**Global liquid fuels**

- The June *Short-Term Energy Outlook* (STEO) is subject to heightened levels of uncertainty resulting from a variety of factors, including Russia’s full-scale invasion of Ukraine. Global macroeconomic assumptions in STEO are from Oxford Economics and include global GDP growth of 3.1% in 2022 and 3.4% in 2023, compared with growth of 6.0% in 2021. A range of potential macroeconomic outcomes could affect energy markets in the forecast period. Factors driving energy supply uncertainty include how sanctions affect Russia’s oil production, the production decisions of OPEC+, and the rate at which U.S. oil and natural gas producers increase drilling.

- The Brent crude oil spot price averaged $113 per barrel (b) in May. We expect the Brent price will average $108/b in the second half of 2022 (2H22) and then fall to $97/b in 2023. Current oil inventory levels are low, which amplifies the potential for oil price volatility. Actual price outcomes will largely depend on the degree to which existing sanctions imposed on Russia, any potential future sanctions, and independent corporate actions affect Russia’s oil production or the sale of Russia’s oil in the global market.

- We forecast Russia’s production of total liquid fuels will decline from 11.3 million b/d in the first quarter of 2022 (1Q22) to 9.3 million b/d in 4Q23. This STEO incorporates the recently announced EU ban of seaborne crude oil and petroleum product imports from Russia. We assume the crude oil import ban will be imposed in six months and the petroleum product import ban in eight months. This forecast does not reflect restrictions on shipping insurance, as details regarding such restrictions were not available when we finalized this forecast on June 2. The possibility that these sanctions or other potential future sanctions reduce Russia’s oil production by more than expected creates upward risks for crude oil prices during the forecast period.

- At its June 2 meeting, OPEC+ announced an upward adjustment of production targets for July and August. We updated our forecast to reflect these targets. We expect OPEC crude oil production to average 29.2 million b/d in 2H22, up 0.8 million b/d from 1H22.

- The U.S. average retail price for regular grade gasoline averaged $4.44 per gallon (gal) in May, and the average retail diesel price was $5.57/gal. Rising prices for gasoline and diesel reflect refining margins for those products that are at or near record highs amid
low inventory levels. We expect the gasoline wholesale margins (the difference between the wholesale gasoline price and Brent crude oil price) to fall from $1.17/gal in May to average 81 cents/gal in 3Q22, and we expect retail gasoline prices to average $4.27/gal in 3Q22. Diesel wholesale margins in the forecast fall from $1.53/gal in May to $1.07/gal in 3Q22, and retail diesel averages $4.78/gal in 3Q22.

- U.S. refinery utilization averages 94% in 3Q22 in our forecast, as a result of high wholesale product margins. Despite our expectation that refinery utilization will be at or near the highest levels in the past five years, operable refinery capacity is about 900,000 b/d less than at the end of 2019, and as a result, we do not expect total refinery output of products to reach its highest level in the past five years. Although we expect high refinery utilization will help bring wholesale margins down from record levels.

**Natural gas**

- We expect the Henry Hub spot price to average $8.69 per million British thermal units (MMBtu) in 3Q22, up from an average of $8.13/MMBtu in May. Natural gas prices are rising mainly because of three factors: natural gas inventories that are below the five-year average, steady demand for U.S. liquefied natural gas (LNG) exports, and high demand for natural gas from the electric power sector given limited opportunities for natural gas-to-coal switching. In 2023, we expect the Henry Hub price will average $4.74/MMBtu amid rising natural gas production.

- U.S. natural gas inventories ended May at 2.0 trillion cubic feet (Tcf), which is 15% below the five-year average. We forecast that natural gas inventories will end the 2022 injection season (end of October) at just over 3.3 Tcf, which would be 9% below the five-year average.

- We forecast that U.S. LNG exports will average 11.7 billion cubic feet per day (Bcf/d) during 2Q22 and 3Q22 and 11.9 Bcf/d for all of 2022, a 22% increase from 2021, as a result of additional U.S. LNG export capacity that has come online. Since the end of 2021, the EU and the UK imported record-high LNG volumes because of low natural gas inventories. Europe has become the main destination for U.S. LNG exports and accounted for 74% of total U.S. LNG exports during the first four months of 2022. We forecast LNG exports will average 12.6 Bcf/d in 2023. Expected growth in LNG exports in 2023 results from LNG export terminals that came online in mid-2022 being operational for the whole year in 2023.

- U.S. consumption of natural gas in our forecast averages 85.3 Bcf/d in 2022, up 3% from 2021. Rising U.S. natural gas consumption reflects increased consumption across all sectors. In the residential and commercial sectors, increasing consumption results from colder temperatures in 2022 than in 2021, and in the industrial sector, rising economic activity contributes to higher consumption. Limited natural gas-to-coal switching in the
electric power sector, despite high natural gas prices, results in increased consumption of natural gas for power generation. For 2023, we forecast that natural gas consumption will average 85.1 Bcf/d, about the same as 2022.

- We forecast U.S. dry natural gas production to average 95.7 Bcf/d in June and to average 97.9 Bcf/d in 2H22, which would be 2.7 Bcf/d (3%) more than in 2H21. We expect dry natural gas production to average 101.6 Bcf/d in 2023.

**Electricity, coal, renewables, and emissions**

- The largest increases in U.S. electricity generation in the next two years are likely to come from renewable energy sources, driven by expanded generating capacity from these sources. We expect renewable energy will provide 22% of U.S. generation in 2022 and 24% in 2023, up from a share of 20% last year. Solar capacity additions in the electric power sector total 20 gigawatts (GW) for 2022 and 22 GW for 2023. Solar PV installation delays from 2022 to 2023 account for about 1 GW of the expected installed solar capacity. We expect that small-scale (systems less than 1 GW) solar capacity will grow to a total of 39 GW by the end of 2022 and to 46 GW in 2023. We estimate that wind capacity additions in the U.S. electric power sector will total 11 GW in 2022 and 5 GW in 2023.

- The continued retirement of coal-fired generating capacity in the United States contributes to our forecast that the share of electricity generation from coal will decline from 23% in 2021 to 21% in 2022 and to 20% in 2023. The coal fleet has been facing constraints in raising its share of generation despite high natural gas prices. The constraints include limited rail capacity for fuel delivery, low coal stocks at power plants, reduced coal mining capacity, and rising generation from renewable sources.

- Although we expect annual U.S. natural gas fuel costs for electricity generators will increase 59% in 2022, we do not expect a significant decline in generation from natural gas-fired power plants because of