of a new shopping mall and showed up early to watch the crowds arrive. The sexes separated themselves without discussion: women in the front, all in black, near the stage where children recited poems and sang; men, in white *thobes*, in the back of the audience and on the sides. The process was unconscious and organic, but to an outsider remarkable, as if salt and pepper were shaken out onto a plate, and the grains slowly and perfectly segregated themselves. Cultural practices decades or centuries old do not yield suddenly.

Taif, a city an hour outside Mecca, was once the summer residence of the king and his family. The Prophet is thought to have visited there, and many Muslims supplement their pilgrimages to Mecca with side trips to other sites from the Prophet's life. The Wahhabis have, historically, treated these visits as un-Islamic and reprehensible. Whenever pilgrimage sites have fallen into Wahhabi hands, they have methodically and remorselessly destroyed them by leveling monuments, grave markers, and other structures sacred to Muslims in other traditions.

One morning I took a long walk to a mosque where the Prophet is said to have prayed. On arrival I found a building in disrepair, fenced off by rusty wire, with parts of it reduced to rubble. A sign at this site, posted by the Ministry of Islamic Affairs, noted in Arabic, Urdu, Indonesian, and English that the historical evidence for the Prophet's visit was uncertain. It suggested, further, that "to feel an adoring reverence or regard toward these places is a kind of heresy and fabrication in religion," an innovation not sanctioned by God that "leads to polytheism."

Later, I met Mohammad al-Issa, formerly the minister of justice under King Abdullah and now, as secretary-general of the Muslim World League, an all-purpose interfaith emissary for his country. In the past, Saudi clerics inveighed against infidels of all types. Now al-Issa spends his time meeting Buddhists, Christians, and Jews, and trying to stay ahead of the occasional surfacing of comments he made in less conciliatory times. I asked him about the site, and whether Saudi Arabia's new tolerance—which he emphasizes so energetically overseas, with non-Muslims—would apply domestically. He assured me that it already did. "If in the past there

were some mistakes, now there is correction," al-Issa said. "Everyone has the right to visit the historic places, and there is a lot of care given to them."

"But the signs are still up," I said.

"Maybe they are there to remind people to be respectful," he suggested. "You see signs like that at sites all over the world: 'Don't touch or take the stones.'"

But these signs are not meant to preserve the ruins. They are there to remind you that you are wicked for visiting at all.



A mosque in Taif where the Prophet Muhammad is said to have prayed. A sign posted by the Ministry of Islamic Affairs notes that the historical evidence for the Prophet's visit is uncertain, and warns that "to feel an adoring reverence or regard toward these places is a kind of heresy." (Lynsey Addario for *The Atlantic*)

The day after my trip to the mosque, I stopped by a Starbucks in Taif. It was early afternoon. When I pulled the door handle, it clunked—the shop was closed for prayer, just as it would have been if the religious police had been enforcing prayer times.

As I waited outside alone, a small police truck pulled up behind me. The police officer salaamed me, and I responded in Arabic. Only after a short interrogation ("What are you doing here? Why are you here?") did he discover that I was American—not, as I think he suspected, Filipino—and apologize awkwardly and leave. It took me a minute to realize what had happened: The religious police have stood down, and the ordinary police have stood up in their place. The conservatism in society has not gone away. In some places, it has just undergone a costume change.

THESE LINGERING MANIFESTATIONS of intolerance illustrate what MBS's critics say is his ultimate error: Even a crown prince can't change a culture by fiat.

Belated realization of this error might be behind the grandest and most improbable of his projects. If existing cities resist your orders, just build a new one programmed to do your bidding from the start. In October 2017, MBS decreed a city in a mostly uninhabited area on the Gulf of Aqaba, adjacent to Egypt's Sinai Peninsula, the southwestern edge of Jordan, and the Israeli resort town Eilat. The city is called Neom, from a violent collision between the Greek word *neos* ("new") and the Arabic *mustaqbal* ("future").

At present, little exists but an encampment for the employees of the Neom project, a small area of tract housing. Regular buses take them to shop in the nearest city, Tabuk, which is itself a city only by the standards

of the vacant, rock-strewn desert nearby. (If you recall the early scenes of *Lawrence of Arabia*, when a lonely camel-borne Peter O'Toole sings "The Man Who Broke the Bank at Monte Carlo" to the echoes of a sandstone canyon, then you know the spot.) The ambitions for this settlement are vast. Neom's administrators say they expect it to attract billions of dollars in investment and millions of residents, both Saudi and foreign, within 10 to 20 years. Dubai grew at a similar pace in the 1990s and 2000s. MBS said Neom is "not a copy of anything elsewhere," not a xerox of Dubai. But it has more in common with the great globalized mainstream than with anything in the history of a country that, until recently, was remarkably successful at walling off its traditional culture from the blandishments of modernity.

For a few hours, the Neom team showed me around and made grandiose promises about the future. Neom would lure its investors, I gathered, by creating the ideal regulatory environment, stitched together from best practices elsewhere. The city would profit from central planning. When New York or Delhi want to grow, they choke on their own traffic and decrepit infrastructure. Neom has no inherited infrastructure at all. The centerpiece of the project will be "The Line"—a 106-mile-long, very skinny urban strip connected by a single bullet train that will travel from end to end in 20 minutes. (No train capable of this speed currently exists.) The Line is intended to be walkable—the train will run underground—and a short hike perpendicular to its main axis will take you into pristine desert. Water will be desalinated; energy, renewable.

So far, Neom is less a city than an urbanist cargo cult. The practicalities can come later, or not at all. (The projected cost is in the hundreds of billions of dollars, a huge sum even for Saudi Arabia.) But many good ideas look crazy at first. What struck me was that Neom's vision is really an anti-vision. It is the opposite of the old Saudi Arabia. In the old Saudi Arabia, and even to an extent today, corruption and bureaucracy layered on each other to make an entrepreneur's nightmare. Riyadh has almost no public transportation. No matter where you are, you cannot walk anywhere, except perhaps to your local mosque. No one in Neom mentioned religion at all. Even Neom's location is suggestive. It is far from where Saudis actually live. Instead it is huddled in a mostly empty corner, as if seeking sustenance and inspiration from Jordan and Israel.

Seen this way, Neom is MBS's declaration of intellectual and cultural bankruptcy on behalf of his country. Few nations have as many carried costs as Saudi Arabia, and Neom zeroes them out and starts afresh with a plan unburdened by the past. To any parts of the kingdom that cling to their old ways, it promises that the future is everything they are not. And the future will wait only so long.

DURING THE 1990S AND 2000S, Saudi Arabia was a net exporter of vision, but it was a jihadist vision. The standard narrative, now accepted by the Saudi state itself, is that the kingdom was seduced by conservative Islam, and eventually the jihadists it sent overseas (most famously Osama bin Laden) redirected their efforts toward the Saudi monarchy and its allies. Fifteen of the 19 hijackers on 9/11 were Saudi citizens.

"A series of things happened that made the Saudis realize they couldn't keep playing the game they had been playing," Philip Zelikow, a State Department official under George W. Bush and the executive director of the 9/11 Commission, told me. The years of violence that followed 9/11 shocked the Saudis into realizing that they had a reckoning coming, though only after jihadists began attacking in the kingdom itself did the government move to crush them. What the Saudis did not have was a plan to redirect the jihadists' energy. "They needed to have some story of what kind of country they were going to be when they grew up," Zelikow said. Jihadism would not be that story. But there was no immediate alternative, either for society or for the individuals

attracted to jihadism. Saudi Arabia was left to do what most other countries, including the United States, have done, which is to imprison terrorists until they grow too old to fight.



Left: The aftermath of an al-Qaeda bombing in Riyadh in 2003. Only after jihadists began attacking in the kingdom did the government move to crush them. *Right:* Saudi Special Security Forces at the Counterterrorism Training School in Riyadh in 2013. (Lynsey Addario)

Last year, Saudi officials informed me that the crown prince had a new plan to deprogram jihadists. One morning they sent a convoy of state-security SUVs to my hotel, and with lights flashing, we left behind the glassy skyscrapers of the capital and continued along one of the straight, hypnotic roads radiating from Riyadh to nowhere. An hour later, we turned off at an area called al-Ha'ir and went through a security checkpoint.

Ha'ir is a state-security prison, run by the Saudi secret police, which means that its prisoners are not car thieves and check forgers but offenders against the state. They include jihadists from al-Qaeda and the Islamic State—I met at least a dozen of each—as well as softer Islamists, like Salman al-Awda, the cleric.

We drove past the checkpoint and through the gates, into a windswept compound coated in a film of light-brown dust, like tiramisu. We were met by the director of state-security prisons, Muhammad bin Salman al-Sarrah, and what appeared to be a television crew of at least half a dozen men, each bearing a microphone or a camera. I worried about what would happen next. Newsworthy events inside the walls of terrorist prisons tend not to be good. Lurking in the background were several bearded men in identical gray business suits.

During the 1990s and 2000s, Saudi Arabia was a net exporter of vision, but it was a jihadist vision. Fifteen of the 19 hijackers on 9/11 were Saudi citizens.

Al-Sarrah, it turned out, was a real jihadism nerd, and over tea we reminisced about various luminaries in the history of Saudi terror. After this small talk, he invited me to join him in an auditorium that could have been a lecture hall on a small college campus. Shutters clicked as the cameramen followed.

In the auditorium, the men in suits took the stage. Their leader, a man named Abdullah al-Qahtani, explained that he and most of the others in the room were prisoners, and that they had a PowerPoint presentation they wished to show me about the enterprise they were running in the prison. The camera crew was made up of prisoners too, and they were documenting my visit for imprisoned members of jihadist sects.

What followed was the most surreal slide deck I have ever seen: a corporate org chart and plans for a set of businesses run from within the prison by jihadists and other enemies of the state. Al-Qahtani spoke in Arabic, translated by an excitable counterpart nearby.

The org chart showed CEO al-Qahtani at the top, with direct reports from seven offices beneath him, among them financial, business development, and "programs' affairs." Under the last of these was another sub-office, "social responsibility."

Al-Qahtani explained that 89 percent of the prison population had taken part in the program so far. In a way, it was like any other prison-industry program; in the United States, prisoners staff call centers, raise tilapia, or just push brooms in the prison corridor for a dollar an hour. But the Ha'ir group, doing business as a company called, simply, Power, was aggressively corporate and entrepreneurial.

Al-Qahtani and the interpreter took me to a small garden, where prisoners cultivated peppers under plastic sheeting and raised bees and harvested their honey to sell at the prison shop, in little jars with the Power logo. They operated a laundromat and presented me with a price list. The prison will clean your clothes for free, they said, but staff and inmates alike could bring clothes here for special services, such as tailoring, for a fee. I could see shirts, freshly laundered and pressed, with prisoner numbers inked into the collars. Each number started with the year of entry on the Islamic calendar. I saw one that started in 1431, about 12 years ago.

Almost all the men wore thick beards, and many had a *zabiba* (literally "raisin"), the discolored, wrinkly spot one gets from pressing the head to the ground in prayer. Some of their products were artisanal and religious-themed. They led me into a tiny room, a factory for the production of perfumes for sale outside the prison, and to another room where they made prayer beads from olive pits.

"Here, smell this," a former member of al-Qaeda commanded me, sticking under my nose a paper strip blotted with a chemical I could not identify. I think the scent was lavender. Another prisoner, at the Power-run prison canteen, offered me free frozen yogurt. As I walked around the prison, the yogurt began to melt, and my interpreter held it so I could take notes.

Strangest of all, I found, was Power's corporate nerve center—a warren of drab, cubicle-filled offices. The employees wore uniforms: suits for the C-suite executives and blue Power-branded polo shirts for the mid-levels puttering on their computers. They had a conference room with a whiteboard (at the top, "In the name of God, the most gracious, most merciful" was written in Arabic, and partially erased; the rest was the remains of a sales brainstorming session), a reception desk, and portraits of the king and the crown prince overseeing it all.

Nothing is stranger than normalcy where one least expects it. These jihadists—people who recently would have sacrificed their life to take mine—had apparently been converted into office drones. Fifteen years ago, Saudi Arabia tried to deprogram them by sending them to debate clerics loyal to the government, who told the prisoners that they had misinterpreted Islam and needed to repent. But if this scene was to be believed, it turned out that terrorists didn't need a learned debate about the will of God. They needed their spirits broken by corporate drudgery. They needed Dunder Mifflin.

My hyperactive interpreter, who had been gesticulating and yapping throughout the tour, was no ordinary jihadist. He was an American-born Saudi member of al-Qaeda named Yaser Esam Hamdi. Hamdi, now 41, emerged from a pile of rubble in northern Afghanistan in December 2001. His dear friend, pulled from the same rubble, was John Walker Lindh, the so-called American Taliban. Hamdi spent months in Guantánamo Bay before being transferred to the U.S.; he was released after his father, a prominent Saudi petrochemical executive, helped take Hamdi's case to the Supreme Court, and won (*Hamdi v. Rumsfeld*). Hamdi was sent back to Saudi Arabia on the condition that he renounce his U.S. citizenship (he was born in Louisiana and left as a small child), but the Saudis decided he needed more time in prison and locked him up for eight years in a facility in Dammam, and for another seven in Ha'ir. He is due for release this year.

Hamdi guided me like a kid showing his parents around his sleepaway camp. He explained that Power is part of a larger entity at the prison, known as the "Management of Time" (*Idarat al-Waqt*)—a comprehensive but amorphous program meant to beguile the inmates out of bad ideas and replace them with good ones. It

involves corporate training, but also gathering the inmates together for song and music, for poetry readings, for the publishing of newspapers (I snagged a copy of the *Management of Time News*), and for the production of TV shows. I watched a room full of men sing a song they had written, “O My Country!,” and show videos in which they extolled the government and the crown prince. Al-Qaeda and ISIS forbid most music and revile the monarchy. Like so many other Saudis, these men seemed to have swapped their religious fanaticism for nationalist fanaticism. One wondered what they really believed.

Al-Sarrah followed close behind us, and I shot him a look when I heard the name of the program. One of the most famous jihadist texts, a playbook for ISIS, is “The Management of Savagery” (*Idarat al-Tawahhush*). It is a deranged manual for destroying the world and replacing it with a new one. That was what this program was doing in reverse: replacing the jihadists’ savage appetite for an imagined future with an appetite for the real, the now, and the ordinary.

A bookish man who had been with Osama bin Laden at Tora Bora looked me steadily in the eye, like he was trying to convince me and not himself. “Vision 2030 is real,” he said.

I told Hamdi that I had corresponded with his friend Lindh, who served 17 years in federal prison in the United States before his release in 2019. Our correspondence had led me to believe that he was just as radical as ever, and that his stay in prison—spent in solitary study of Islamic texts—had confirmed his violent streak and converted him from an al-Qaeda supporter to an ISIS supporter.

Graeme Wood: I wrote to John Walker Lindh. He wrote back.

“Really?” Hamdi asked, before venturing a guess as to why. “The United States doesn’t know how to deal with Muslims. When I was in Afghanistan, I had extreme thinking.” Going to a Saudi prison helped. “The difference is that in jail [here] we have a program. You want to explode the thinking we have in our brain. For 17 years he was alone.” The Saudis filled Hamdi’s time. They managed it. “We didn’t have time to read the Islamic books … We didn’t have time to do anything but work to improve ourselves.” He was a specialist in Power’s media department, and could now produce videos of passable quality.

“I didn’t know what a montage was,” he said. “I didn’t know what a design was.” We were driving to another part of the prison with al-Sarrah in the front seat and Hamdi and me in the back. “Now I am professional!” he said. “I am a complete montage expert!” He pointed at al-Sarrah, who smiled but did not speak or even look back. “All thanks to this man! The government opened this for us! Now I am in a car! Talking to you! Normally! Peacefully! No kind of problems!” Upon release, he said, he might work for his father’s company, or even (this was his dream) go into film and television production. I wondered what it might be like to have a co-worker like Hamdi, with, shall we say, an unconventional work history, and a penchant for extremism and Osama bin Laden that he swore up and down had been thoroughly replaced with a love for film and video production and the crown prince of Saudi Arabia. I was pretty sure Hamdi would be a better colleague than John Walker Lindh.

 *Top left:* A camel market about an hour outside Riyadh, in January. *Top right:* A sign on the highway from Jeddah to Taif marking the turnoff for Mecca. *Bottom:* Women in Asir province. Outside Saudi Arabia's major cities, it isn't clear how quickly modernization is catching on. (Lynsey Addario for *The Atlantic*)

At the prison I asked many inmates how they could trade jihadism for these worldly things, which surely amounted to frippery compared with the chance to die in the path of God. They laughed, nervously, as if to ask what I was trying to do—get them to leave the prison and kill again? They were mostly still young, and they yearned for freedom. That they no longer wanted something thrilling and extraordinary was exactly the point. It is possible to have too much vision, or the wrong kind—some of them had gone to Syria, barely survived, and had had enough vision, thank you very much. "We don't want anything but a normal life," one told me. "I would be happy just to go outside, to walk on the Boulevard in Riyadh, to go to McDonald's."

"I went to Syria because I was offered to take part in a dream, the dream of a caliphate," said another. Ali al-Faqasi al-Ghamdi, a bookish man who had been with bin Laden at Tora Bora, told me he now recognized such dreams as counterfeit. What, he asked, is the point of a big, exciting dream when it is a false one? A small ambition that can actually be fulfilled is preferable to a big one that cannot. He looked me steadily in the eye, like he was trying to convince me and not himself. "Vision 2030 is real."

AMERICA MUST NOW decide whether that vision is worth encouraging. Twenty years ago, if you had told me that in 2022 the future king of Saudi Arabia would be pursuing a relationship with Israel; treating women as full members of society; punishing corruption, even in his own family; stanching the flow of jihadists; diversifying and liberalizing his economy and society; and encouraging the world to see his country and his country to see the world—Wahhabism be damned—I would have told you that your time machine was malfunctioning and you had visited 2052 at the earliest. Now that MBS is in power, all of these things are happening. But the effect is not as pleasing as I had hoped.

In 1804, another modernizing autocrat, Napoleon Bonaparte, arrested Louis Antoine, the duke of Enghien, on suspicion of sedition. The duke was young and foolish, and no great threat to Napoleon. But the future

emperor executed him. Around Europe, monarchs were shocked: If this was how Napoleon treated a harmless naif like the duke, what could they expect from him as his power grew, and his domestic opposition dissolved in fear? The execution of Enghien alerted the most perceptive among them that Napoleon could not be managed or appeased. It took a decade of carnage to figure out how to stop him.

Enghien's schemes wouldn't have stopped Napoleon, and Khashoggi's columns wouldn't have stopped MBS. But his murder was a warning about the personality of the man who will be running Saudi Arabia for the next half century, and it is reasonable to worry about that man even when most of what he does is good and long overdue.

For now, MBS's main request to the outside world, and especially the United States, is the usual request of misbehaving autocrats—namely, to stay out of his internal affairs. "We don't have the right to lecture you in America," he said. "The same goes the other way." Saudi affairs are for Saudis. "You don't have the right to interfere in our interior issues."

But he acknowledges that the fates of the two countries remain linked. In Washington, many see MBS's rise as abetted, perhaps even made inevitable, by American support. "There was a moment in time where the international community could have made it clear that the Khashoggi murder was the straw that broke the camel's back, and that we weren't willing to deal with MBS," Senator Murphy told me. The Trump administration's support, when MBS was at his most vulnerable, saved him. "If MBS ultimately becomes king," Murphy said, "he owes no one bigger than Jared Kushner," Trump's personal envoy to the crown prince. ("You Americans think there is something strange about a ruler who sends his unqualified son-in-law to conduct international relations," one Saudi analyst told me. "For us this is completely normal.")

Some still hope that MBS will not accede to the throne. "Only one of the last five crown princes has eventually become king," Khalid al-Jabri noted to me, optimistically. But everything I see suggests that his ascent is certain, and that the search for alternatives is forlorn. Two of those four also-ran crown princes were sidelined or replaced by MBS himself. The other two died of old age.

The United States needs its partners in isolating Iran, and MBS is a stalwart there. And even domestically, he remains in some ways the right man for the job. He is at least, as Philip Zelikow reminded me, not a ruler in denial. "We wanted Saudi leadership who would face their problems, and embark on an ambitious and incredibly challenging generational struggle to remake Saudi society for the modern world," he told me. Now we have such a leader, and he is presenting a binary choice: support me, or prepare for the jihadist deluge.

"We don't have the right to lecture you in America," MBS said. "The same goes the other way."

MBS is correct when he suggests that the Biden administration's posture toward him is basically recriminatory. *Stop bombing civilians in Yemen. Stop jailing and dismembering dissidents.* The U.S. might, on the margins, be able to persuade MBS to use a softer touch—but only by first persuading him that he will be rewarded for his good behavior. And no persuasion will be possible at all without acknowledging that the game of thrones has concluded and he has won.

Many of the exiles I spoke with said their best hope now is that the crown prince will mellow, and that elder Saudi wise men will keep him from destroying the country with rash decisions, like the fight with Qatar, or the murder of Khashoggi. MBS does have a sense that being capricious and impulsive can be costly. "If we run the country randomly," he told me, "then the whole economy is going to collapse." Others had tried that strategy: "That's the Qaddafi way."

King Salman has instituted measures ostensibly intended to force his son to govern more inclusively after Salman's death. He changed the law of succession to prevent the next king from naming his own children, or indeed anyone from his own branch of the family, as his crown prince. I asked MBS if he understood that to be the rule, and he said yes. I asked if he had anyone in mind for the job. "This is one of the forbidden subjects," he said. "You will be the last to know."

WHEN HE IS KING, however, the rules will belong to him, and to ask him to abide by them against his wishes will be about as easy as negotiating from your suite at the Ritz-Carlton.

A crown prince with a subtler mind and a gentler soul might have implemented MBS's reforms without resorting to his brutal methods. But it is pointless to consider policy in a state of childlike fantasy, as if it were possible to conjure some new Saudi monarch by closing your eyes and wishing him into existence. Open your eyes, and MBS will still be there. If he is not, then the man ruling in his place will not be an Arab Dalai Lama. He will be, at best, a member of the unsustainable Saudi old guard, and at worst one of the big beards of jihadism, now richer than Croesus and ready to fight. As MBS told me, to justify the Ritz operation, "It's sometimes a decision between bad and worse."

Since reality has handed us MBS, the question for America is how to influence him. This question is practical rather than moral: If your moralism drives him into a partnership with China, what good will it have been? A fundamental principle of Chinese foreign relations is butting out of other countries' internal affairs and expecting the same from them. Certainly Beijing will not reprimand him for his treatment of dissidents.

In effect, both the Saudis and the Americans are now in the Ritz-Carlton, forced to bargain with a jailer who promises us prosperity if we submit to his demands, and *Mad Max* if we do not. The predicament is familiar, because it is the same barrel over which every secular Arab autocrat has positioned America since the 1950s. Egypt, Iraq, and Syria all traded semitribal societies for modern ones, and they all became squalid dictatorships that justified themselves as bulwarks against chaos.

Twenty years ago, Syria watchers praised Bashar al-Assad for his modernizing tendencies—his openness to Western influence as well as his Western tastes. He liked Phil Collins; how evil could he be? By now most everyone outside Damascus, Tehran, and Moscow recognizes him as Saddam Hussein's only rival in the dubious competition for most evil Arab leader.

MBS has completed about three-quarters of the transition from tribal king with theocratic characteristics to plain old secular-nationalist autocrat. The rest of that transition need not be as ruthless as the beginning, but MBS shows no sign of letting up. The United States can, and should, make the case that Saudi Arabia's security and development will demand different tools going forward. It might even suggest what those tools should be. But it probably cannot make MBS use them.

A more pragmatic approach is to make sure that the reforms he has instituted stick, and that the changes in Saudi culture become irreversible. The opening of the country and the forcible sidelining of a crooked royal class—these are hard changes to undo, and they bind even the absolute monarch who decreed

them. Granting women driver's licenses was ultimately a smooth process. Taking them back would disrupt millions of lives and sow protest across the kingdom. American influence can acknowledge and encourage such changes.

Sometimes this is how absolute power relaxes its grip: slowly, without anyone noticing. In England, the transition from absolute monarchy to a fully constitutional one took 200 years, not all of them superintended by the most stable kings. MBS is still young and hoarding power, and everyone who has predicted that he would ease up on dissent has so far been proved optimistic. But 50 years is a long reign. The madness of King Mohammed could give way to something else: a slow and graceful renunciation of power—or, as with Assad, an ever more violent exercise of it.

This article appears in the April 2022 print edition with the headline "Absolute Power."

Graeme Wood is a staff writer at *The Atlantic* and the author of *The Way of the Strangers: Encounters With the Islamic State*.

SAF created transcript of excerpts from video in the Arab News July 16, 2022 report "*INTERVIEW: Adel Al-Jubeir on why Biden's Saudi visit is a success, and US commitment to Kingdom's security"* that included a video. at https://www.arabnews.com/node/2123271/saudi-arabia. Al-Jubeir is Saudi Arabia Minister of State for Foreign Affairs.

Items in "italics" are SAF Group created transcript

Note Arab News had the vast majority of Al-Jubeir's comments but we made a few s and added the comments that weren't in the Arab News report.

Al-Jubeir "*I think Saudi Arabia's policy on oil has been to try to seek balance in the energy markets, to make sure that the markets are adequately supplied and that you have no shortages.*

Now, when you have dislocations in the markets because of geopolitics or because of dislocations in the price of other energy, whether it is coal or natural gas, and they skyrocket and they pull up the price of crude oil, that really has nothing to do with a shortage of crude oil as much as other factors.

With regards to the price of gasoline in the United State, that's really a function of a lack of refining capacity. The US has not built a refinery in more than 40 years and it has something to do with a regulatory environment that has now led to having many different blends of gasoline in different regions of the United States, which makes it complicated to supply gasoline into the American market.

So increasing crude oil supplies to the US is not going to alleviate that problem. But going back to the global situation, Saudi Arabia's policy is to work within OPEC and OPEC+ to make sure the markets are adequately supplied and we have been doing that.

And I believe that the Biden administration is aware of this. If you look at only the last year alone, Saudi Arabia was able to increase oil production on a fairly regular basis. As well as within OPEC and OPEC+ in order to meet the demands of the market, and Saudi Arabia will continue to assess market needs and take decisions according to that.

But I think that this idea that he asked for oil increase and they said no, or he asked for oil and they said yes is an over-simplification and over-dramatization of the situation. The US administration is fully aware of Saudi Arabia's policies in this regard and what Saudi Arabia is doing. And also appreciates the responsible manner in which Saudi Arabia has managed its production and export of crude oil."

Prepared by SAF Group https://safgroup.ca/news-insights/

SAF Group created transcript of excerpts from Mike Muller (Head, Vitol Asia) on Gulf Intelligence PODCAST: Daily Energy Markets – June 5th hosted by Sean Evers (Managing Partner, Gulf Intelligence) on June 5, 2022 [LINK]

Items in "*Italics*" are SAF Group created transcript

At 3:30 min mark, Muller ".. *what actually happens to OPEC+ output of course is a different matter. There is a commonly held view that really only the UAE and Saudi have spare capacity. And the debate now focuses on what exactly is that number, what can those two countries produce, sustainably. Because no one really knows, it's subsurface and it's not been tested other than a couple of surge production, high watermarks set by the Saudis to much fanfare, of course, just before Covid struck and those were in the high 12's. But the smart money is of the view that the Saudi current sustainable production limit is somewhere 11 point something and that's a pretty wide range. And yes, the quota gets them to 10.8 and above. And we must remind ourselves that most OPEC+ members are already at their limits and therefore this provides an open door for Saudi and UAE to make up the shortfall. Notably also, some may recall there was a month, which I believe was March, just a few months back, when the Saudi OSPs went very because of the formula and a lot of people felt that was too much at once and there was an undenomination. So I think there is a little up their sleeves as well."*

At 25:50 min mark, Muller "*Sean, I don't think we would be complete if we didn't talk about Iran a little bit, if I may. You have to take a view that the status quo is this, the US is allowing a certain amount of flows under carve out, which they have given silent okay to, maybe flows to China. And at the same time, there is also a certain amount of Venezuela flow that is condoned. But it would appear like, if we assume the JCPOA is more or less hacked out, that it's a political decision centering around the refusal of the Americans to accede to the request to drop the designation of the republican guard as a terrorist organization. This is a sticking point that is likely to persist. And I think most analysts now don't have any Iranian oil coming back this year. But it is another form of release in terms of oil ready to go now because there is so much being in storage and floating, hundred and something million barrels take your pick regarding where condensate is. Now I think the window of political opportunity for the Biden administration to reach a deal with Iran is already evaporated, if not gone, because we are getting into mid-terms soon. But if the mid-terms are dominated by needing to get gas prices lower in America, turning a somewhat greater blind eye to the sanction barrels flowing out and competing with Russia for that matter, is probably something that you might expect to see. And the US intervention in these flows has always been pretty sparse anyway. So whilst I don't think there is going to be a deal, I think the clamping down and arresting of ships even though there was some going on in the Aegean Sea and Mediterranean just recently and then a reciprocal arrest of ships in the Hormuz area. I think there is a chance that Uncle Sam might allow just allow a little bit more of that oil to flow, which is not good for markets because it creates a three-tier market if you like."*

Evers: "*Mike just on that point, if you've got those two pieces right – you've got the Iranian leak and now you've got these heavily discounted Russian barrels coming into Asia, coming into China and looking to increase, how should the Saudis and the Gulf Arabs look at that, it that a threat to their market? is it no bid deal over the mid term?*"

Muller: "*This is where this huge range of views comes in. If you believe things are going to remain pretty tight and there's not enough oil to go around because of spare capacity concerns and the whole underinvestment theme, then those consultants and those experts believe that we need those Iranian to come to the market because there is nowhere else to bring them from. If you believe the Saudis have an extra million barrels a day of spare capacity and there is going to be substantial demand destruction because of recessionary concerns and high commodity prices, then you don't. So take your pick on what perspective*."

Prepared by SAF Group https://safgroup.ca/news-insights/

https://www.timesofisrael.com/laser-based-air-defense-shoots-down-drones-rockets-in-first-series-of-trials/

In ‘game changer,’ Israeli laser-based air defense shoots down drones

Officials hail Iron Beam system after successful interceptions of guided and unguided projectiles; Gantz says all efforts being made for early deployment

By **EMANUEL FABIAN** 14 April 2022, 4:00 pm

The Defense Ministry revealed Thursday that a laser air defense system it is developing successfully shot down drones, rockets, mortars, and anti-tank missiles in a first series of tests last month.

According to the head of the ministry’s research and development team, Brig. Gen. (res.) Yaniv Rotem, the tests were conducted at “challenging” ranges and timings.

“The use of a laser is a ‘game changer’ and the technology is simple to operate and proves to be economically viable,” he said.

In a video released by the ministry, the laser-based system can be seen intercepting a rocket, a mortar, and a drone at an undisclosed location in southern Israel’s Negev desert, during March of this year.

The ministry has been testing the laser-based defense system for several years, shooting down a drone with it last year. The recent tests were the first to be successful against the other threats, including unguided projectiles and anti-tank guided missiles. (The latter was not shown in footage released by the ministry.)

Its research and development department initially planned to deploy the anti-missile system by 2024, but the military has pushed for an earlier deployment. Prime Minister Naftali Bennett announced in February that Israel would deploy the system within the year.

The ‘Iron Beam’ laser-based air defense system is seen during a test in southern Israel, March 2022. (Defense Ministry)

This was apparently driven by concerns that in a future conflict, the military would not have sufficient interceptor missiles for the Iron Dome and other air defense systems to shoot down incoming rockets, missiles, and drones.

“Every effort is being made to make the system operational as soon as possible and enable an efficient, inexpensive, and innovative protection umbrella,” Defense Minister Benny Gantz said Wednesday.

The ground-based laser system — dubbed Iron Beam — which is being developed with the Rafael weapons manufacturer, is not meant to replace the Iron Dome or Israel’s other air defense systems, but to supplement and complement them, shooting down smaller projectiles and leaving larger ones for the more robust missile-based batteries.

According to the ministry, Israel is among the first countries in the world to succeed in using powerful laser technology to develop a working air defense system and to demonstrate interceptions in operational scenarios.

Hundreds of millions of shekels have been allocated to the final development stages and trial phase, in which the system will be placed on the border with the Gaza Strip.

Defense Minister Benny Gantz (second from left) is shown a new laser-based air-defense system at a Rafael weapons manufacturer complex in Israel, on March 17, 2022. (Defense Ministry)

Since development began, the high-power laser has proven more powerful than the ministry's team initially aimed for, officials previously said, without detailing the exact number of kilowatts of electricity it operates on.

According to the Defense Ministry, as long as there is a constant source of energy for the laser, there is no risk of ever running out of ammunition.

The downside of a laser system is that it does not function well in times of low visibility, including heavy cloud cover or other inclement weather. For that reason, the ministry intends to also mount the system on an airplane, which would help get around this limitation by putting the system above the clouds, though that is still a few more years off, ministry officials have said.

"The successful series of tests proved the uniqueness of the system, intercepting a wide range of threats in a variety of scenarios," said Rafael Advanced Defense Systems director-general Yoav Har-Even.

"The cooperation between Rafael and the Defense Ministry [research team] has led to a technological breakthrough and the completion of a significant milestone, one that will allow us to reach initial operational capability in a short time," he added.

A target is intercepted by the ‘Iron Beam’ laser-based air defense system, over southern Israel, March 2022. (Defense Ministry)

The ministry said the system is an “effective, accurate, easy-to-operate tool that is significantly cheaper than any other existing means of protection,” against the threats Israel faces.

The Lebanese Hezbollah terror group is believed to maintain an arsenal of some 130,000 rockets, missiles, and mortar shells, which the military believes would be used against Israel in a future war.

The two largest terror groups in the Gaza Strip, Hamas and the Palestinian Islamic Jihad, are also each believed to possess thousands of rockets and mortar shells, even after firing upwards of 4,000 projectiles at Israel during last year’s 11-day war.

Israeli military officials have also said they have seen a growing trend in Iranian use of drone attacks in recent years, dubbing it Iran’s “UAV terror.”
Against these and other threats, Israel operates a multi-tiered air defense array, made up of the short-range Iron Dome, the medium-range David’s Sling, and the long-range Arrow and Patriot systems.

Oil price outlook – Snapshot: July 11, 2022

Disclaimer: Please note that BNEF does not offer investment advice. Clients must decide for themselves whether current market prices fully reflect the issues discussed in this note.

Category	Indicator	Signal	Comment
Fundamentals	**Refinery margins**	↓	• Refinery margins were lower over the past week as middle distillate and fuel oil cracks weakened.
	Crude stocks	↓	• In the week ending July 1, land crude-oil storage levels in BloombergNEF's tracked regions (the US, ARA and Japan) grew by 2.7% to 544.7 million barrels (m bbl). The stockpile **deficit** against the five-year average (2015-19) **narrowed from 80.8m bbl to 61.6m bbl**. • Including global floating crude stockpiles from the same week, total crude oil inventories increased by 3.4% to 638.1m bbl, with the stockpile **deficit narrowing from 49.1m bbl to 22.6m bbl.**
	Product stocks	↑	• In the week ending July 1, gasoline and light distillate stockpiles in BNEF's tracked regions (the US, ARA, Singapore, Japan and Fujairah) fell by 0.5% week-on-week to 261.4m bbl, with the stockpile **deficit** against the three-year average (2017-19) **narrowing from 10.7m bbl to 10m bbl**. Gasoil and middle distillate stockpiles in BNEF's tracked regions dropped by 0.8% to 142.1m bbl, with the stockpile **deficit** against the three-year average **widening from 29.2m bbl to 34.9m bbl**. • Total oil product stockpiles in tracked regions decreased by 0.1% to 923.9m bbl, with the stockpile **deficit** against the three-year seasonal average **widening from 62.2m bbl to 66.4m bbl**. Altogether, crude and product stockpiles rose by 1.3% to 1,561.9m bbl, with the stockpile **deficit narrowing from 111.3m bbl to 88.9m bbl.**
	Demand indicators	↓	• In the week to July 12, global jet fuel demand from commercial passenger flights grew 2% week-on-week to 5.70 million barrels per day. Jet fuel consumption by international passenger flight departures was up by 26,300 barrels per day (or +0.8%) week-on-week, while consumption by domestic passenger flight departures increased by 86,600 barrels per day (or +3.6%). In the week to July 10, flight departures in the Eurocontrol area rose to 87.3% of the equivalent week in 2019 (up from 86.6% last week), while in the week to July 9, passenger throughput in the US dipped to 83.2% of the equivalent week in 2019 (down from 98.1% last week). • Global mobility indices were weaker over the past week, according BNEF's calculations based on Google, TomTom and Baidu data. The Google global mobility index dropped by 0.7% in the week to July 6, as declines in the Americas (-2.6%) offset growth in Asia Pacific ex-China (+0.2%) and Europe (+0.2%). Meanwhile, in the week to July 6, TomTom's peak congestion data showed a dip in North America (-15.6%) and Europe (-3.9%), while Asia Pacific ex-China saw growth (+4.6%). Road congestion in China's key 15 cities was up by 4.2 percentage points to 113.4% of January 2021 levels in the week to June 29, according to BNEF's calculation based on Baidu data. • Daily average Covid-19 cases rose by 13% to 875,000 in the week to July 9. The Asia Pacific number increased by 23% to 177,000 daily cases (with China rising 170% to 429 cases), the Americas was up 0.2% to 226,000 daily cases, and Europe rose by 19% to 441,000 daily cases.
Financial	**Macro indicators**	↓	• The US dollar index averaged 106.6 over the past week and was 1.8% higher than the week before.
	Hedge fund positioning	↓	• In the week to July 5, Managed Money net positioning in the oil complex was down by 110.3m bbl (or -19.9%) week-on-week to 445.3m bbl, and fell to the 9th percentile (versus the 24th percentile last week) of the past five years. This was the largest decrease in net length since the week to March 8, 2022.
	Options chains and volatility	↓	• There was a significant surge in open interest for WTI calls. Brent and WTI 1M volatility skews saw some recovery over the past week.
Outlook	**Weekly call**	↓	• BNEF is bearish on oil prices for the week ahead, with Brent Sep-22 trading at $105.53/bbl and WTI Aug-22 trading at $103.13/bbl at the time of writing. • The global mobility index showed signs of weakness over the past week, with a strong dip in the Americas, particularly North America. Jet fuel demand rose in the week to July 12, although air traffic in the US weakened significantly against 2019 levels. Weekly road congestion levels in China also fell over the past week, although they held on to most of their gains over the past weeks. Shandong private refinery run rates remained flat over the past week, putting an end to nine consecutive weeks of gains. • Weekly crude and oil product inventories made a significantly bearish move over the past week. Weekly crude inventory deficit against the three-year (2017-19) seasonal range shrunk by more than half, while oil product inventory deficit widened but remained range-bound. • Oil prices face headwinds over the coming week. Signs of demand destruction are becoming more apparent lately - road and air traffic levels in the US seems to be faltering, while global road traffic has struggled to break the pre-pandemic-highs reached in March 2020. Virus cases in China have also almost tripled over the past week, potentially hampering the country's demand recovery trajectory.

BloombergNEF

Past outlooks

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Date of report	Refinery margins	Crude stocks	Product stocks	Demand indicators	Commitment of traders	Options chain and volatility	BNEF week ahead call	Brent/WTI price at time of writing ($/bbl)	Web Link
July 11	↓	↓	↑	↓	↓	↓	↓	Brent-Sep: 105.53 WTI-Aug: 103.13	
July 5	↓	↑	↓	↑	↓	↓	↔	Brent-Sep: 111.71 WTI-Aug: 107.91	
June 21	↑	↓	↑	↑	↓	↓	↔	Brent-Aug: 115.81 WTI-Aug: 110.34	
June 13	↔	↑	↔	↔	↑	↔	↔	Brent-Aug: 120.06 WTI-Jul: 118.58	
June 6	↔	↑	↑	↔	↑	↔	↔	Brent-Aug: 119.88 WTI-Jul: 118.94	
May 30	↔	↑	↓	↔	↔	↔	↔	Brent-Aug: 116.46 WTI-Jul: 115.81	
May 23	↑	↑	↑	↔	↑	↑	↑	Brent-Aug: 110.88 WTI-Jul: 111.11	
May 16	↓	↓	↔	↑	↓	↓	↔	Brent-Jul: 112.22 WTI-Jul: 109.69	
May 9	↔	↓	↔	↑	↓	↔	↑	Brent-Jul: 109.93 WTI-Jun: 107.22	
May 2	↑	↔	↑	↑	↔	↔	↑	Brent-Jul: 103.87 WTI-Jun: 101.25	
April 25	↑	↑	↔	↓	↑	↔	↔	Brent-Jul: 101.31 WTI-Jun: 97.39	
April 18	↑	↓	↔	↑	↓	↓	↔	Brent-Jun: 111.97 WTI-Jun: 106.31	
April 11	↑	↓	↔	↓	↓	↓	↓	Brent-Jun: 98.34 WTI-May: 93.69	
April 4	↑	↑	↔	↑	↓	↓	↑	Brent-Jun: 104.71 WTI-May: 99.73	

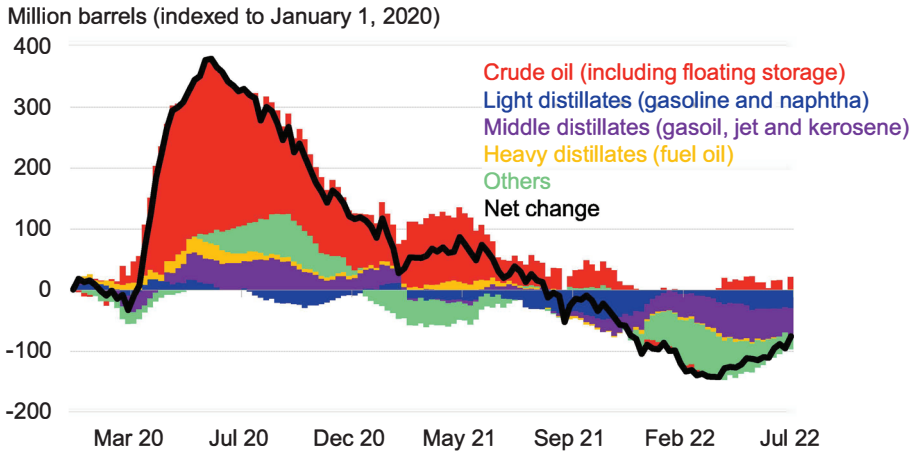
To view past reports on terminal, go to NI BNEFOIL, search for the report and click on the icon to the far right:

BloombergNEF

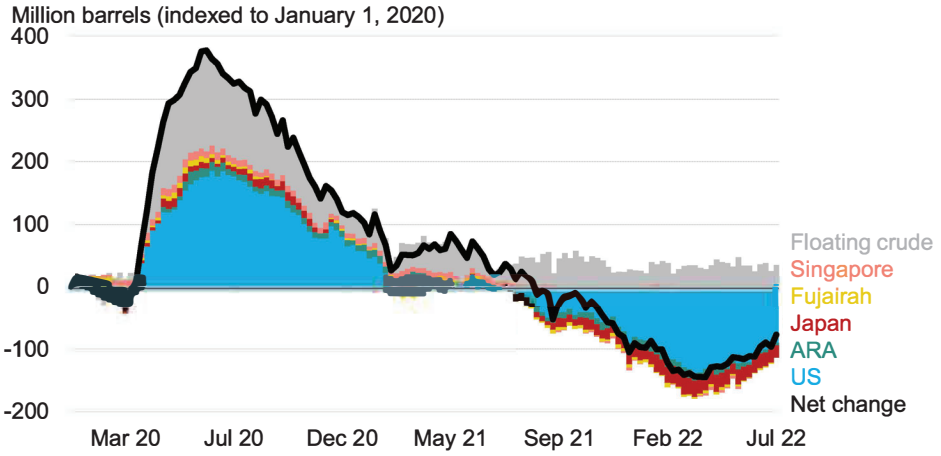
Weekly oil inventories

Stockpiles see growth

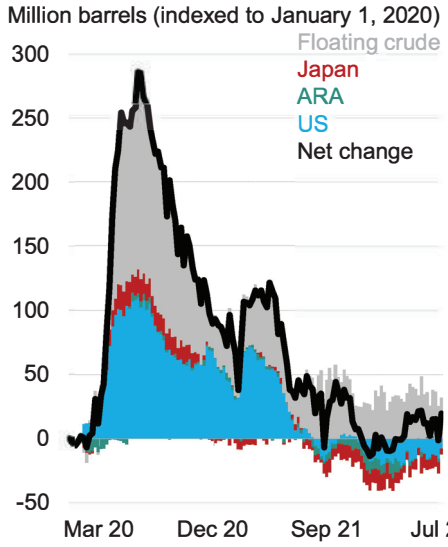
Weekly oil inventories by type



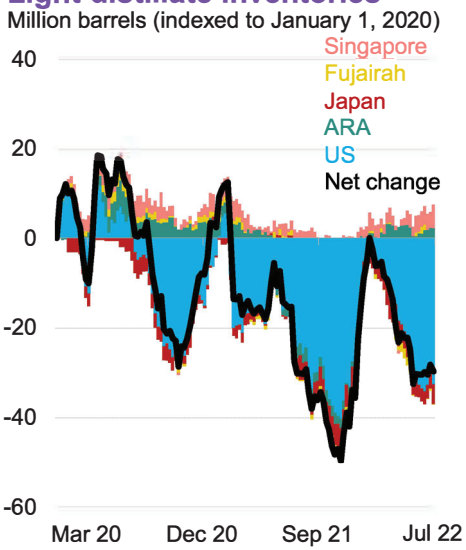
Weekly oil inventories by region



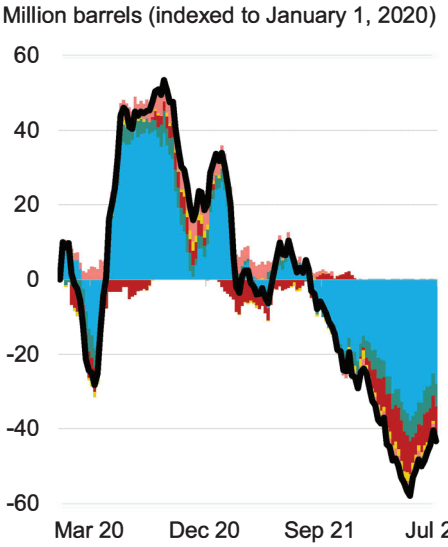
Crude inventories



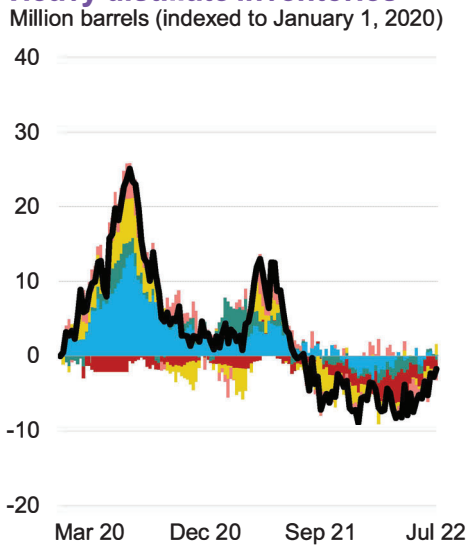
Light distillate inventories



Middle distillate inventories



Heavy distillate inventories



Source: BloombergNEF, US EIA, PJK, IE Singapore, FEDCom/Platts, PAJ ,Vortexa, Genscape. As of the week ending ***July 1, 2022****.*

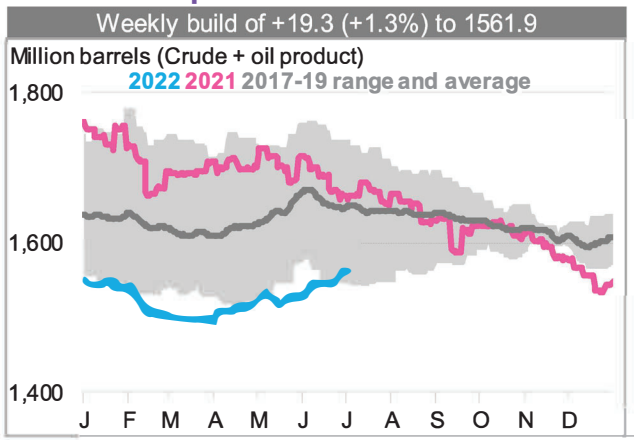
Aggregated oil stockpiles

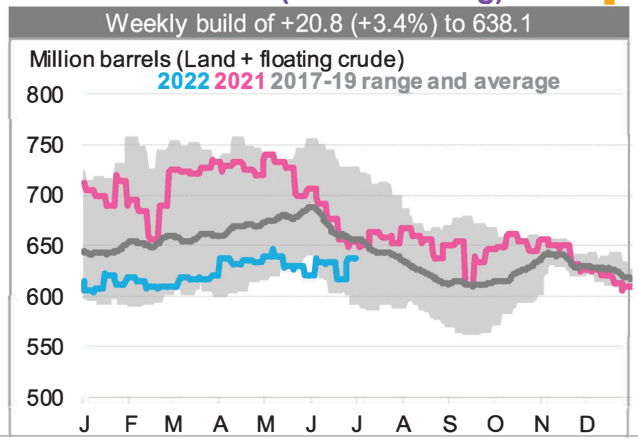
Note: We will continue to compare current inventory levels with the three-year (2017-19) seasonal average for the time being. Crude inventory data for Shandong teapots were excluded since January 10.

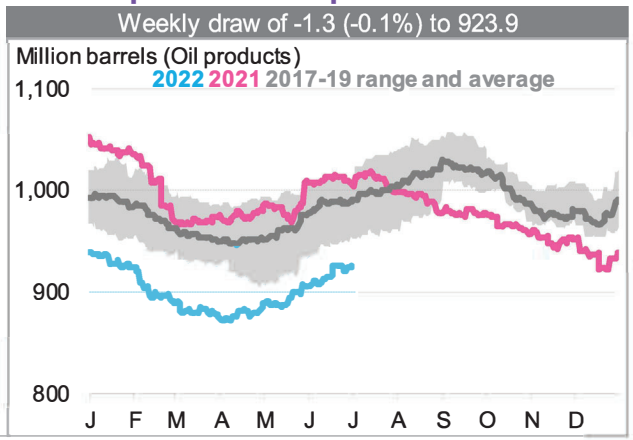
Bearish: Stockpile deficit narrowed from 111.3m bbl to 88.9m bbl

- Charts below use the **2017-19** (three-year) seasonal stockpiles. All calculations are recalibrated to measure against their respective three-year seasonal averages, so the values below may differ from the previous slides.
- Land crude inventories include the US, ARA, Japan and Shandong Teapots. Floating storage data are global. Oil product storage includes the US, ARA, Japan, Singapore, Shandong Teapots and Fujairah. Floating crude inventories may have been adjusted since the previous report – see slide 8 for further info.

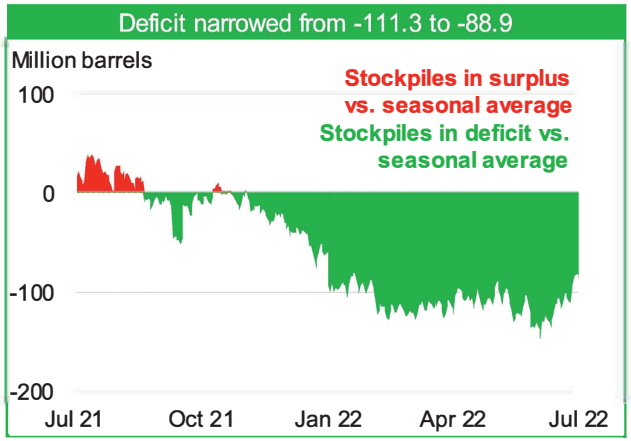
Total oil and product stocks = **Total crude stocks (land + floating)** + **Total oil product stockpiles**

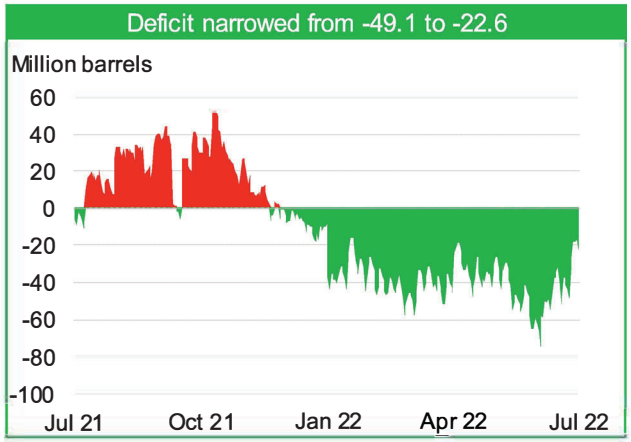


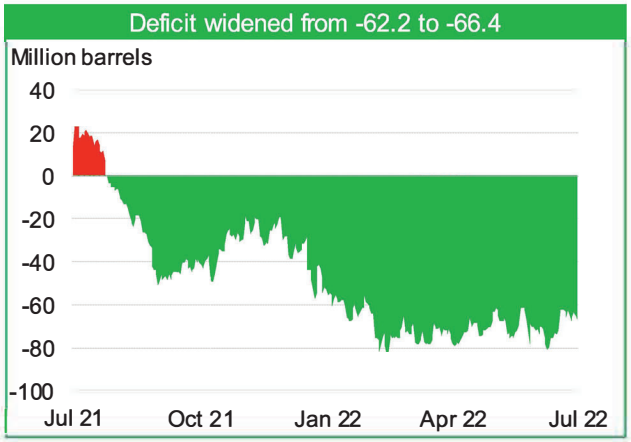




Charts below subtract current stockpiles by the 2017-19 (three-year) seasonal average







*Source: BloombergNEF, US EIA, PJK, IE Singapore, FEDCom/Platts, PAJ ,Vortexa, Genscape. As of the **week ending July 1, 2022.***

BloombergNEF

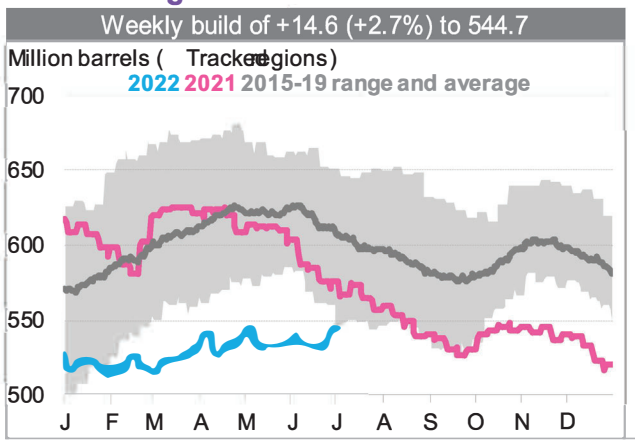
Crude stocks: Land

Note: We will continue to compare current inventory levels with the three-year (2017-19) seasonal average for the time being. Crude inventory data for Shandong teapots have been excluded since January 10.

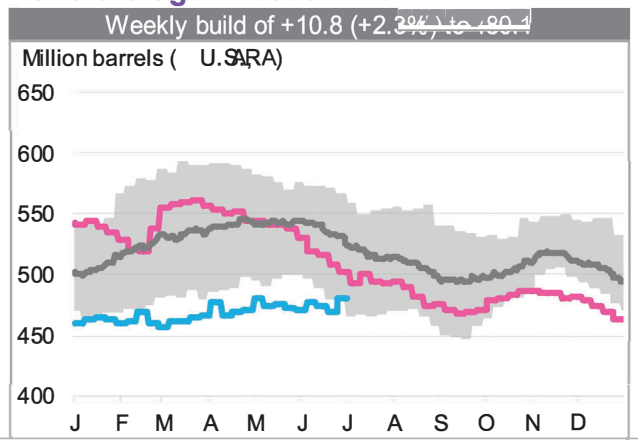
Bearish: Deficit narrowed from 80.8m bbl to 61.6m bbl against the seasonal average

- Crude inventory rises when supply outstrips demand (meaning more physical oil is available than is needed). High or rising inventories are therefore a bearish factor for oil prices. Every year, storage levels fluctuate due to seasonal demand trends. The intra-year directional movement of stockpile levels is somewhat predictable, yet the magnitude of movement can differ significantly from expectations.
- A useful way to gauge if the intra-year storage levels differ from the norm is to measure the difference between the current and seasonal average inventory levels.

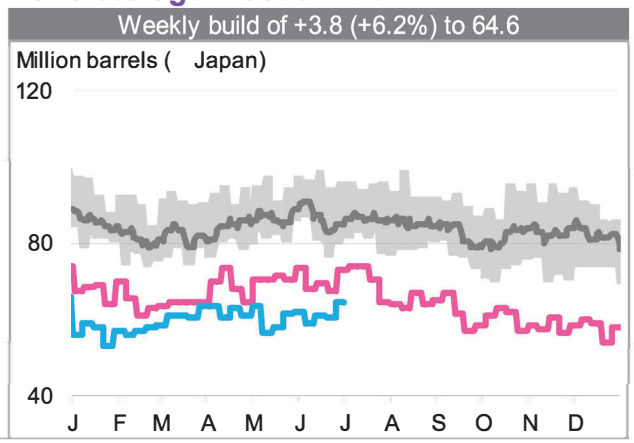
Land storage: Total



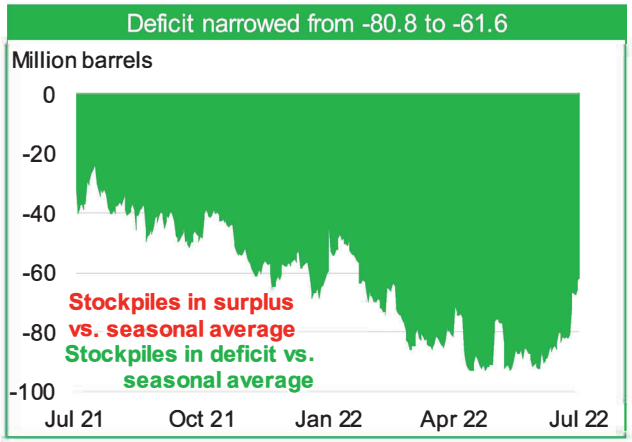
Land storage: West of Suez

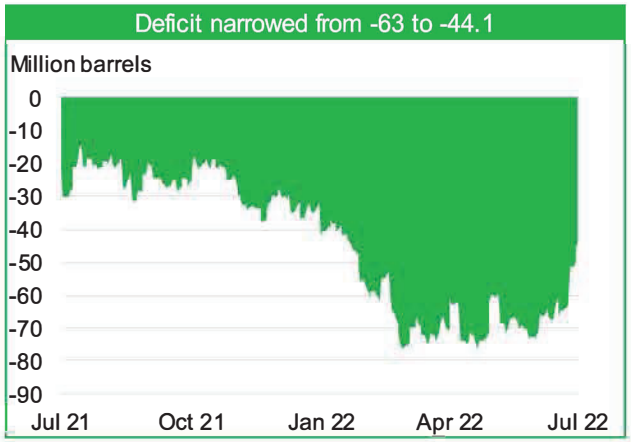


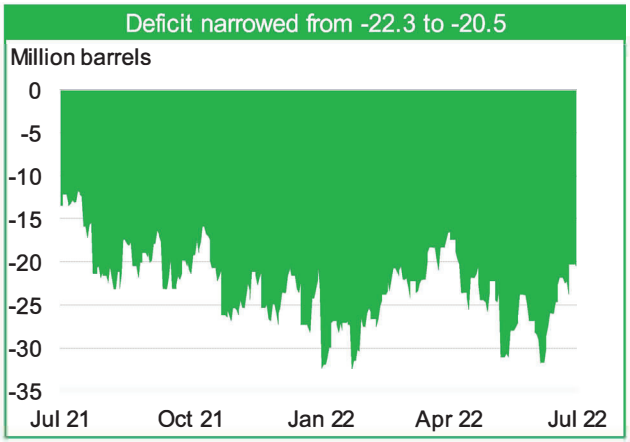
Land storage: East of Suez



Charts below subtract current stockpiles by the 2015-19 (five-year) seasonal average







*Source: BloombergNEF, US EIA, Genscape, PAJ. Note: As of the **week ending July 1, 2022.***

BloombergNEF

Crude stocks: Floating

Bearish: Surplus narrowed over the past week

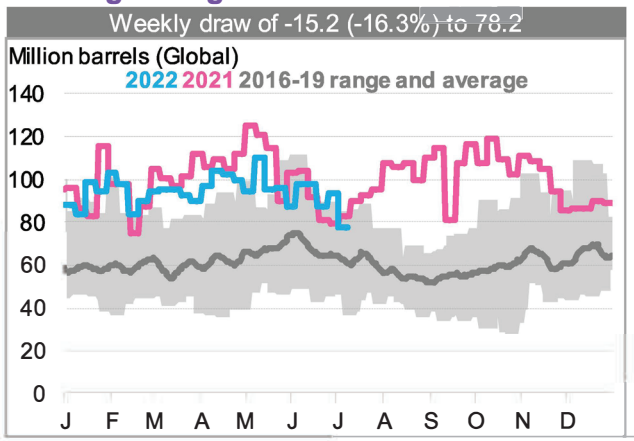
- Floating storage is only profitable if the strength of contango (future vs. prompt price) is greater than the tanker costs. Therefore, tankers become floating storage when the profit from a storage play exceeds the cost of the forward freight agreement (FFA).
- The floating storage data used in the "Oil Price Outlook" slide is for the previous week (i.e., the week before the latest data shown below). That data are available in the table to the right.

Vortexa's revision to global floating crude inventories

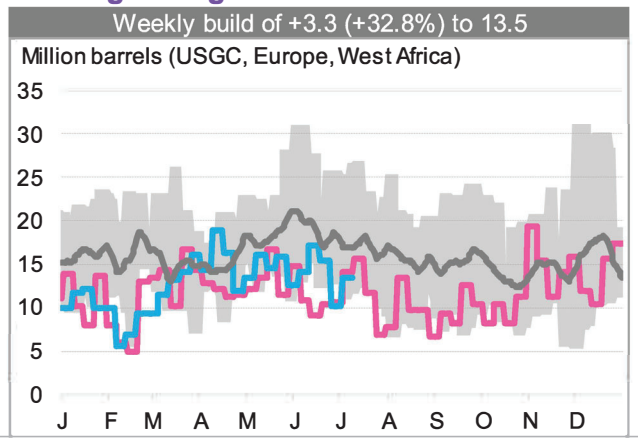
Million barrels	Previous report	Current report	Vortexa's revision
Inventories in week of July 1	92.5	**93.4***	+0.9
Inventories in week of June 24	91.4	87.2	-4.2

*Note: *Figure used to aggregate total oil inventories on page 8.*

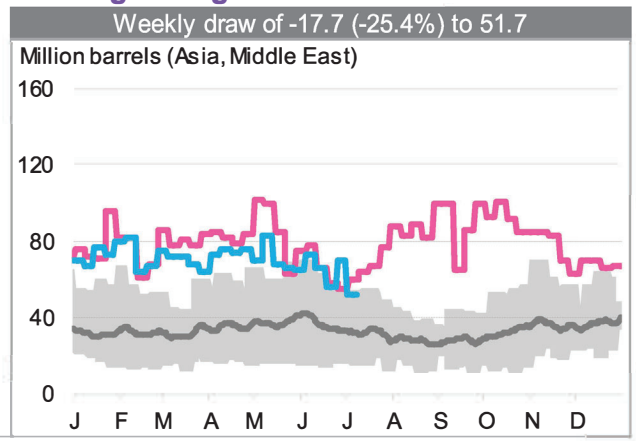
Floating storage: Total



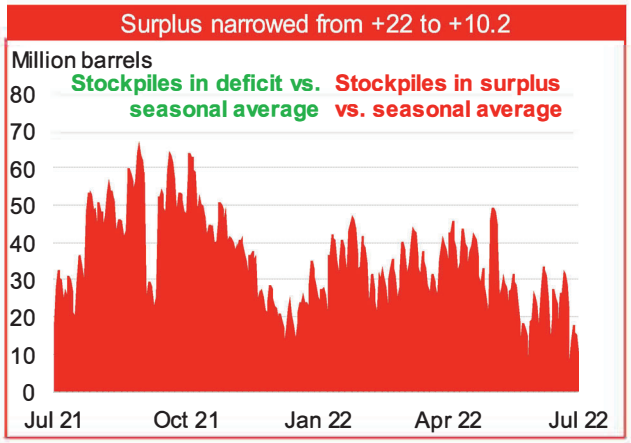
Floating storage: West of Suez

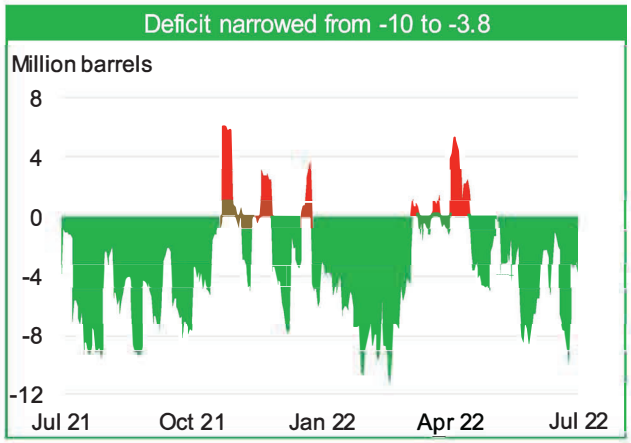


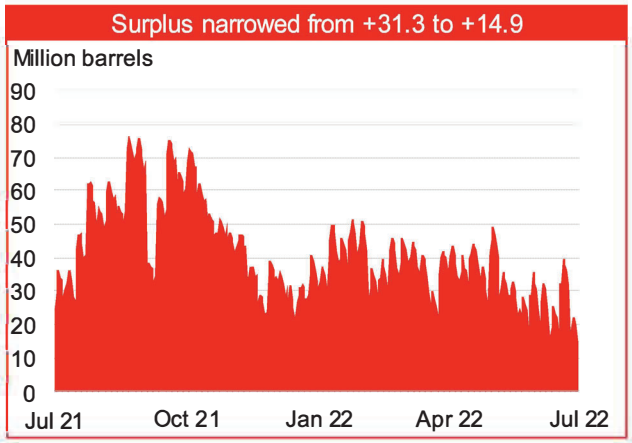
Floating storage: East of Suez



Charts below subtract current stockpiles by the 2016-19 (four-year) seasonal average







*Source: BloombergNEF, Vortexa. Note: As of the **week ending July 8, 2022**. **Raw data from Vortexa are revised frequently, so the data in this report might change week-to-week.***

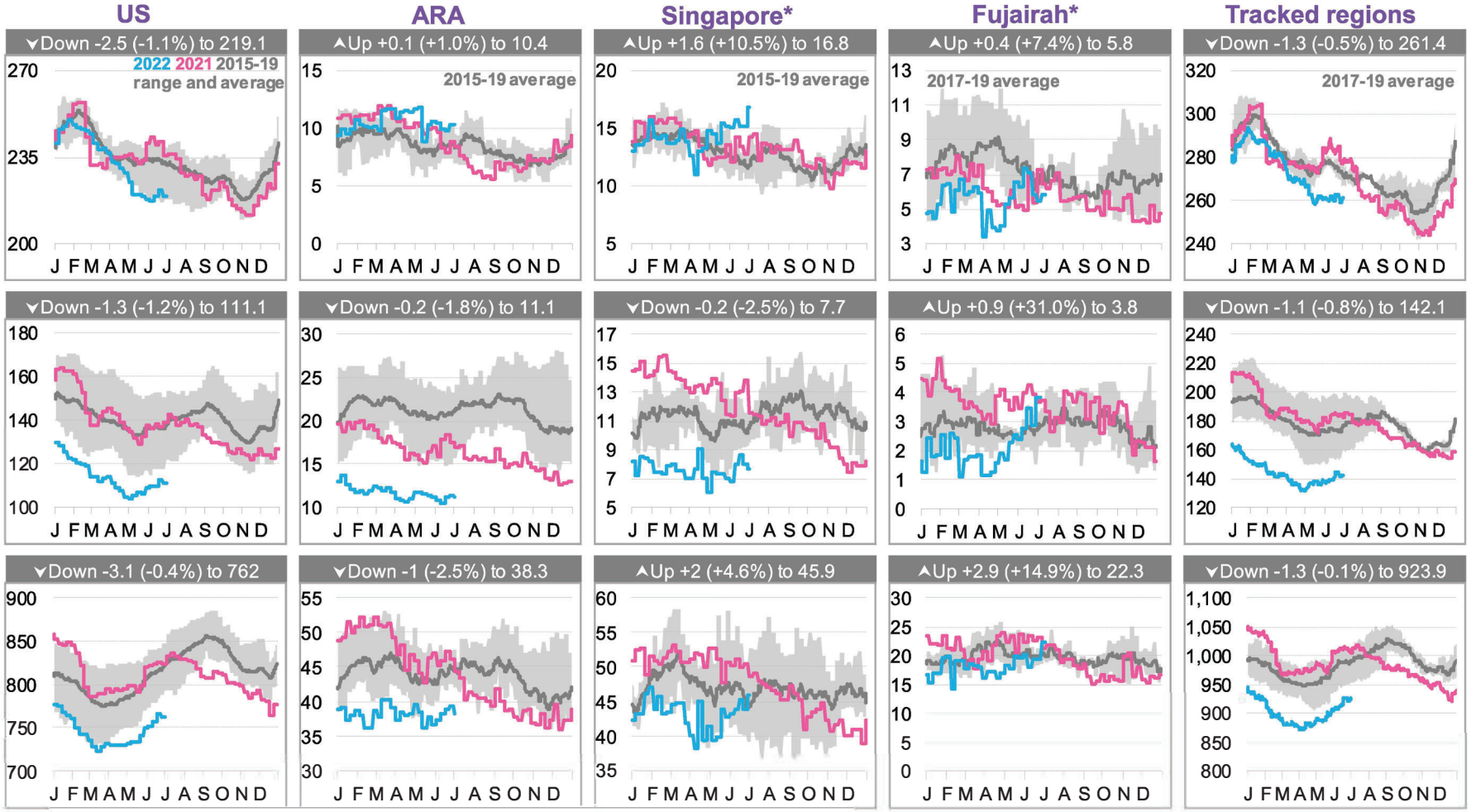
BloombergNEF

Product stocks: Current vs. seasonal average

Neutral: Oil product stockpiles in tracked regions fell by 0.1% week-on-week

- Chart legend are as follows: 2022, 2021 and the 2015-19 range and average. For Fujairah and tracked regions, the **2017-19 (three-year) seasonal range** is shown. Tracked regions include US, ARA, Singapore, Japan and Fujairah

**units are in million barrels*



*Source: BloombergNEF, US EIA, PJK, IE Singapore, FEDCom/Platts, PAJ. Note: As of the **week ending July 1, 2022.***

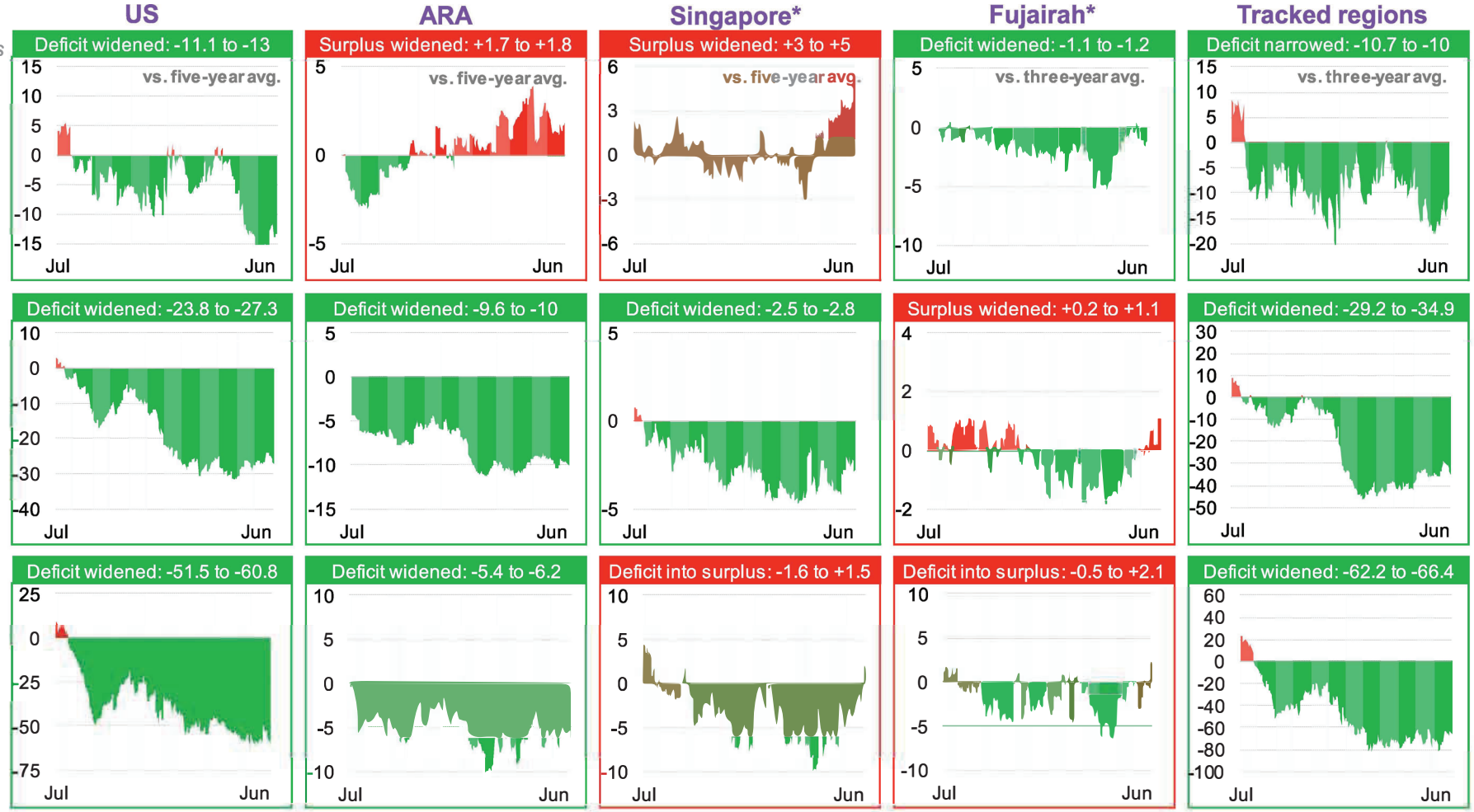
BloombergNEF

Product stocks: Current vs. seasonal average

Bullish: Oil product stockpile deficit against the seasonal average widened from 62.2m bbl to 66.4m bbl

- The charts below compare each respective regional product stockpile level against the seasonal average defined in the previous slide.
- **Red** signifies that the current stockpile levels are higher (in surplus) than the seasonal average, while **green** signals that the current stockpiles are lower (in deficit).

**units are in million barrels*



*Source: BloombergNEF, US EIA, PJK, IE Singapore, FEDCom/Platts, PAJ. Note: As of the **week ending July 1, 2022.***

BloombergNEF

Global Road Traffic Indicators

Congestion in China and Europe nosedived as North America recovers

Claudio Lubis
Wayne Tan

July 15, 2022

BloombergNEF

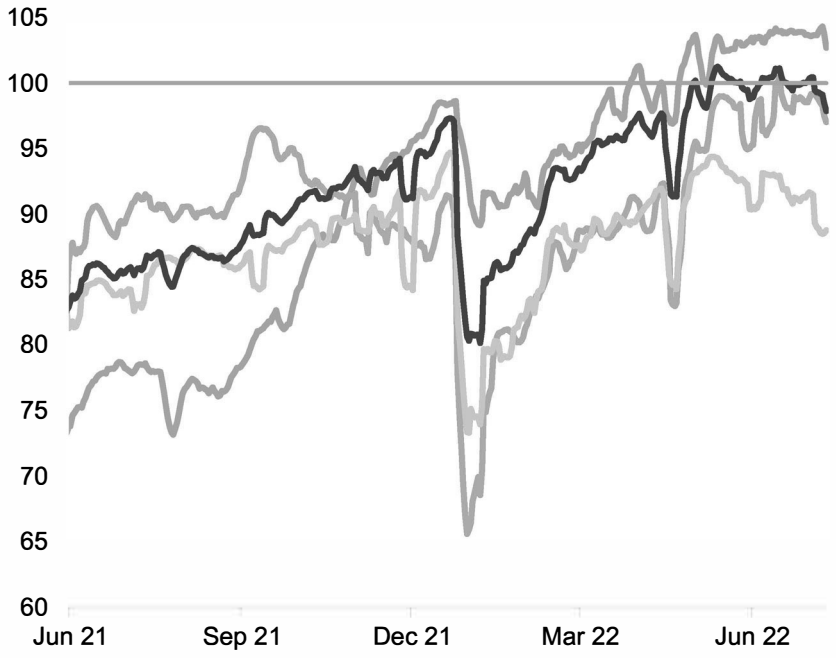
Apple Mobility reports were discontinued on April 14, 2022. We will resume updating TomTom congestion data, which was previously updated to March 16.

Comparing the three mobility indicators

Traffic levels in Europe plunged according to TomTom data

Google mobility index

Indexed to Jan – Feb 2020 (seven-day moving average)

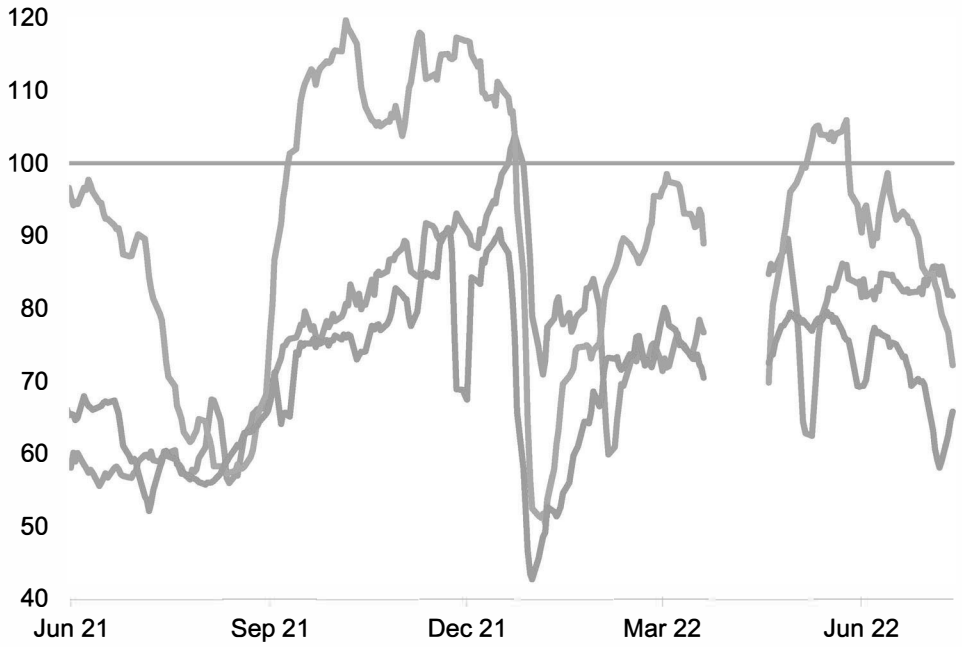


	Latest	Week Δ	Four-week Δ
Asia Pacific	**102.7**	-1.0 (-0.9%)	-1.2 (-1.1%)
World	**97.9**	-2.5 (-2.5%)	-2.7 (-2.7%)
Europe	**97.0**	-2.1 (-2.1%)	-0.4 (-0.4%)
Americas	**88.8**	-2.7 (-2.9%)	-4.3 (-4.6%)

Source: Google Community Mobility Report, BloombergNEF. Note: ***Data exclude China and Russia.*** *Calculation includes retail and recreation, workplaces and transport hubs.* ***Data updated to July 10, 2022.*** *The world/regional index is weighted by the 2019 road fuels demand of each country.*

TomTom congestion index

Indexed to the peak congestion of the average week in 2019 (five-day weekday moving average)



	Latest	Week Δ	Four-week Δ
Europe	**72.3**	-10.1 (-12.3%)	-22.4 (-23.6%)
Asia Pacific	**81.8**	-4.0 (-4.7%)	-2.9 (-3.4%)
North America	**65.9**	6.7 (+11.4%)	-9.5 (-12.6%)

Source: TomTom, BloombergNEF. Note: ***Asia Pacific excludes China. Data updated to July 13, 2022.***

BloombergNEF

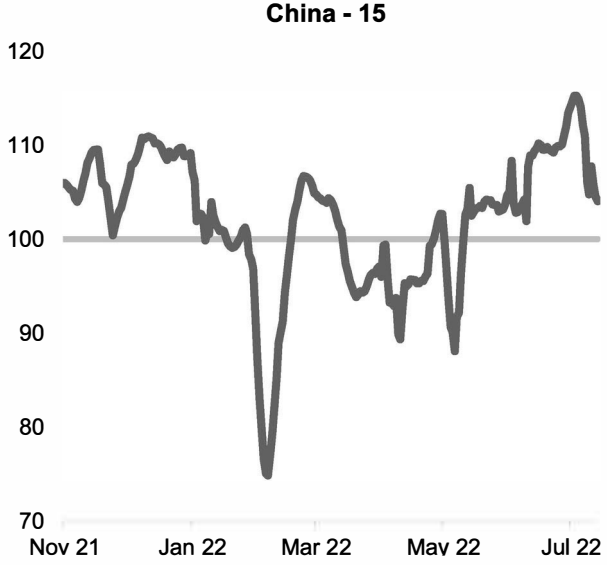
China (Baidu)

Congestion index bearish as nationwide traffic levels plummet

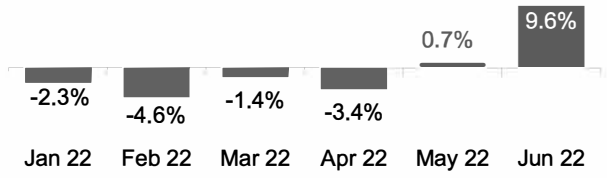
- City-level charts start from November 1, 2021. They display, in alphabetical order, the 15 cities with the highest number of vehicle registrations (excluding two- and three-wheelers). The China-15 congestion level is calculated by taking the weighted average of the congestion levels in the 15 cities and their vehicle registration numbers.

China congestion index (calculated from Baidu data)

Daily peak congestion levels, indexed to January 2021 (seven-day moving average)



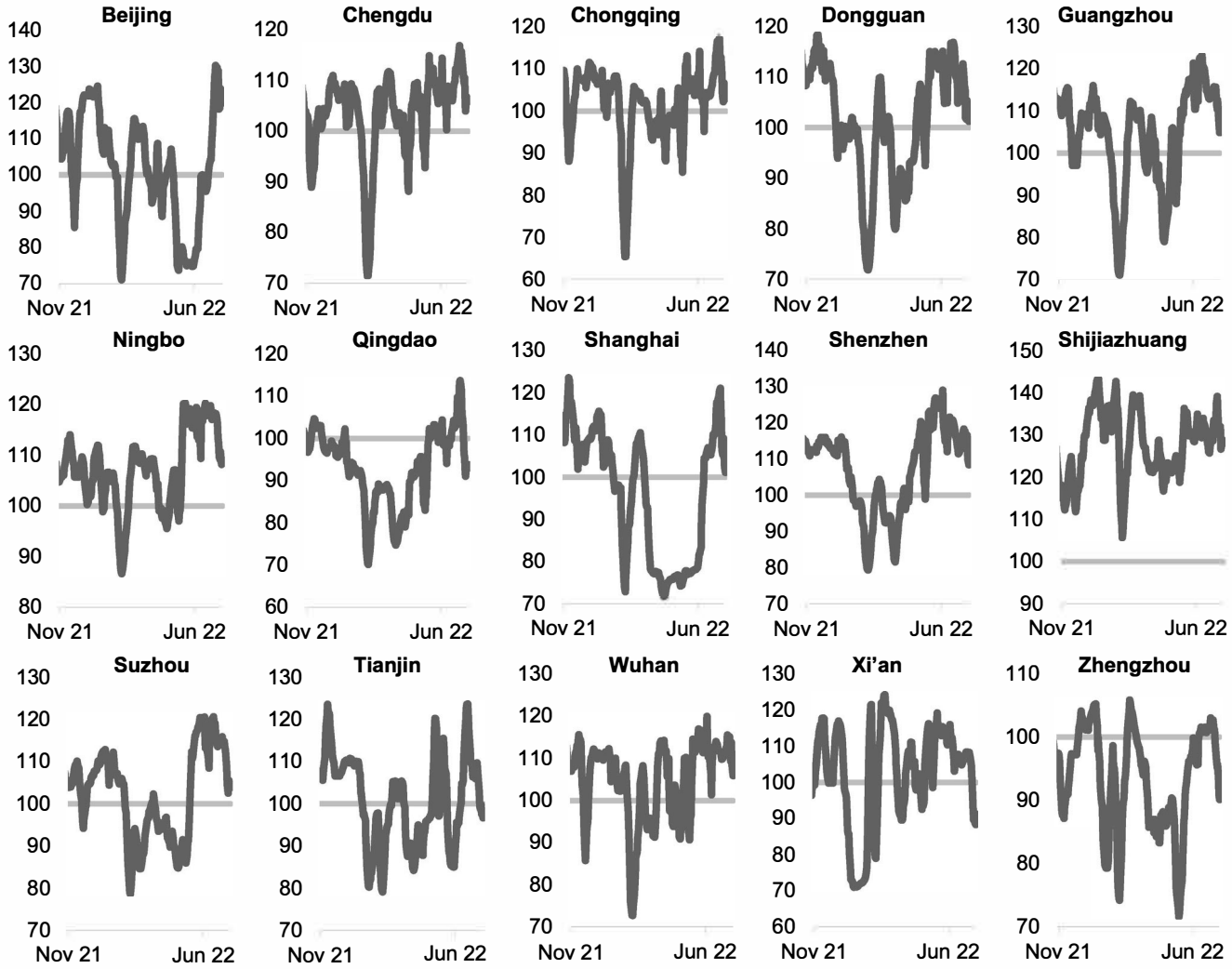
Monthly % change from January 2021 level



	Latest	Week Δ	Four-week Δ
China - 15	**104.01**	-8.0 (-7.2%)	-6.1 (-5.6%)

- In China, road traffic in the week ending July 13 was down 8.0 percentage points to 104.01% of January 2021 levels.

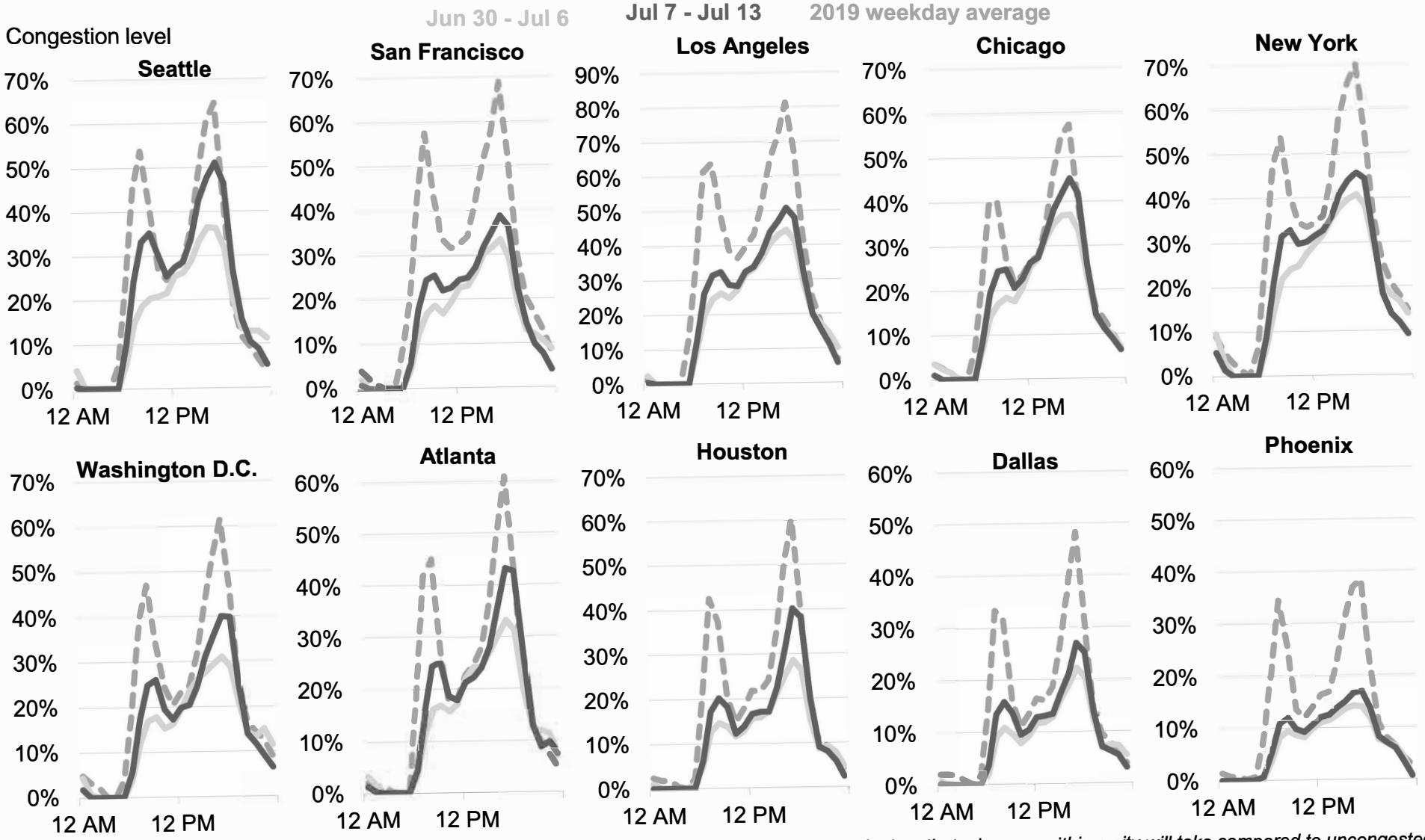
Daily peak congestion levels, indexed to January 2021 (seven-day moving average)



*Source: BloombergNEF, calculated from Baidu's data. Note: Data updated to **July 13, 2022**.*

BloombergNEF

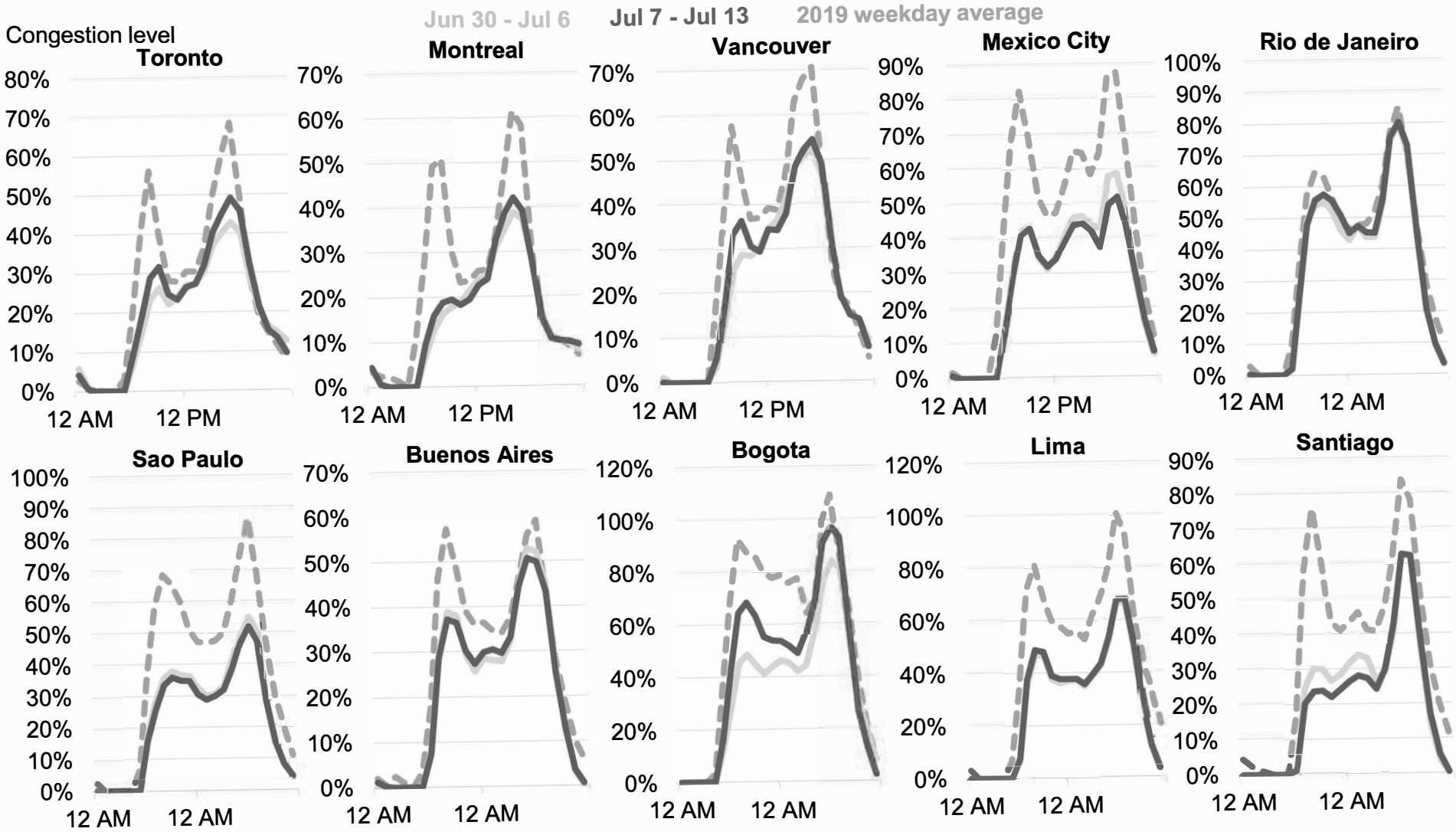
Major Americas cities (1/2) (TomTom)



Source: BloombergNEF, TomTom Traffic Index. Note: 'Congestion level' is an estimate of the increase in time that a journey within a city will take compared to uncongested conditions – so, 40% congestion implies that a journey will take 40% longer than on empty roads. Charts show Thursday-Wednesday average hourly congestion levels.

BloombergNEF

Major Americas cities (2/2) (TomTom)



Source: BloombergNEF, TomTom Traffic Index. Note: 'Congestion level' is an estimate of the increase in time that a journey within a city will take compared to uncongested conditions – so, 40% congestion implies that a journey will take 40% longer than on empty roads. Charts show Thursday-Wednesday average hourly congestion levels.

BloombergNEF

US Oil Indicators Weekly

Takeaways: Crude oil prices have sunk more than $14 per barrel since the start of July and West Texas Intermediate is now trading at around $95 per barrel. This price weakness continues despite a drop in US production numbers and refineries continuing to operate above 95% utilization.

The main source of uncertainty is in demand markets. Gasoline demand decreased last week, despite the Fourth of July holiday weekend, which usually boosts road travel. Road congestion in the US continues to fall short of pre-pandemic levels, and air travel is also declining despite the summer travel season, as staff shortages and widespread flight cancellations disincentivize travelers.

	Frequency	Source	Snapshot: July 15, 2022
Overall market indicators:			
Mobility	Daily	Google and TomTom mobility	Traffic in the Americas is still short of pre-pandemic trends, contrasting Europe and Asia where road congestion has fully recovered.
Economic activity	Daily	New York MTA, Moovit, OpenTable, Prodco	Restaurant bookings remain strong, despite Covid-19 variants, inflation and recession fears.
Crude oil prices	Daily	Bloomberg	WTI fell below $95 per barrel for the first time since April, continuing its steady decline this month.
Oil demand:			
Road congestion and gasoline	Weekly, Hourly	US EIA, TomTom	Gasoline demand declined 14% last week, resulting in the largest weekly inventory gain since January.
Air travel and jet fuel	Daily	US TSA, FlightStats	Passenger numbers are down, allowing jet fuel inventories to return to seasonal average levels.
Refinery operations	Daily	US EIA	US refiners are still operating at full tilt, with utilization at 95% of capacity.
Crude and product inventories	Weekly	US EIA	Commercial petroleum stockpiles rose by 21.7 million barrels, with nearly every product seeing a build except for the federal strategic reserves.
Oil production	Weekly	US EIA	US crude production slipped back to 12 million barrels a day, but the rig count continues to slowly grow.

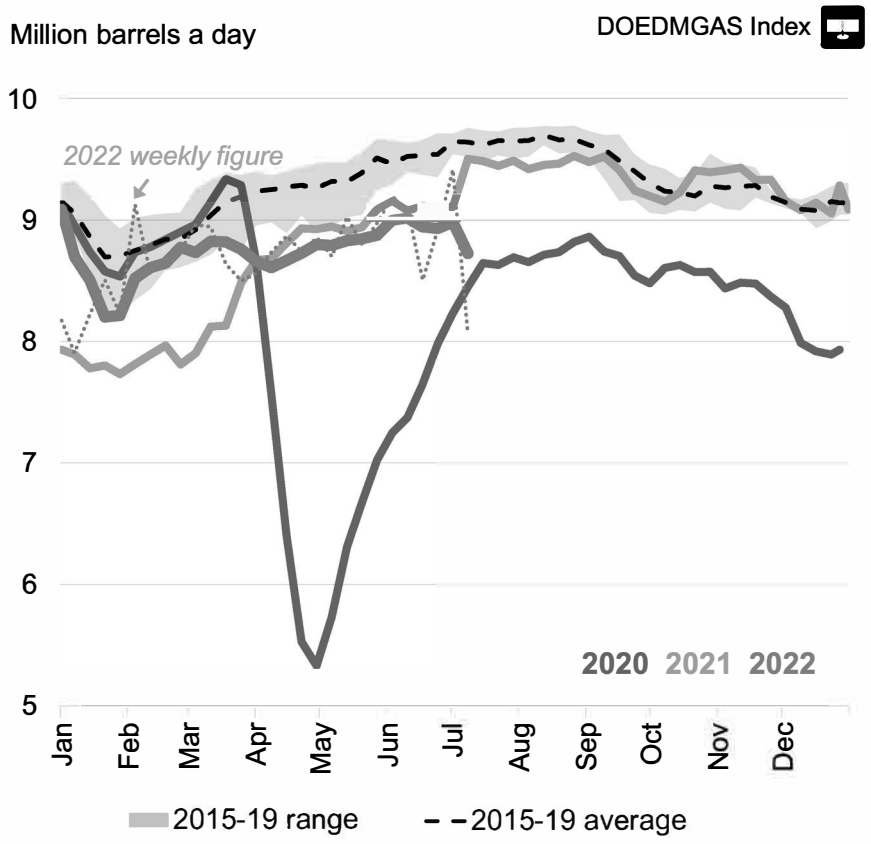
Source: BloombergNEF. Note: Green signals an upturn from the disruption caused by Covid-19, red indicates a downturn, orange indicates no or mixed change. In most cases, the colors are indicative of changes from the prior week.

Gasoline demand

For more data on congestion around the world, see BNEF's Covid-19 Indicators: Road Traffic

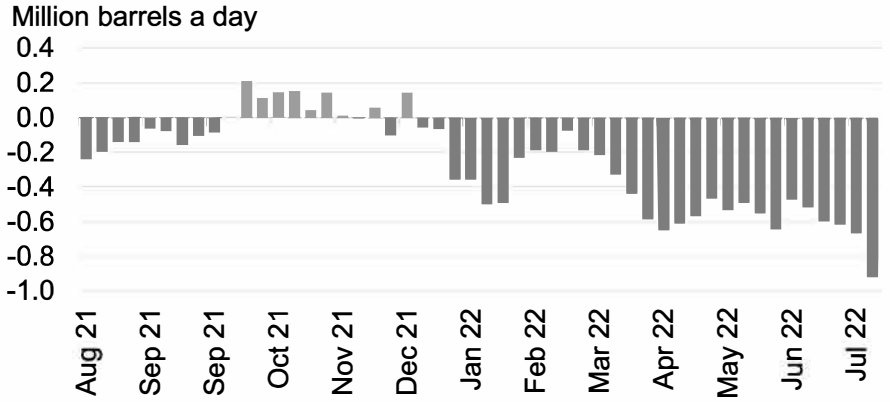
Gasoline demand fell by 14% last week, despite the Fourth of July holiday bump. This allowed for the largest one-week gain in gasoline inventories since January.

Implied gasoline demand*

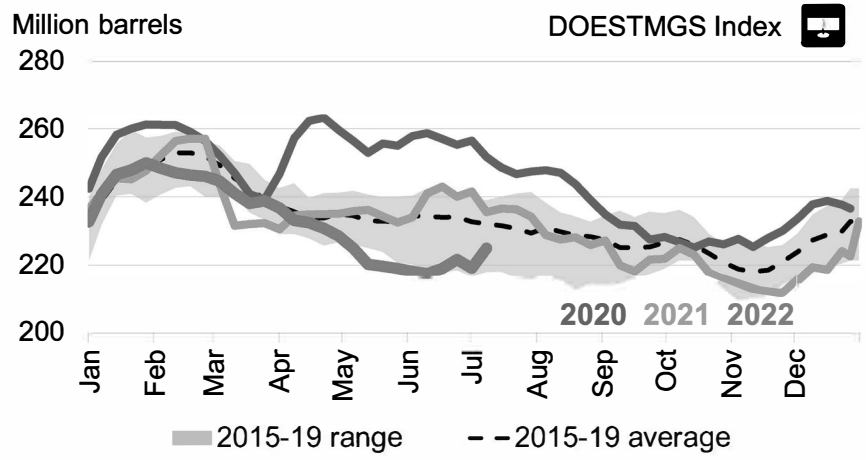


*Source: BloombergNEF, US Energy Information Administration (EIA). Note: *Based on the four-week moving average, except the 2022 weekly figure.*

Demand difference to five-year seasonal average



Gasoline inventory

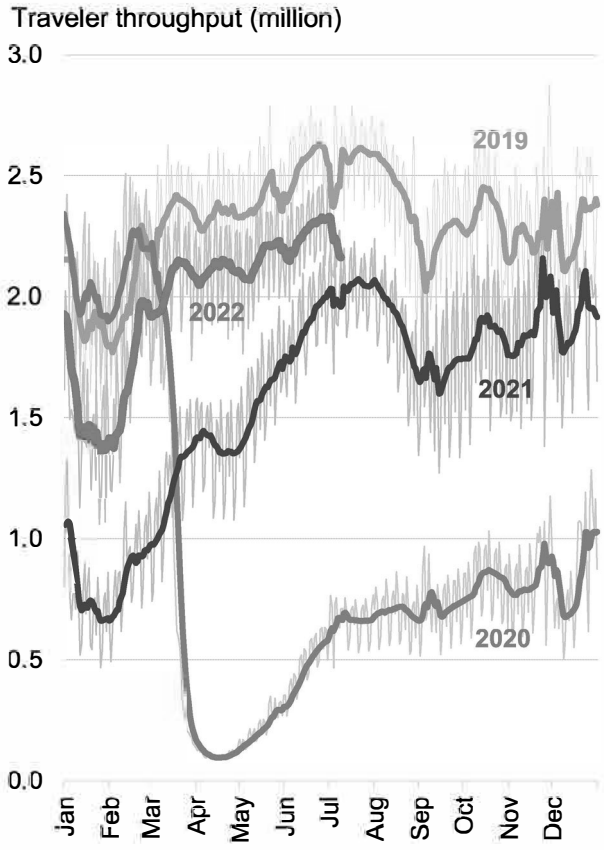


Source: BloombergNEF, US EIA

Jet fuel demand

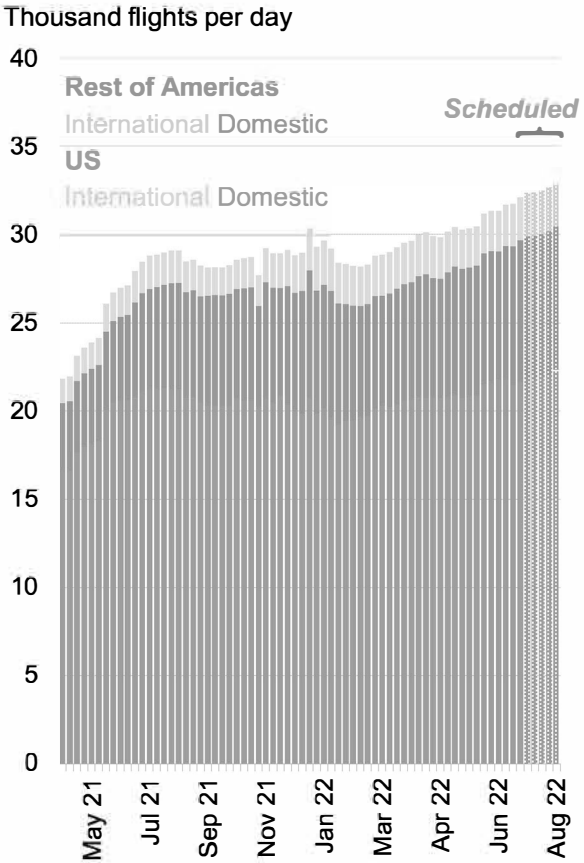
Jet fuel inventories are now above the 2015-19 average, as the number of air travelers fell 7% week-on-week, despite the holiday weekend

TSA checkpoint traffic



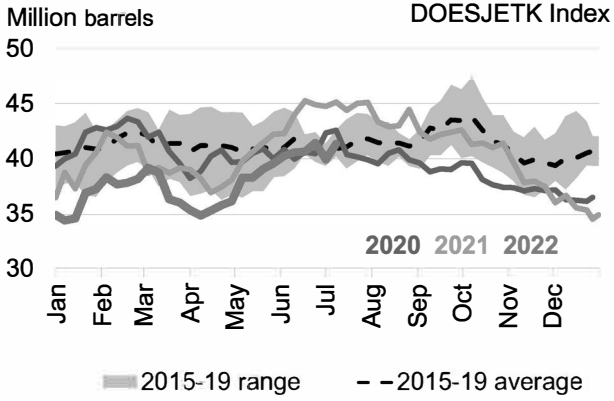
Source: BloombergNEF, US Transportation Security Administration (TSA)

Daily flight departures

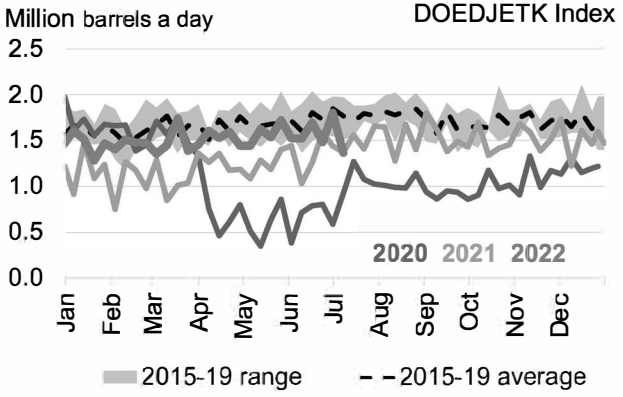


Source: BloombergNEF, FlightStats

Jet kerosene storage



Jet kerosene implied demand



Source: BloombergNEF, US EIA

For more data on congestion around the world, see BNEF's Covid-19 Indicators: Aviation

Independent Statistics & Analysis
U.S. Energy Information Administration

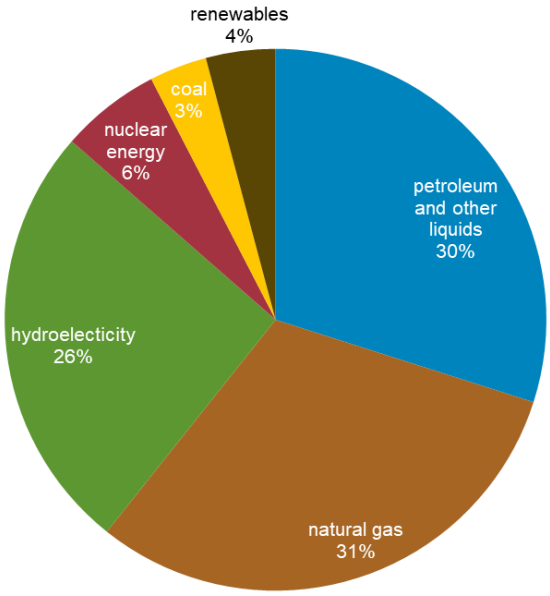
Country Analysis Executive Summary: Canada

Last Updated: July 12, 2022

Overview

- Canada is a net exporter of most energy commodities and is a significant producer of natural gas, hydroelectricity, and crude oil and other liquids. Most of Canada's energy exports are destined for the United States.
- Canada ranked fourth in 2021 among top energy producers of petroleum and total liquids in the world, behind only the United States, Russia, and Saudi Arabia.
- In 2021, energy consumption in Canada, which totaled 13 quadrillion British thermal units (quads), accounted for less than 3% of total world energy consumption.[1] Canada's domestic consumption of energy largely consists of oil, natural gas, and hydroelectricity (Figure 1).
- In 2018, the government of Canada announced regulations to phase out traditional coal-fired electricity by 2030. It also announced greenhouse gas regulations for natural gas-fired electricity.[2] Following these announcements, the government imposed a 20 Canadian dollars per ton (CAD20/t) carbon tax on Ontario, Saskatchewan, Manitoba, and New Brunswick, effective from January 2019 under the Greenhouse Gas Pollution Pricing Act. These tariffs increased from CAD10/t per year to CAD50/t on April 1, 2022.[3]

Figure 1. Total primary energy consumption in Canada by fuel type, 2021



Data source: *BP Statistical Review of Energy, 2022*

Petroleum and other liquids

Reserves

- The *Oil & Gas Journal* estimates that as of January 2022, Canada had 168 billion barrels of proved oil reserves, ranking fourth in the world.[4] Only Venezuela, Saudi Arabia, and Iran hold larger reserves. Oil sands make up most of the country's proved oil reserves.
- Canada's oil sands have significantly contributed to the recent growth in liquid fuel supply. In 2021, non-OPEC petroleum liquids grew by 0.8 million barrels per day (b/d), 0.3 million b/d of which were from Canada (primarily from oil sands).

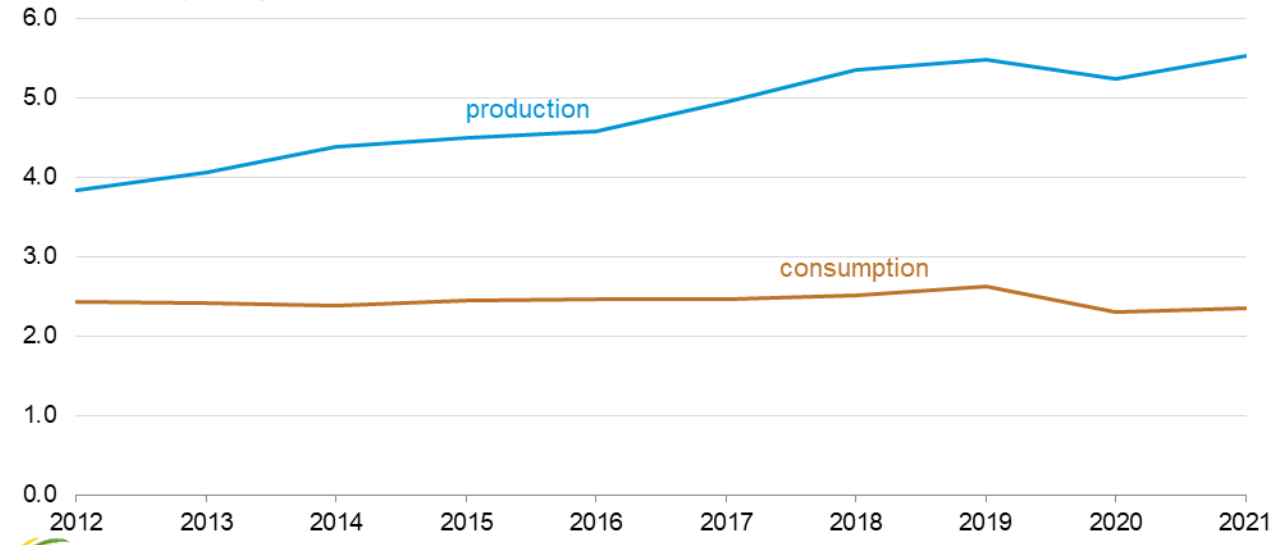
Production and consumption

- In 2021, Canada was the world's fourth-largest petroleum and other liquids producer and was a net exporter of oil. As a neighboring country, the United States is a market for Canadian oil. In addition, American refineries are designed to process heavy oils such as oil sands.
- Canada produced 5.5 million b/d of petroleum and other liquid fuels in 2021, an increase of more than 300,000 b/d from the previous year. Crude oil (including condensate) accounted for 4.3 million b/d, and the remainder included biofuels and natural gas liquids (NGLs) (Figure 2).
- Bitumen and upgraded synthetic crude oil produced from the Alberta oil sands have driven recent growth in Canada's liquid fuels production. Canada's oil sands remain the primary source of hydrocarbon production and make up more than 97% of the country's total oil reserves; about 80% of total output in 2021 originated in Alberta.[5] These heavy deposits are found in three areas: Athabasca, Peace River, and Cold Lake in the provinces of Alberta and Saskatchewan. Most of Canada's proved oil reserves and future growth in the country's liquid fuels production will come from these resources.
- Canada's offshore production is located in the eastern provinces and accounts for less than 5% of total output in Canada.[6] Harsh weather and challenging deep-water conditions have limited

development of offshore projects in Newfoundland, Labrador, and Nova Scotia. These challenges raise both the technical difficulty and the cost of exploration and production.

- We expect that Canada's production will grow in 2022 and 2023 because of several factors. The government of Alberta rescinded mandatory production curtailments set in 2019. Additional export pipeline capacity will also likely lead to increased production. Enbridge Inc.'s Line 3 Replacement Project (370,000 b/d incremental capacity)[7] came online in late 2021, and Trans Mountain Corporation's Trans Mountain pipeline expansion project (590,000 b/d incremental capacity) is expected to be operational in 2023.[8]
- Producers in the Western Canadian Sedimentary Basin (WCSB) have traditionally focused on the production of natural gas, however, a continued lack of midstream takeaway infrastructure and export capacity for these volumes has shifted their focus to the production of liquids that can be used as domestic diluents at nearby oil sands projects. The extra-heavy crude oil produced in Alberta must be blended with lighter liquids products, such as plant condensate or pentanes, to flow through pipelines and reach downstream facilities. We expect that additional supply will also come from producing field condensate and natural gasoline in the liquids-rich Montney and Duvernay plays, located in the southwestern region of Alberta.
- In 2020, refined products demand fell to 2.3 million b/d from 2.6 million b/d in 2019 as a result of responses to efforts to reduce the spread of COVID-19. In 2021, demand increased to 2.4 million b/d as COVID-19 restrictions were eased.
- In 2021, most of the liquid fuels consumed in Canada were used for transportation; motor gasoline had a 34% share of demand and distillate fuel had a 26% share.

Figure 2. Total petroleum and other liquids production and consumption



Data source: U.S. Energy Information Administration, *International Energy Statistics*

Refining

- Canada had 16 refineries with a total crude oil processing capacity of 1.85 million b/d as of 2021.[9] Eastern Canada's seven refineries have 1.1 million b/d of capacity, or about 60% of total

crude oil refining capacity.[10] Most crude oil is refined into motor gasoline (48%) and diesel fuel (37%).[11]

- Although Canada produces more crude oil than it refines domestically, it imports large amounts of crude oil because the eastern refineries are not as well connected to domestic crude oil production supplies. Western Canada's nine refineries have a total capacity of 784,000 b/d.[12]
- In July 2021, the U.S. private equity group Cresta Fund Management purchased the idled Come by Chance refinery and announced plans to convert the plant to a 15,000 b/d renewable diesel facility by 2022. The refinery was shut down in March 2020 as a result of challenging economics during the COVID-19 pandemic. As part of the acquisition, the refinery was renamed Braya Renewable Fuels.[13]

Table 1: Oil refineries in Canada, 2021

Eastern Canada			
Owner	**Refinery**	**Location**	**Capacity (thousand b/d)**
Imperial	Nanticoke Refinery	Nanticoke	112
Imperial	Sarnia Refinery	Sarnia	121
Shell	Corunna Refinery	Sarnia	75
Suncor	Sarnia Refinery	Sarnia	85
Suncor	Montreal Refinery	Montreal	137
Valero Energy Corporation (Ultraar)	Jean-Gaulin Refinery	Quebec City	235
Irving	Irving Oil Refinery	Saint John	300
Total Eastern capacity			*1,065*
Western Canada			
Owner	**Refinery**	**Location**	**Capacity (thousand b/d)**
Shell	Scotford Refinery	Strathcona	114
Cenovus	Lloydminster Refinery	Lloydminister	30
Imperial	Strathcona Refinery	Edmonton	191
Suncor	Edmonton Refinery	Edmonton	146
North West Redwater Partnership	Sturgeon Refinery	Sturgeon County	79
Parkland Fuel	Burnaby Refinery	Burnaby	55
Tidewater Midstream	Prince George Refinery	Prince George	12
FCL	Co-op Refinery	Regina	135
Gibson	Moose Jaw Refinery	Moose Jaw	22
Total Western capacity			*784*
Total capacity			*1,849*

Data source: Canadian Association of Petroleum Producers[14] and Oil Sands Magazine[15]
Note: The 2021 refinery capacity is calculated as 2020 capacity (1.979 million b/d) minus Come by Chance refinery capacity (130,000 million b/d) = 1.849 million b/d.

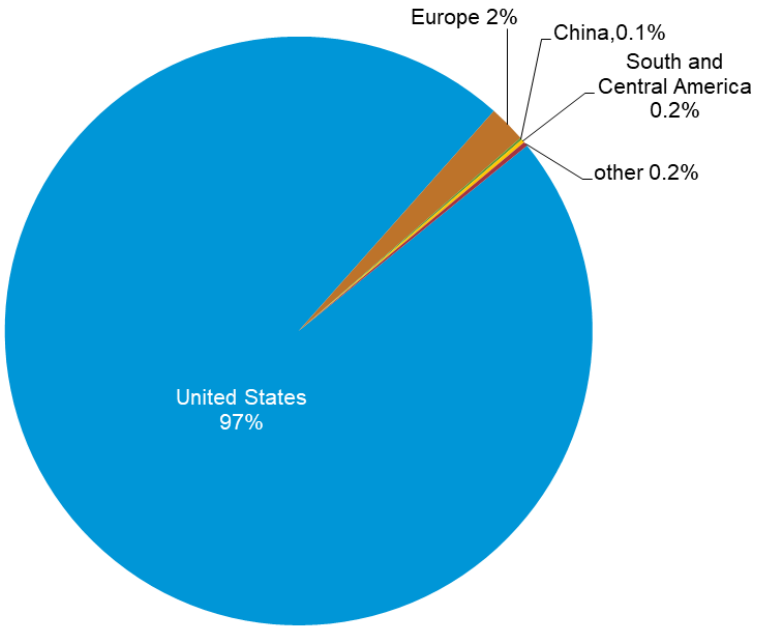
Bitumen upgrading

- The country has significant upgrading capacity because oil sands (bitumen) account for over 60% of Canada's crude oil production. In 2020, four upgraders in Alberta and two in Saskatchewan were active and had a total capacity of 1.4 million b/d.[16]
- Bitumen is a thick, sticky form of crude oil. When extracted from the ground, bitumen is too thick to be transported by pipeline.[17] An upgrader is a facility that processes bitumen or extra heavy oil into synthetic crude oil. Although some upgrading takes place within refineries, the majority is carried out at upgraders in Alberta. The upgraders are usually associated with specific oil sands projects.[18]

Trade

- Nearly all of Canada's crude oil exports were sent to the United States in 2021 (Figure 3). The largest regional market in the United States for Canada's crude oil exports is the Midwest. Almost all of these volumes exported to the Midwest originate in Western Canada.
- Canada is the largest source of U.S. crude oil and refined product imports. U.S. crude oil imports from Canada accounted for 62% of total U.S. crude oil imports in 2021, averaging 3.8 million b/d. U.S.-refined products imported from Canada accounted for 582,000 b/d, or 25% of total U.S. petroleum product imports.
- As the total volume of U.S. crude oil imports from Canada rose in 2021, Canada's share of total U.S. crude oil imports reached 62%. In particular, crude oil imports from Canada replaced imports from Venezuela after the United States stopped importing oil from Venezuela in 2019.[19]
- Currently, producers face complex market and logistical challenges. Oil supply in Western Canada exceeds transport capacity of pipelines serving external markets. Because export pipelines in Canada operate at full capacity and the timing of new capacity remains uncertain, Canada's producers increasingly rely on rail transportation to deliver crude oil to market.
- The reversal in late 2021 of Marathon's Capline pipeline in the United States has allowed increased volumes of oil sands production from Alberta to be shipped to Asia via the Gulf Coast.[20]

Figure 3. Canada crude oil exports by destination, 2021



Data source: Global Trade Tracker

Natural Gas

Reserves

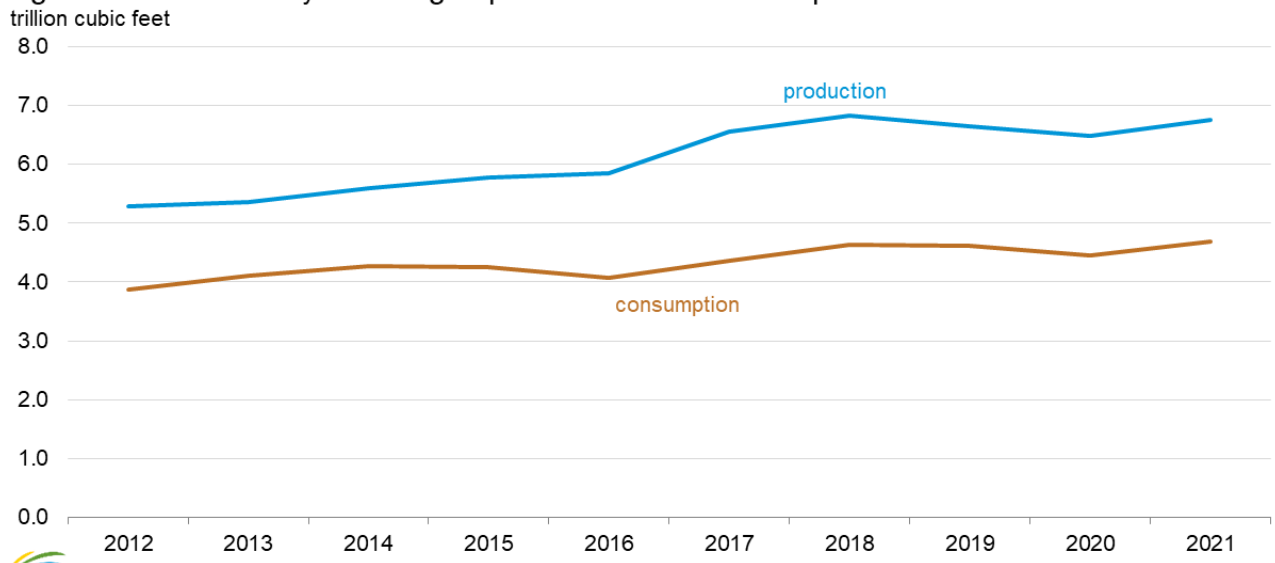
- According to the Oil & Gas Journal, Canada held 83 trillion cubic feet (Tcf) of proved natural gas reserves as of January 2022. [21]
- Most of Canada's natural gas reserves are traditional resources in the WCSB, including those reserves associated with the region's oil fields. Other areas with significant natural gas reserves include offshore fields near the eastern shore of Canada (primarily Newfoundland and Nova Scotia), the Arctic region, and the Pacific coast.
- In March 2016, the Canada Energy Regulator released a study of the Liard Basin, estimating that it contained 219 Tcf of marketable, unconventional natural gas, making it the ninth-largest shale gas resource in the world. [22, 23]

Production and consumption

- In 2021, Canada produced 6.7 Tcf of dry natural gas and was the sixth-largest producer behind the United States, Russia, Iran, China, and Qatar (Figure 4). Most of Canada's natural gas production occurs in the prolific WCSB.
- Although Canada's production of conventional natural gas has been declining, unconventional natural gas liquids production in the Montney formation has been rising, driven by drilling activities related to liquefied natural gas (LNG) export projects. Canada's shale gas production potential has been limited because LNG export facilities along the West Coast face continued delays in obtaining the environmental approvals required to link natural gas supplies to the LNG facilities.
- In 2021, natural gas consumption rebounded to 4.7 Tcf following a 2% decline during the COVID-19 pandemic, consistent with an overall energy consumption decrease (Figure 4).[24,25]

- Growth in Canada's natural gas-fired electric power sector will be driven by new power plants, many of which are being developed to replace coal-fired power plants.[26]

Figure 4. Canada's dry natural gas production and consumption



Source data: U.S. Energy Information Administration, *International Energy Statistics*; 2020 and 2021 estimations based on BP Statistical Review of World Energy, 2022

Trade

- Almost all of Canada's natural gas exports go to the United States. In 2021, 99% of all U.S. natural gas imports came from Canada. Most of Canada's natural gas exports to the United States originate in Western Canada and are piped to U.S. markets in the West and Midwest regions. [27]

Liquefied Natural Gas (LNG)

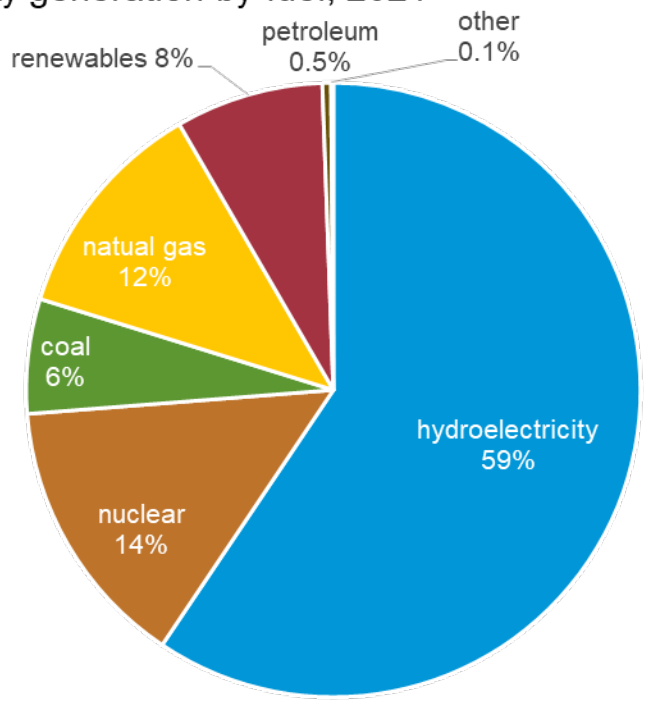
- Currently, Canada does not have any LNG export capacity in operation. As of 2020, 18 LNG export facilities had been proposed, with approximately 29 billion cubic feet per day (Bcf/d) of capacity across British Columbia, Nova Scotia, and Quebec. The projects vary in size and scope, but nearly all of the proposed facilities are by non-producers of Canada's natural gas.[28]
- Only LNG Canada, located in Kitimat, British Columbia, was approved and is currently under construction. LNG Canada is expected to be online in 2025. The export facility will initially consist of two LNG processing trains with a combined export capacity of 3.5 Bcf/d.[29] In the future, the facility might expand to four trains. However, opposition against the Coastal Gas Link pipeline, which is expected to feed the terminal, has intensified and could delay project construction. In February 2022, the Coastal GasLink pipeline work camp was attacked.[30]

Electricity

- Canada generated 641 billion kilowatthours (kWh) of electricity in 2021, and nearly 60% of total generation was hydroelectric.[31] Only China and Brazil produce more hydroelectricity than Canada on a kWh basis.[32] Nuclear and natural gas plants satisfy most of Canada's electricity needs not met by hydroelectricity (Figure 5).

- Canada has three power grids: the Western grid, the Eastern grid, and the Quebec grid. The border between the Eastern and Western grids is the Alberta-Saskatchewan border. Canada's grids are also tied into the United States' grids through 37 major transmission lines from New England to the Pacific Northwest.[33]
- The Canada Energy Regulator (CER) describes Canada's electricity grid as "fragmented," with few grid connections that link different locations together. Most of these areas generally supply electricity to meet their own demand. The large grid connections primarily connect provinces to the United States and electricity flows north to south. Only Nunavut in Canada does not have an electricity grid, and the territory relies on local diesel generation.[34]

Figure 5. Electricity generation by fuel, 2021



Data source: *BP Statistical Review of Energy, 2022*

Hydroelectricity

- About 60% of Canada's electricity was generated with hydropower in 2020.[35] That year, Canada was the third-largest producer of hydroelectricity in the world.
- Hydroelectricity has been the main source of power generation in Canada for more than a century.[36] British Columbia, Manitoba, Quebec, Ontario, Newfoundland, and Labrador use hydropower to meet most of their electricity demand. All provinces and territories produce hydroelectricity except Nunavut and Prince Edward Island.[37]
- Several large hydroelectric projects are under construction. These projects include the 1,100 megawatt (MW) Site-C in British Colombia, the 695 MW Keeyask Project in Manitoba, two new generation units with a combined capacity of 640 MW at La Romaine in Quebec,[38] and the 824 MW Muskrat Falls project in Labrador.[39]

Other renewables

- Canada has potential for large renewable energy development in wind, solar, and biomass. The development of non-hydroelectricity renewable energy in Canada is led by the federal and province commitments to reduce carbon emissions in the electricity sector and to increase renewables by 2030. According to Natural Resources Canada, renewable electricity generation increased 18% between 2010 and 2019. Solar and wind contributed the most to the growth.[40]
- The Canada Energy Regulator forecasts that wind capacity will triple over the next 20 years, driven by favorable market conditions and abundant, high-quality wind resource. Solar photovoltaic (PV) is mostly located in Ontario, but British Columbia, Saskatchewan, and Alberta are developing solar PV capacity.[41]
- In November 2015, the government of Alberta announced it would phase out coal-fired power generation by 2030. Renewables and natural gas-fired power plants will replace two-thirds of the coal-fired power capacity.[42,43]
- SaskPower, the main public utility in Saskatchewan, announced that it will increase the share of renewables in its portfolio from 25% to 50% by 2030. The company plans to invest in wind, solar, geothermal, hydropower, and biomass.[44]
- To further support the growth of renewables in electricity, the Smart Renewables and Electrification Pathways Program was announced in June 2021, providing up to $960 million over four years for smart renewable energy and electrical grid modernization projects.[45]

Trade

- Canada is a net exporter of electricity to the United States, which accounts for a small, although locally important, share of bilateral trade. The United States imported 48 million megawatt hours (MWh) of electricity from Canada in 2021, primarily into the Northeast and Midwest. In 2021, the United States exported 10 million MWh to Canada, nearly all of which was from the Pacific Northwest.

Coal

Reserves

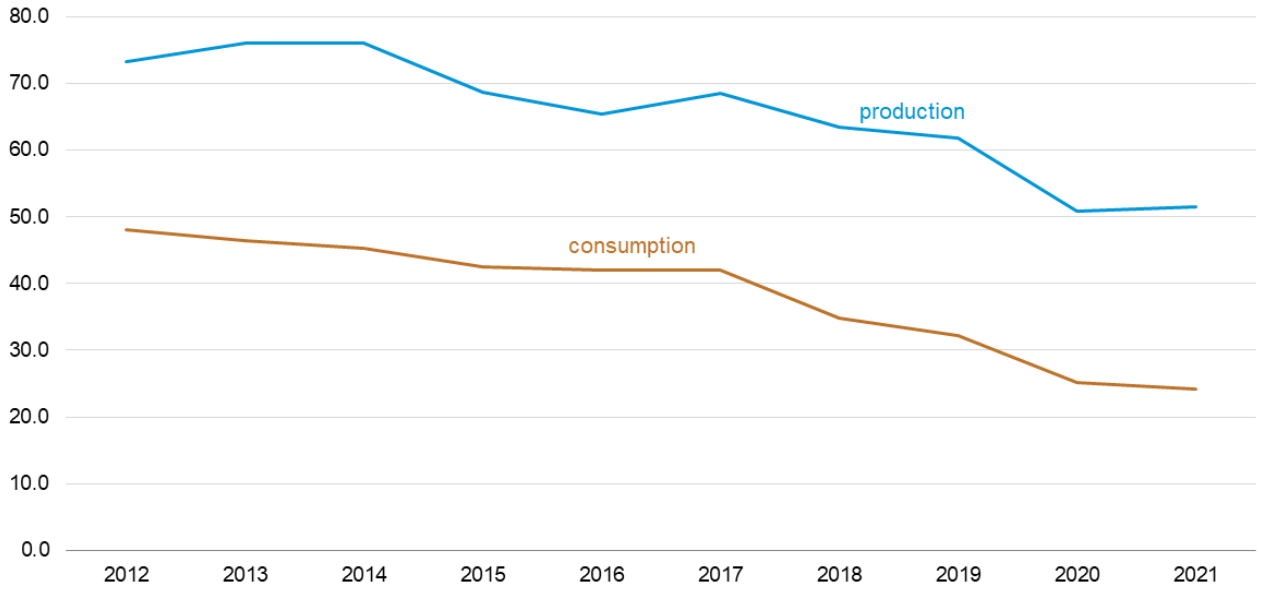
- Canada's total proved coal reserves were about 6.6 billion short tons in 2020.[46] More than 60% of the reserves are anthracite and bituminous coal. The remaining reserves are subbituminous and lignite coal.[47] Coal resources are located across the country, but they are actively mined and produced in Alberta, British Columbia, and Saskatchewan.

Production and consumption

- In 2021, Canada produced 52 million short tons of coal, a slight increase from the previous year. More than 50% of Canada's coal is produced in British Colombia.[48] About 32% of Canada's coal is consumed domestically, which is less than the 5-year average (42%).
- In 2020, thermal coal, which is used for electricity generation, accounted for 93% of coal consumed in Canada while metallurgical coal, which is used for steel manufacturing, accounted for 7%.
- The government of Canada has committed to phasing out its coal generation capacity by 2030. Four provinces operate coal-fired power plants: Alberta, Saskatchewan, New Brunswick, and Nova Scotia. The federal government enacted emissions requirements that require coal-fired

power plants to be shut down at the end of their life expectancy or be retrofitted with carbon capture and storage technology.[49]

Figure 6. Canada's coal production and consumption



Data source: U.S. Energy Information Administration, *International Energy Statistics*; 2021 data from BP *Statistical Review of Energy, 2022*

Trade

- In 2020, Canada exported more than half of the coal it produced, primarily metallurgical coal. Canada is the world's third-largest exporter of metallurgical coal after Australia and the United States.
- Most of Canada's coal exports go to Asia.[50, 51] In 2021, Japan, China, and South Korea, cumulatively, accounted for 74% of Canada's total steam coal exports and 72% of total metallurgical coal exports. In addition, 10% of total metallurgical coal exports from Canada went to OECD Europe.[52]

Notes

- Data presented in the text are the most recent available as of June 15, 2022.
- Data are EIA estimates unless otherwise noted.

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https://www.ercot.com/files/docs/2022/05/16/SARA_Summer2022.pdf

Release Date: May 16, 2022

Seasonal Assessment of Resource Adequacy for the ERCOT Region (SARA) Summer 2022

SUMMARY

The ERCOT region is expected to have sufficient installed generating capacity to serve peak demands in the upcoming summer season, June - September 2022, under normal system conditions and most of the reserve capacity risk scenarios examined. This SARA report includes seven risk scenarios reflecting alternative assumptions for peak demand, unplanned thermal outages, and renewable generation output.

With continued economic growth across the state, ERCOT anticipates a summer 2022 peak demand of 77,317 MW, which accounts for load reductions based on an incremental rooftop solar capacity forecast. This would be a new system-wide peak demand record for the region.

ERCOT anticipates there will be 91,392 MW of resource capacity available during summer peak demand hours, which includes 473 MW of planned gas-fired, utility-scale solar and wind capacity. Additionally, ERCOT expects to have 2,035 MW of operational battery storage resources, which includes 283 MW of planned additions. While some of these battery storage resources may help meet customer demand, they are not currently included in ERCOT's capacity contribution for summer because they are not expected to provide sustained capacity for meeting system peak loads.

A noteworthy development is that several operational generation resources are now classified as Private Use Network (PUN) generators. The aggregate installed capacity for these new PUN units is almost 1,700 MW.

The summer capacity planning reserve margin is forecasted at 22.8%, after accounting for forecasted customer demand, emergency demand reduction programs, typical unplanned outages, and typical renewable output.

Report Design Changes

Beginning with this SARA, ERCOT is including the installed capacity ratings of individual generating units, as well reporting the aggregate installed capacities of the various resource categories on the 'Forecasted Capacity' tab. Installed capacity ratings are based on the maximum power that a generating unit can produce during normal sustained operating conditions as specified by the equipment manufacturer.

Seasonal Assessment of Resource Adequacy for the ERCOT Region
Summer 2022
Release Date: May 16, 2022

Installed and Summer Capacity Ratings, MW

Resources, MW	Installed Capacity Rating (see note)	Expected Capacity for Summer Peak Demand	
Thermal Resources, Installed Summer-rated Capacity	71,214	63,514	Based on current Seasonal Maximum Sustainable Limits reported through the unit registration process
Hydroelectric, Peak Average Capacity Contribution	563	475	Based on 83% of installed capacity for hydro resources (summer season) per ERCOT Nodal Protocols Section 3.2.6.2.2
Switchable Capacity Total	3,840	3,490	Installed capacity of units that can interconnect with other Regions and are available to ERCOT
Less Switchable Capacity Unavailable to ERCOT	(572)	(542)	Based on survey responses of Switchable Resource owners
Available Mothballed Capacity	470	365	Based on seasonal Mothball units plus Probability of Return responses of Mothball Resource owners
Capacity from Private Use Networks	11,249	4,262	Average grid injection during the top 20 summer peak load hours over the last three years, plus the forecasted net change in generation capacity available to the ERCOT grid pursuant to Nodal Protocols Section 10.3.2.4.
Coastal Wind, Peak Average Capacity Contribution	5,138	2,928	Based on 57% of installed capacity for coastal wind resources (summer season) per ERCOT Nodal Protocols Section 3.2.6.2.2
Panhandle Wind, Peak Average Capacity Contribution	4,245	1,273	Based on 30% of installed capacity for panhandle wind resources (summer season) per ERCOT Nodal Protocols Section 3.2.6.2.2
Other Wind, Peak Average Capacity Contribution	25,812	5,162	Based on 20% of installed capacity for other wind resources (summer season) per ERCOT Nodal Protocols Section 3.2.6.2.2
Solar Utility-Scale, Peak Average Capacity Contribution	11,342	9,140	Based on 81% of rated capacity for solar resources (summer season) per Nodal Protocols Section 3.2.6.2.2
Storage, Peak Average Capacity Contribution	1,752	-	Based on 0% of rated capacity (summer season); resources assumed to provide regulation reserves rather than sustained capacity available to meet peak loads
RMR Capacity to be under Contract	-	-	
Capacity Pending Retirement	-	-	Announced retired capacity that is undergoing ERCOT grid reliability reviews pursuant to Nodal Protocols Section 3.14.1.2
Non-Synchronous Ties, Capacity Contribution	1,220	850	Based on net imports during summer 2019 Energy Emergency Alert (EEA) intervals
Planned Thermal Resources with Signed IA, Air Permits and Adequate Water Supplies	356	356	Based on in-service dates provided by developers
Planned Coastal Wind with Signed IA, Peak Average Capacity Contribution	-	-	Based on in-service dates provided by developers and 57% summer capacity contribution for coastal wind resources
Planned Panhandle Wind with Signed IA, Peak Average Capacity Contribution	-	-	Based on in-service dates provided by developers and 30% summer capacity contribution for panhandle wind resources
Planned Other Wind with Signed IA, Peak Average Capacity Contribution	16	3	Based on in-service dates provided by developers and 20% summer capacity contribution for other wind resources
Planned Solar Utility-Scale, Peak Average Capacity Contribution	141	114	Based on in-service dates provided by developers and 81% summer capacity contribution for solar resources
Planned Storage, Peak Average Capacity Contribution	283	-	Based on in-service dates provided by developers and 0% summer capacity contribution for storage resources
[a] Total Resources, MW	137,067	91,392	

Note on Installed Capacities: Installed capacity ratings are based on the maximum power that a generating unit can produce during normal sustained operating conditions as specified by the equipment manufacturer.

Dan Tsubouchi @Energy_Tidbits · 2h

Peak Oil Supply! Saudi will reach peak #Oil capacity in by 2027. Don't forget majority of Russia's oil reserves only work at high oil prices. See Jan 27, 2021 tweets twitter.com/Energy_Tidbits.... Bullish for #Oil thru 2020s. #OOTT

> **Dan Tsubouchi** @Energy_Tidbits · Jul 16
>
> sounds like a turning point for #Oil markets. Saudi finally admits it is reaching peak oil capacity and supply. key question is after reaching peak in four or five years or so, how long can saudi maintain production and then how fast are the declines. bullish for oil. #OOTT twitter.com/amena__bakr/st...

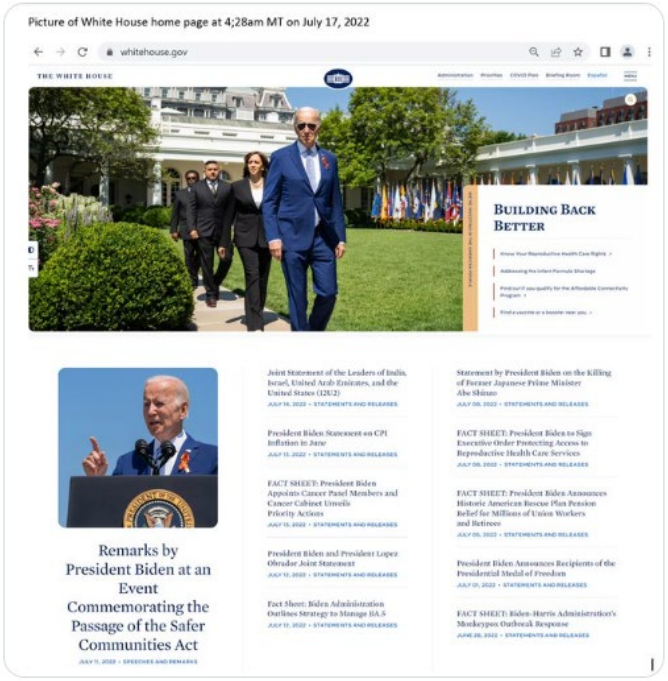
Dan Tsubouchi @Energy_Tidbits · 3h

#MBS certainly looks like the big winner post #Biden meetings. if so, see 👇 as @gulf_intel @sean_evers June 20 prediction is likely right, time for MBS to become king. And as seen in not giving anything to Biden on #Oil, MBS is a positive for Oil. #OOTt

> **Dan Tsubouchi** @Energy_Tidbits · Jun 20
>
> Hmmm! #Biden/#MBS meet. "i think what MBS ultimately gets, in my opinion is the final blessing of Washington to ascend to become King. I think that is the real big prize here for him. Because up to know, they haven't given that" said @sean_evers. MBS is a positive for #Oil. #OOTT twitter.com/Energy_Tidbits...

Dan Tsubouchi @Energy_Tidbits · 3h

Ouch! Best indicator #Biden didn't get any wins on #Oil supply or #Iran from MBS & Gulf Arab leaders meetings. Go to @WhiteHouse home page, nothing to even indicate he was in Jeddah. Didn't expect the MBS fist bump, but there would be something he thought he won something. #OOTT



Dan Tsubouchi @Energy_Tidbits · 12h

Best nigiri ever! Lobster nigiri at @MikuRestaurant. We come in for 3 nights to #Vancouver every year so we can hit Miku twice. Best server/Miku ambassador/friend Lenny got us a couple of Lobster nigiri pieces. Other must haves are Salmon Oshi Sushi and Ebi fritters. Thx Miku!

Dan Tsubouchi @Energy_Tidbits · 18h

#Vortexa crude #Oil floating storage at 07/15 est 78.40 mmb, -10.29 mmb WoW vs revised up 07/08 of 88.69 mmb. No other major revisions ie. floating storage more around 90-95 mmb range than >100 mmb range from 2 mths ago. Thx @Vortexa @business. #OOTT

Dan Tsubouchi @Energy_Tidbits · 19h

Ouch. Saudi reminds US it has gasoline shortage, not crude oil. "With regards to the price of #Gasoline in the US, that's really a function of a lack of refining capacity ...So increasing crude #Oil supplies to the US is not going to alleviate that problem." Thx @NoorNugali #OOTT

SAF created transcript of excerpts from video in the Arab News July 16, 2022 report *"INTERVIEW: Adel Al-Jubeir on why Biden's Saudi visit is a success, and US commitment to Kingdom's security"* that included a video. at https://www.arabnews.com/node/2123271/saudi-arabia. Al-Jubeir is Saudi Arabia Minister of State for Foreign Affairs.

Items in "italics" are SAF Group created transcript

Note Arab News had the vast majority of Al-Jubeir's comments but we made a few s and added the comments that weren't in the Arab News report.

Al-Jubeir "I think Saudi Arabia's policy on oil has been to try to seek balance in the energy markets, to make sure that the markets are adequately supplied and that you have no shortages.

Now, when you have dislocations in the markets because of geopolitics or because of dislocations in the price of other energy, whether it is coal or natural gas, and they skyrocket and they pull up the price of crude oil, that really has nothing to do with a shortage of crude oil as much as other factors.

With regards to the price of gasoline in the United State, that's really a function of a lack of refining capacity. The US has not built a refinery in more than 40 years and it has something to do with a regulatory environment that has now led to having many different blends of gasoline in different regions of the United States, which makes it complicated to supply gasoline into the American market.

So increasing crude oil supplies to the US is not going to alleviate that problem. But going back to the global situation, Saudi Arabia's policy is to work within OPEC and OPEC+ to make sure the markets are adequately supplied and we have been doing that.

And I believe that the Biden administration is aware of this. If you look at only the last year alone, Saudi Arabia was able to increase oil production on a fairly regular basis. As well as within OPEC and OPEC+ in order to meet the demands of the market, and Saudi Arabia will continue to assess market needs and take decisions according to that.

But I think that this idea that he asked for oil increase and they said no, or he asked for oil and they said yes is an over-simplification and over-dramatization of the situation. The US administration is fully aware of Saudi Arabia's policies in this regard and what Saudi Arabia is doing. And also appreciates the responsible manner in which Saudi Arabia has managed its production and export of crude oil."

Prepared by SAF Group https://safgroup.ca/news-insights/

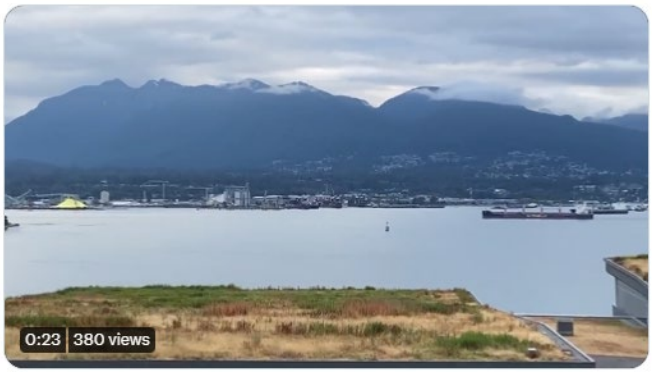
Dan Tsubouchi @Energy_Tidbits · Jul 16

sounds like a turning point for #Oil markets. Saudi finally admits it is reaching peak oil capacity and supply. key question is after reaching peak in four or five years or so, how long can saudi maintain production and then how fast are the declines. bullish for oil. #OOTT

> **Amena Bakr** @Amena_Bakr · Jul 16
>
> Saudi crown prince said: the kingdom has plans to increase its oil production capacity to 13 million bpd and after that it will not have the ability to increase production further. #OOTT
>
> Show this thread

Dan Tsubouchi @Energy_Tidbits · Jul 16

pretty impressive watching this cruise ship back into his spot in #vancouver. wondering where is the guy with the orange stick guiding him in like the do with airplanes at the gate?



Dan Tsubouchi @Energy_Tidbits · Jul 16

Welcome to the Future! #MBS says "unrealistic energy policies", MBS means the #EnergyTransition. Without a workable plan to provide reliable, 24/7, available energy during the energy transition, it will take energy transition way longer, be a bumpy road & cost a lot more. #OOTT

> **Amena Bakr** @Amena__Bakr · Jul 16
>
> Saudi Crown Prince MBS: Following unrealistic energy policies will lead to inflation #OOTT
>
> Show this thread

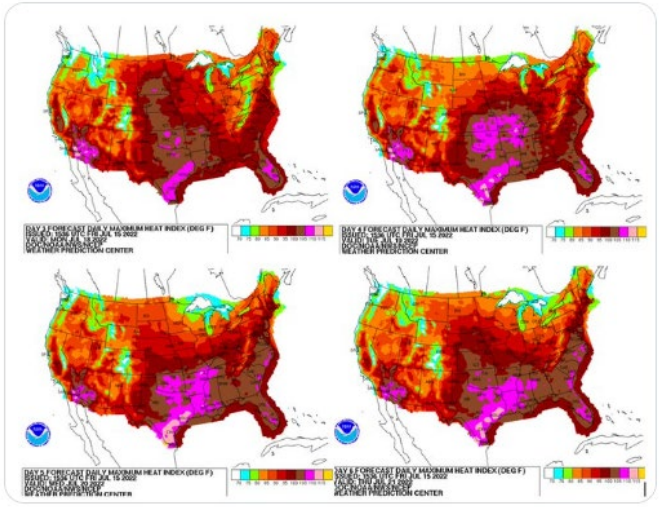
Dan Tsubouchi @Energy_Tidbits · Jul 15

Why mkt followers in KSA/UAE expected no real result from #Biden hope for more #Oil from #MBS. It's not just Biden's election attacks on MBS. Yesterday, @_HadleyGamble summed it up, Biden had zero relationship with KSA & impossible to ask for favors without a relationship. #OOTT

> eated transcript of CNBC Hadley Gamble's comments on July 14, a day before Biden's meeting i
> ://twitter.com/_HadleyGamble/status/1547492362225606656
>
> ics" are SAF Group created transcript.
>
> *ple in this part of the world remember and they have been watching what has been happening c*
> *coming out of Washington. They went from an agreement essentially behind the scenes with Dc*
> *ld literally pick up the hot line to Riyadh. Pick up the hotline frankly to Moscow and talk oil price*
> *in. Talk oil prices with the King and the Crown Prince of Saudi Arabia to a situation today where*
> *, seems to have literally no relationship with the King and the Crown Prince. And as you know, t*
> *sential, not just for the security of the region, but also oil prices and what happens next in oil ma*
> *ctor leader of OPEC".*
>
> SAF Group

Dan Tsubouchi @Energy_Tidbits · Jul 15

Today's @NOAA daily max temp forecast for Mon thru Thurs shows continued weather (warm temps) support for US #NatGas consumption, HH closed $7.13. #OOTT



Dan Tsubouchi @Energy_Tidbits · Jul 15

Hmmm! Just before #Biden summit with KSA, UAE, Kuwait, etc. UAE says ""Abu Dhabi is not open to establishing an axis against any country in the region, especially Iran." Is this to support Biden conviction that diplomacy and a return to #JCPOA is the way to deal with Iran? #OOTT

https://www.arabnews.com/node/2122921/middle-east

Gargash: Abu Dhabi is sending an ambassador to Tehran and wants to rebuild relations with it

DEVELOPING

Advisor to the President of the United Arab Emirates Anwar Gargash. (File/AFP)

pdated 27 sec ago

ARAB NEWS

July 15, 2022 12:26

1136

Diplomatic Adviser to the President of the UAE, Anwar Gargash said that Abu Dhabi was sending an ambassador to Tehran and wants to rebuild relations, Al Arabiya TV reported on Friday.

"Abu Dhabi is not open to establishing an axis against any country in the region, especially Iran," Gargash said.

Abu Dhabi is open to anything that protects the UAE without targeting a third country, he said.

"The idea of a confrontational approach with Iran is not something the UAE embraces," the diplomatic adviser said, even if Tehran's actions in the region were not helping diplomatic efforts

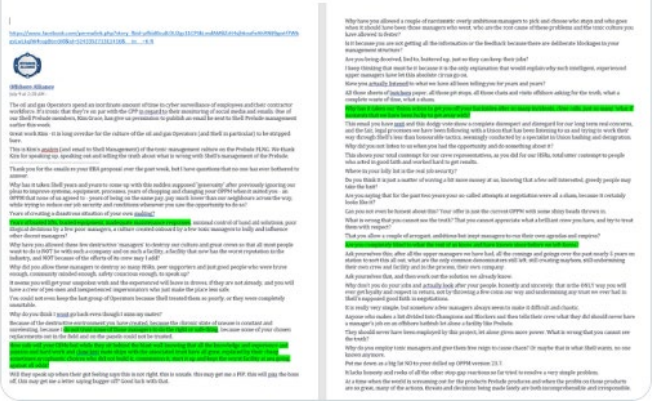
Dan Tsubouchi @Energy_Tidbits · Jul 15

Money Talks! Still a Haftar wildcard, but here's why new @NOC_Libya Chair Bin Qadara has a chance to increase production for now. @S_Elwardany reports Tripoli will give NOC $7.2b budget "needed to upgrade oil facilities, and that salaries of employees will be raised." #OOTT

Dan Tsubouchi @Energy_Tidbits · Jul 14

No surprise: #Shell cancels #LNG loadings at 0.47 bcf/d #PreludeFLNG thru July after a workers' strike extended an outage at the facility, according to people with knowledge of the matter, reports @SStapczynski. Still wonder if 👇 union email raises risks to timing? #NatGas #OOTT

> **Dan Tsubouchi** @Energy_Tidbits · Jul 11
>
> Will 👇 union email be dismissed as negotiating tactic or are there real safety track record incidents/close calls/what if moments to be reviewed ie. potentially causing a longer than expected pause in #Shell #PreludeFLNG 0.47 bcf/d #LNG loadings? #OOTT
> reuters.com/business/energ...



Dan Tsubouchi @Energy_Tidbits · Jul 14

Reality check. Goes without saying #NatGas #LNG will be needed for longer. @VanBeurdenShell is right, #EnergyTransition is going to happen, but it's just going to take way way longer, be a very bumpy road and lead to higher for longer energy prices and volatility. #OOTT

> **Dan Tsubouchi** @Energy_Tidbits · Jul 14
>
> #Shell @VanBeurdenShell ".. specifically the renewed reliance on coal, meant that #EU would have to "backtrack" on its #EnergyTransition plans, at least initially. "We will take a few steps backwards before we are able to make a few steps forwards". #OOTT ft.com/content/fb5786 ...

Dan Tsubouchi @Energy_Tidbits · Jul 14

#Shell @VanBeurdenShell ".. specifically the renewed reliance on coal, meant that #EU would have to "backtrack" on its #EnergyTransition plans, at least initially. "We will take a few steps backwards before we are able to make a few steps forwards". #OOTT

ft.com

Shell chief warns Europe may need to ration energy this winter

Head of Europe's largest oil and gas company said prices will rise significantly as Russia limits supply

Dan Tsubouchi @Energy_Tidbits · Jul 14

Note @IsraeliPM Lapid "only thing that will stop Iran is knowing that, if they CONTINUE TO DEVELOP their nuclear program, the free world will use force". Vs @POTUS "never obtains a nuclear weapon". #Oil risk premium? #OOTT

SAF Group created transcript of excerpts from Biden/Lapid press conference on July 14, 2022

Items in "italics' are SAF Group created transcript

At 5:36am MT, Lapid "*... our way of life is what threatens them. It's what makes the Iranian regime develop its nuclear program, Hezbollah aim its missiles at us and terrorist organizations worldwide send suicide bombers. They want to destroy the only Jewish state in the world. That, we will never let happen. Words will not stop them Mr. President. Diplomacy will not stop them. The only thing that will stop Iran is knowing that, if they continue to develop their nuclear program, the free world will use force. The only way to stop them is to put a credible military threat on the table. You have said many times, Mr. President, that big countries do not bluff. I completely agree. It should not be a bluff but the real thing the Iranian regime must know that if they continue to deceive the world, they will pay a heavy price*".

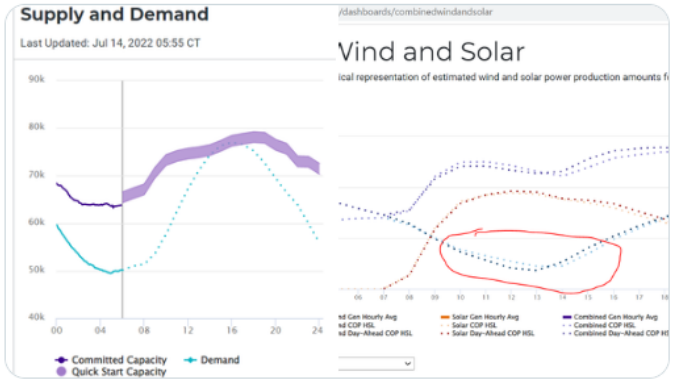
At 5:45am MT. Biden "*... Today, you and I also discussed America's commitment to ensuring Iran never obtains a nuclear weapon..... I continue to believe that diplomacy is the best way to achieve this outcome.*"

At 5:58am MT. Lapid "*... we cannot allow Iran to become nuclear. Iran reserves the right to act freely on the subject.*"

Prepared by SAF Group https://safgroup.ca/news-insights/

Dan Tsubouchi @Energy_Tidbits · Jul 14

Looks like another day for Texans to conserve power consumption. Another low wind generation day amidst the hot weather. Good thing 24/7 #NatGas generation is there. Thx @ERCOT_ISO. #OOTT



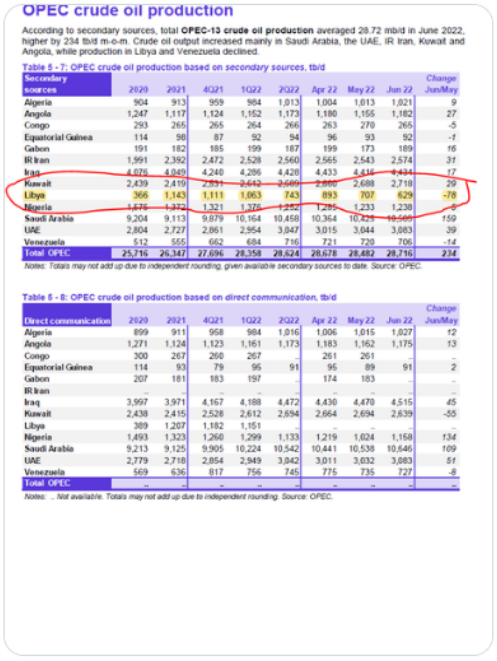
Dan Tsubouchi @Energy_Tidbits · Jul 14

ICYMI! good timing ahead of Biden visit to Saudi. Certainly not a critical US give to Saudi as Biden tries to "reorient, but not rupture" relations. But makes you wonder what will be the big ones and other little ones in Biden's gift package to MBS? #OOTT

> **Andrew Beaton** @andrewlbeaton · Jul 11
>
> NEW: The Justice Department is investigating the PGA Tour over potential antitrust violations while it continues to battle with the Saudi-backed LIV Golf circuit.
>
> With @louiseradnofsky:
>
> wsj.com/articles/pga-t...

Dan Tsubouchi @Energy_Tidbits · Jul 14

Increasing risk to Libya #Oil supply. Power struggle to who runs @NOC_Libya is continuing. Chair Sanalla isn't giving up, especially now that @USEmbassyLibya wades in to support chair Sanalla. And Libya PM's new NOC Chair Farhat bin Qadara shows up to work. #OOTT



OPEC crude oil production

According to secondary sources, total **OPEC-13 crude oil production** averaged 28.72 mb/d in June 2022, higher by 234 tb/d m-o-m. Crude oil output increased mainly in Saudi Arabia, the UAE, IR Iran, Kuwait and Angola, while production in Libya and Venezuela declined.

Table 5 - 7: OPEC crude oil production based on *secondary sources*, tb/d

Secondary sources	2020	2021	4Q21	1Q22	2Q22	Apr 22	May 22	Jun 22	Change Jun/May
Algeria	904	913	959	984	1,013	1,004	1,013	1,021	9
Angola	1,247	1,117	1,124	1,152	1,173	1,180	1,155	1,182	27
Congo	293	265	265	264	266	263	270	265	-5
Equatorial Guinea	114	90	87	92	94	96	93	92	-1
Gabon	191	182	185	199	187	199	173	189	16
IR Iran	1,991	2,392	2,472	2,528	2,560	2,565	2,543	2,574	31
Iraq	4,076	4,049	4,240	4,286	4,428	4,433	4,416	4,434	17
Kuwait	2,439	2,419	2,551	2,642	2,689	2,860	2,688	2,718	29
Libya	366	1,143	1,111	1,063	743	893	707	629	-78
Nigeria	1,575	1,372	1,321	1,375	1,252	1,285	1,233	1,238	6
Saudi Arabia	9,204	9,113	9,879	10,164	10,458	10,364	10,225	10,565	159
UAE	2,804	2,727	2,861	2,954	3,047	3,015	3,044	3,083	39
Venezuela	512	555	662	684	716	721	720	706	-14
Total OPEC	25,716	26,347	27,696	28,358	28,624	28,678	28,482	28,716	234

Notes: Totals may not add up due to independent rounding, given available secondary sources to date. Source: OPEC.

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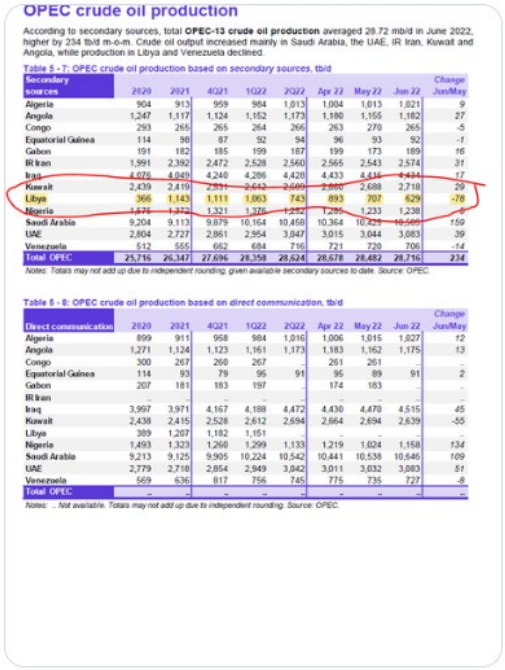
Algeria	899	911	958	984	1,016	1,006	1,015	1,027	12
Angola	1,271	1,124	1,123	1,161	1,173	1,183	1,162	1,175	13
Congo	300	267	260	267	..	261	261	..	..
Equatorial Guinea	114	93	79	95	91	95	89	91	2
Gabon	207	181	183	197	..	174	183	..	..
IR Iran	..	..	..	..	..	..	..	..	..
Iraq	3,997	3,971	4,167	4,188	4,472	4,430	4,470	4,515	45
Kuwait	2,438	2,415	2,528	2,612	2,694	2,664	2,694	2,639	-55
Libya	389	1,207	1,182	1,151	..	..	..	..	..
Nigeria	1,493	1,323	1,260	1,299	1,133	1,219	1,024	1,158	134
Saudi Arabia	9,213	9,125	9,905	10,224	10,542	10,441	10,538	10,646	109
UAE	2,779	2,718	2,854	2,949	3,042	3,011	3,032	3,083	51
Venezuela	569	636	817	756	745	775	735	727	-8
Total OPEC	..	..	..	..	..	..	..	..	..

Notes: .. Not available. Totals may not add up due to independent rounding. Source: OPEC.

> **U.S. Embassy - Libya** @USEmbassyLibya · Jul 14
>
> 1/5 Amb. Norland; "We are following with deep concern developments surrounding the National Oil Corporation (NOC), which is vital to #Libya's stability and prosperity, and has remained politically independent and technically competent under the ...
>
> Show this thread

Dan Tsubouchi @Energy_Tidbits · Jul 13

Surely the power struggle at @NOC_Libya has to put more Libya #Oil production at risk for more interruptions? LIbya PM wants @NOC_Libya chair out. Chair says i'm not going. PM sends in military to take over @NOC_Libya headquarters. Thx @ZaidSabah. #OOTT



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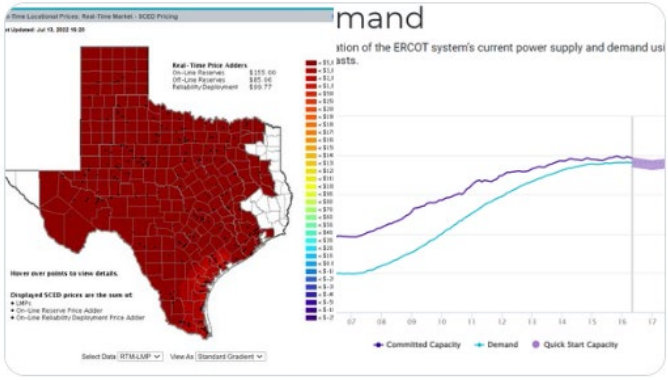
Notes: .. Not available. Totals may not add up due to independent rounding. Source: OPEC.

Dan Tsubouchi @Energy_Tidbits · Jul 13

Crunch time of day in Texas. Not seeing reports of outages, but very expensive power. @ERCOT_ISO graphs. Good thing for Texas they have #NatGas to save the day. #OOTT



Dan Tsubouchi @Energy_Tidbits · Jul 13

Is this a give to Israel for #Biden to go back into JCPOA? "My administration has allocated $ 4 billion and another billion to Iron Dome, and we are working on a laser project that can "Replacing the Iron Dome". Great interview @LeviYonit #OOTT jpost.com/israel-news/ar...

Joe Biden in an interview with Yonit Levy Photo: The News 12Joe Biden in an interview with Yonit Levy Photo: The News 12

Excerpt from https://www.mako.co.il/news-politics/2022_q3/Article-1c38cb84aa8f181027.htm?utm_source=Twitter&utm_medium=NewsChannelPost&partne=rNewsChannelTwitter

The nuclear deal, relations with Saudi Arabia and the Israeli elections: President Biden in an exclusive interview with Yonit Levy

US President pledges in first television interview to foreign media: "Iran will not be nuclear in my shift" • He explains why an agreement with Iran is needed despite Israeli opposition, clarifies that Revolutionary Guards will remain on the list of terrorist organizations in any situation and says: "I can work with any Israeli prime minister To be elected "• And what about the possibility that he will face Trump again head to head? • The full interview

yonit Levi|The main edition| Posted 13/07/22 21:00

You are fighting for Israel to receive military and security assistance. It should be remembered that the Obama-Biden administration approved the (funding) Iron Dome. But there are other voices in the Democratic Party, sir, voices that claim that Israel is an apartheid state, and call for an end to "unconditional aid." There is no doubt that there is a gap between you and these voices.

"There are some such voices, I think they are wrong, they are wrong. Israel is a democratic state, Israel is our ally, Israel is a society. And I do not apologize. My administration has allocated $ 4 billion and another billion to Iron Dome, and we are working on a laser project that can "Replacing the Iron Dome. We have a clear interest in Israel being stable."

But if an issue like (funding) interceptors for the Iron Dome is a controversial issue, should we fear for the future of Israel's relations with the Democratic Party?

"No. No. It is not possible that the Democratic Party, or even a significant part of the Republican Party, will abandon Israel."

Dan Tsubouchi @Energy_Tidbits · Jul 13

Pls read 👇 prior #Biden answer "Whether Quds Force continues to operate or not in the region. We can act against them and still reach an agreement that will curb the nuclear program". Seems Biden saying Quds stays on, rest of IRGC removed and US will return to #JCPO...

Dan Tsubouchi @Energy_Tidbits · Jul 13

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Excerpt https://www.maka.co.il/news-politics/2022_q3/Article-1c30cb04aa6f131827.htm?utm_source=Twitter&utm_medium=NewsChannel&utm_campaign=NewsChannel

The nuclear deal, relations with Saudi Arabia and the Israeli elections: President Biden in an exclusive interview with Yonit Levy

yonit Levi07:00 main edition| Posted 13/07/22 21:00

So following on from what you said, sir, I want to continue from this point and ask you about Iran. You know, most Israelis oppose a return to an agreement with Iran, and America's partners in the region are in doubt. I wanted to ask, and many Israelis wonder, why are you determined to return to the agreement?

"Because the only thing worse than today's Iran is Iran with nuclear weapons, and if we can go back to the agreement and 'keep them short' ... I think the previous president made a huge mistake when he left the agreement, Iran is now closer to developing nuclear weapons than it used to be. "Whether Quds Force continues to operate or not in the region. We can act against them and still reach an agreement that will curb the nuclear program. I still think it makes sense. We went to the negotiating table, drafted an agreement, proposed it and now it depends on Iran."

And you pledge to keep the Revolutionary Guards on the list of terrorist organizations even if it eliminates the agreement?

"Yes".

You have said before, and you say again, that you will do everything to ensure that Iran does not have nuclear weapons. Does this also mean that you will act forcefully against Iran if necessary? Is that the intention?

"As a last resort - yes."

Will you work with Israel on this? Did you receive any promise from Israel?

"I will not speculate on the issue, but Iran must not have nuclear weapons."

Did you receive any promise from the Israeli government, from Bennett or Lapid, that they would not act without your knowledge?

"I will not talk about it."

Well, you can not say I did not try, sir.

"definitely not".

Yonit Levi @LeviYonit · Jul 13

EXCLUSIVE @POTUS interview with @N12News: committed to keeping IRGC on the foreign terrorist organizations list even if it kills the deal; willing to use force “as last resort”

Dan Tsubouchi @Energy_Tidbits · Jul 13

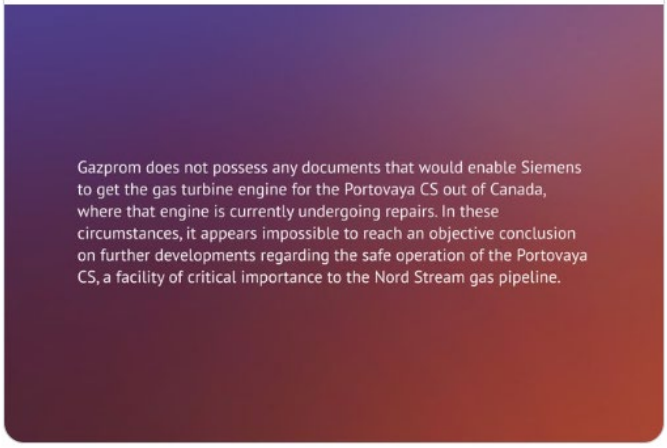
US lowering expectations for #Biden/#MBS. @JakeSullivan46 "we also want that energy supply to be sustainable over time, meaning having spare capacity is part of the equation". ie. US will message a win if KSA sustains #OPEC+ Aug quota of 11.00 mmbd. See 👇👇@michaelwmuller #OOTT

Dan Tsubouchi @Energy_Tidbits · Jul 13

See 👇, #Vitol Asia head @michaelwmuller called it, big diff in surge capacity vs current sustainable production limit. @JakeSullivan46 "we also want that energy supply to be sustainable over time, meaning having spare capacity is part of the equation" Thx @Jordanfabian. #OOTT twitter.com/Energy_Tidbits…

Dan Tsubouchi @Energy_Tidbits · Jul 13

Buckle up! For near term EU TTF #NatGas #LNG prices have to go higher with pretty clear warning that #NordStream 5.3 bcf/d July 11-21 maintenance will take longer. Also will raise winter gas supply panic. Assume #Gazprom does extra checks to make sure nothing unusual. #OOTT #LNG

> **Gazprom** @GazpromEN · Jul 13
>
> 
>

Dan Tsubouchi @Energy_Tidbits · Jul 13

For those not near their laptop, @business reporting @EIAgov #Oil #Gasoline #Distillates inventory as of July 8 just out. Table below compares vs @APIenergy
yesterday and expectations. Prior to release, WTI was $95.19. #OOTT ir.eia.gov/wpsr/overview....

s Inventory July 8: EIA, Bloomberg Survey Expectations,			
ls)	EIA	Expectations	
	3.25	-1.50	
	5.83	-1.00	
	2.67	1.70	
	11.75	-0.80	
ommercial so builds in impact of 6.9 mmb draw from SPR for			
d in the oil data, Cushing had a draw of 0.32 mmb for July 8 w			
Bloomberg			
SAF Group https://safgroup.ca/news-insights/			

Dan Tsubouchi @Energy_Tidbits · Jul 13

See 👇, #Vitol Asia head @michaelwmuller called it, big diff in surge capacity vs current sustainable production limit. @JakeSullivan46 "we also want that energy supply to be sustainable over time, meaning having spare capacity is part of the equation" Thx @Jordanfabian. #OOTT

> **Dan Tsubouchi** @Energy_Tidbits · Jun 5
>
> Buckle up! #Vitol Asia head @michaelwmuller "smart money is of the view that the Saudi current sustainable production limit is somewhere 11 point something", a huge gap vs "surge" KSA #Oil of high 12's mmbd. Very bullish for oil as demand keeps going up. Thx @gulf_intel. #OOTT twitter.com/gulf_intel/sta...
>
> SAF Group created transcript of excerpts from Mike Muller (Head, Vitol Asia) on Gulf Intelligence PODCAST: Daily Energy Markets – June 5th hosted by Sean Evers (Managing Partner, Gulf Intelligence) on June 5, 2022 [LINK]
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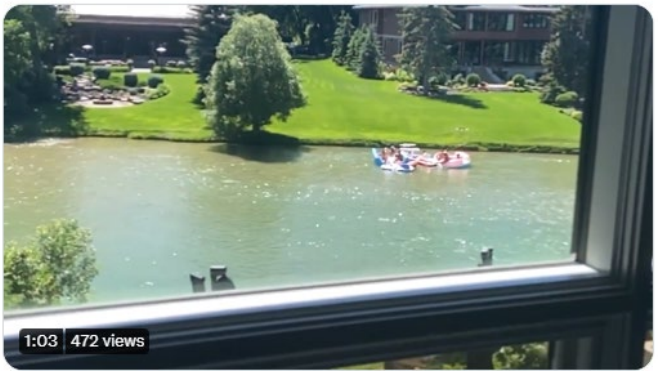
> Items in "*Italics*" are SAF Group created transcript
>
> At 3:30 min mark, Muller "*... what actually happens to OPEC+ output of course is a different matter. There is a commonly held view that really only the UAE and Saudi have spare capacity. And the debate now focuses on what exactly is that number, what can those two countries produce, sustainably. Because no one really knows, it's subsurface and it's not been tested other than a couple of surge production, high watermarks set by the Saudis to much fanfare, of course, just before Covid struck and those were in the high 12's. But the smart money is of the view that the Saudi current sustainable production limit is somewhere 11 point something and that's a pretty wide range. And yes, the quota gets them to 10.8 and above. And we must remind ourselves that most OPEC+ members are already at their limits and therefore this provides an open door for Saudi and UAE to make up the shortfall. Notably also, some may recall there was a month, which I believe was March, just a few months back, when the Saudi OSPs went very because of the formula and a lot of people felt that was too much at once and there was an undenomination. So I think there is a little up their sleeves as well.*"
>
> Prepared by SAF Group https://safgroup.ca/news-insights/

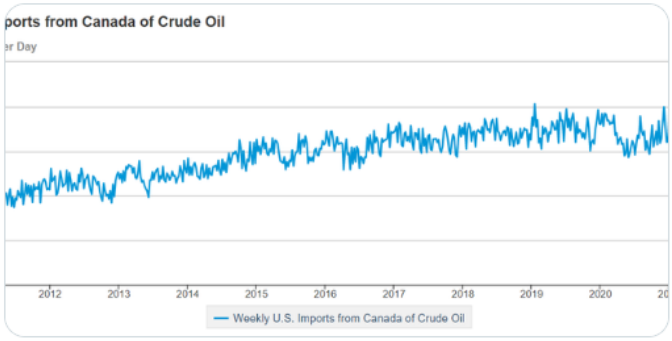
Dan Tsubouchi @Energy_Tidbits · Jul 12

people must be Stampeding today. it's 31C and sunny on #Calgary. normally the Elbow River would be packed with rafters



Dan Tsubouchi @Energy_Tidbits · Jul 12

Latest #EIA data US imported 3.80 mmb/d #Oil from Canada in 07/01 week. @EIAgov new CAN brief reminds CAN is world's 4th largest liquids producer. But exports >97% to US via pipelines. One nit, forgot to mention @WoodfibreLNG_ 0.28 bcf/d LNG project. #OOTT
eia.gov/international/...

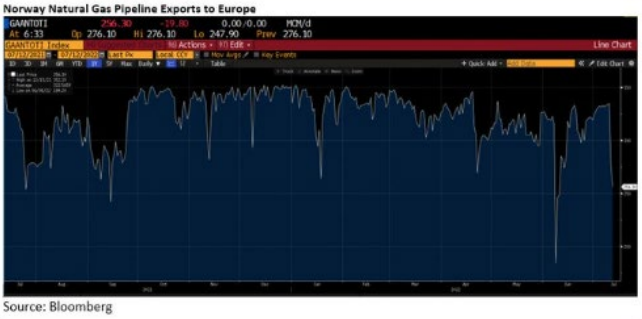


Dan Tsubouchi @Energy_Tidbits · Jul 12

Very bullish for #Oil if #OPEC 's MOMR 1st 2023 fcast is reasonable. Key takeaway - an increased call +0.9 mmbd on OPEC when OPEC is nowhere near meeting current quota. Plus global crude oil stocks still -177 mmb vs 2015-19 ave. #OOTT
opec.org/opec_web/en/pu...

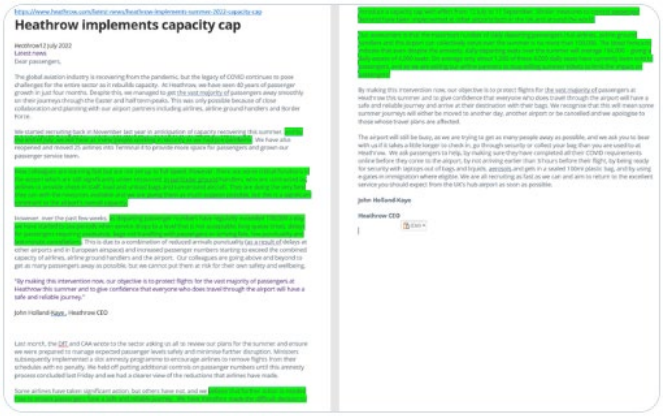
Dan Tsubouchi @Energy_Tidbits · Jul 12

Another hit to #EU #NatGas supply. @a_shiryaevskaya reports capacity reductions at Norway offshore facilities hitting exports until Thurs. Norway pipeline exports -2.10 bcfd on Mon, further 0.70 bcfd today for total -2.80 bcfd to 9.05 bcfd. #OOTT



Dan Tsubouchi @Energy_Tidbits · Jul 12

Will other airports, like @TorontoPearson follow @HeathrowAirport's lead? Airlines, airline ground handlers and the airport capacity is only 100,000 so immediate cap of 100,000 departing passengers vs current 104,000 daily departures. Note passengers cap not # of planes. #OOTT



Dan Tsubouchi @Energy_Tidbits · Jul 11

The Q3 Cdn drilling to surpass normal winter peak for only the 2nd time in ~40 yrs was said by #PrecisionDrilling CEO Neveu on Q1 call on 04/28. see 👇 excerpt from SAF Group May 1, 2022 Energy Tidbits memo. #OOTT

safgroup.ca/news-insights/

AF Group May 1, 2022 Energy Tidbits

dn drilling to surpasss normal winter peak for only 2nd time in ~40 years

AP may be having a more reserved increase for drilling in 2022, but that isn't the case in Canada with C ery high levels. And don't forget this is in the face of the continued lack of drilling on the Blueberry first E BC that is still awaiting a BC govt deal. Precision Drilling held its Q1 call on Thursday and CEO Kevi very clear indications or how Cdn drilling is higher than normal and going higher. As most are aware, cally peaks every winter when frozen grounds give access to basically all potential lands, drilling then ing the spring break-up and then starts building again in June/July up to its winter peak. Neveu gave tw on Cdn drilling. (i) Drilling up during spring break-up. Neveu said *"Turning to Canada for the first quar d strong customer demand matching 2018, activity level. Importantly, our customers extended the win well into the traditional spring breakup period driving first quarter activity up almost 50% from last year e midst of spring break-up, we have 33 rigs operating compared to 21 this time last year continuing the* Q3 drilling will surpass the normal peak in the winter. On Friday, we tweeted [LINK] *""we expect Q3 [C s the winter season for only the 2nd time in memory, has to be the busiest 2nd half since 2014" says Drilling CEO Neveu. Cdn E&P has never looked stronger - very low debt, increasing dividends & drillin* u has almost 40 years of oilfield experience and this is only the 2nd time that Q3 drilling will surpass the k drilling. Later in the memo, we note other items from the Precision Q1 call.

> **Dan Tsubouchi** @Energy_Tidbits · Jul 11
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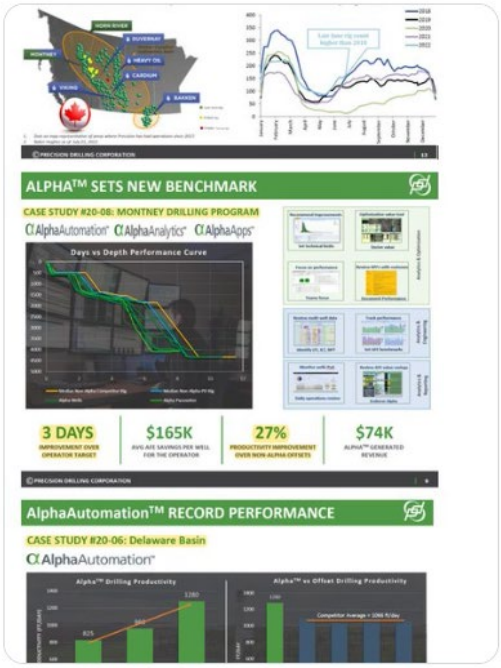
> More indicators for strong Cdn #Oil #NatGas E&P momentum into 2023. New #PrecisonDrilling slide deck: For only 2nd time in ~40 yrs, Cdn Q3 drilling will surpass normal winter peak. Plus faster drilling/higher well productivity in #Montney. #OOTT

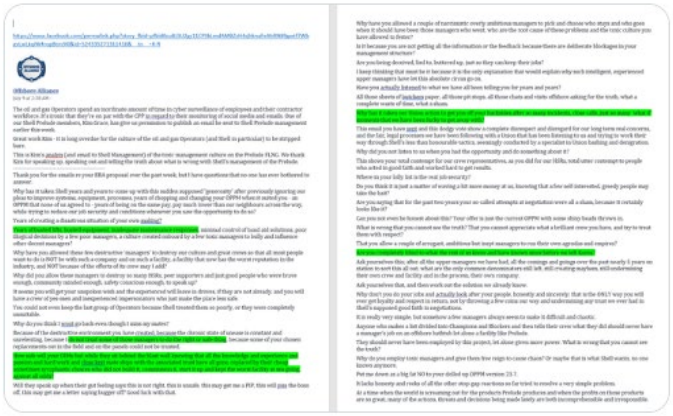
Dan Tsubouchi @Energy_Tidbits · Jul 11

More indicators for strong Cdn #Oil #NatGas E&P momentum into 2023. New #PrecisonDrilling slide deck: For only 2nd time in ~40 yrs, Cdn Q3 drilling will surpass normal winter peak. Plus faster drilling/higher well productivity in #Montney. #OOTT



Dan Tsubouchi @Energy_Tidbits · Jul 11

Will 👇 union email be dismissed as negotiating tactic or are there real safety track record incidents/close calls/what if moments to be reviewed ie. potentially causing a longer than expected pause in #Shell #PreludeFLNG 0.47 bcf/d #LNG loadings? #OOTT reuters.com/business/energ...

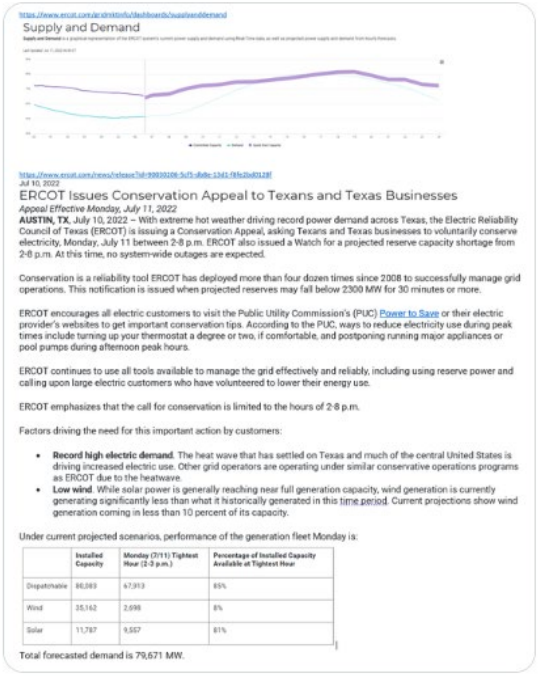


Dan Tsubouchi @Energy_Tidbits · Jul 11

best food deal in 🇺🇸🇨🇦 is not at risk of price increase or #Shrinkflation. @carlquintanilla asks ".. leads to speculation on the hot dog combo, is there any inflationary environment where you would raise that price?" @wcraigjelinek "No".

Dan Tsubouchi @Energy_Tidbits · Jul 11

Welcome to the future. TX installed #Electricity capacity is 159% vs forecast demand today. But wind at only 8% of capacity at 2-3 pm means @ERCOT_ISO says Texans need to conserve to avoid power outage. Fortunately TX has #NatGas to produce 24/7 power. #OOTT



Supply and Demand

Jul 10, 2022

ERCOT Issues Conservation Appeal to Texans and Texas Businesses

Appeal Effective Monday, July 11, 2022

AUSTIN, TX, July 10, 2022 – With extreme hot weather driving record power demand across Texas, the Electric Reliability Council of Texas (ERCOT) is issuing a Conservation Appeal, asking Texans and Texas businesses to voluntarily conserve electricity, Monday, July 11 between 2-8 p.m. ERCOT also issued a Watch for a projected reserve capacity shortage from 2-8 p.m. At this time, no system-wide outages are expected.

Conservation is a reliability tool ERCOT has deployed more than four dozen times since 2008 to successfully manage grid operations. This notification is issued when projected reserves may fall below 2300 MW for 30 minutes or more.

ERCOT encourages all electric customers to visit the Public Utility Commission's (PUC) Power to Save or their electric provider's websites to get important conservation tips. According to the PUC, ways to reduce electricity use during peak times include turning up your thermostat a degree or two, if comfortable, and postponing running major appliances or pool pumps during afternoon peak hours.

ERCOT continues to use all tools available to manage the grid effectively and reliably, including using reserve power and calling upon large electric customers who have volunteered to lower their energy use.

ERCOT emphasizes that the call for conservation is limited to the hours of 2-8 p.m.

Factors driving the need for this important action by customers:

- **Record high electric demand**. The heat wave that has settled on Texas and much of the central United States is driving increased electric use. Other grid operators are operating under similar conservative operations programs as ERCOT due to the heatwave.
- **Low wind**. While solar power is generally reaching near full generation capacity, wind generation is currently generating significantly less than what it historically generated in this time period. Current projections show wind generation coming in less than 10 percent of its capacity.

Under current projected scenarios, performance of the generation fleet Monday is:

	Installed Capacity	Monday (7/11) Tightest Hour (2-3 p.m.)	Percentage of Installed Capacity Available at Tightest Hour
Dispatchable	86,083	67,913	85%
Wind	35,162	2,698	8%
Solar	11,787	9,557	81%

Total forecasted demand is 79,671 MW.

Dan Tsubouchi @Energy_Tidbits · Jul 11

Reality check. @bsurveillance @tomkeene asked who speaks to Putin in EU that #NordStream doesn't flow #NatGas post July 11-21 maintenance now that these RUS threats appear to be reality? ie DEU leadership, utilities, etc? @SandraPhlippen "nobody is speaking to Russia". #OOTT #LNG

Dan Tsubouchi @Energy_Tidbits · Jul 11

Breaking. Negative to #Oil. "Russia's court of Krasnodar region canceled the decision of a lower court to halt CPC's terminal operations for 30 days, according to a statement by the court's press office" instead court imposed fine of $3,203. Thx @ja_herron. #OOTT

Russian Court Cancels Order to Halt CPC Operations for 30 Days

By Bloomberg News

(Bloomberg) -- Russia's court of Krasnodar region canceled the decision of a lower court to halt CPC's terminal operations for 30 days, according to a statement by the court's press office.

- The court imposed a fine of 200,000 rubles ($3,203) instead on CPC, a crucial export route for Kazakh oil
- The ruling has entered force immediately
- READ, July 7: Kazakh Oil Loadings Proceed as CPC Fights Russia Court Order

Related tickers:
3080503Z KZ (Caspian Pipeline Consortium-R AO)
7751924Z RU (Caspian Pipeline Consortium-R CJSC)

To contact Bloomberg News staff for this story:
James Herron in London at jherron9@bloomberg.net

Dan Tsubouchi @Energy_Tidbits · Jul 10

Our weekly SAF July 10, 2022 Energy Tidbits memo is posted on SAF Group website. this 46-pg energy research memo expands upon & covers more items than tweeted this week. See news/insights section of SAF website #Oil #OOTT #LNG #NatGas #EnergyTransition safgroup.ca/news-insights/

SAF GROUP

Energy Tidbits

July 10, 2022

Produced by: Dan Tsubouchi

Is Biden's Op-ed Messaging to MBS That the U.S. Expects a Return to the JCPOA?

Welcome to new Energy Tidbits memo readers. We are continuing to add new readers to our Energy Tidbits memo, energy blogs and tweets. The focus and concept for the memo was set in 1999 with input from PMs, who were looking for research (both positive and negative items) that helped them shape their investment thesis to the energy space, and not just focusing on daily trading. Our priority was and still is to not just report on events, but also try to interpret and point out implications therefrom. The best example is our review of investor days, conferences and earnings calls focusing on sector developments that are relevant to the sector. Our target is to write on 48 to 50 weekends per year and to post by noon MT on Sunday. The Sunday noon timing was because PMs said they didn't have research to read on Sundays and Sundays are a day when they start to think about the investing week ahead.

This week's memo highlights:

1. Biden's op-ed yesterday makes us wonder if he is messaging to MBS that the US expects a return to the JCPOA? [LINK]
2. Will Saudi at least increase to quota levels post the Biden/MBS meeting? [LINK]
3. Germany is no longer subtle, warning of natural gas supply risk this winter and for years [LINK]
4. Europe is panicking Nord Stream won't come back on as planned post the annual maintenance July 11-21 [LINK]
5. What will Biden do with Cheniere's LNG exports knowing that Cheniere's emissions are over limits? [LINK]
6. Please follow us on Twitter at [LINK] for breaking news that ultimately ends up in the weekly Energy Tidbits memo that doesn't get posted until Sunday noon MT.
7. For new readers to our Energy Tidbits and our blogs, you will need to sign up at our blog sign up to receive future Energy Tidbits memos. The sign up is available at [LINK].

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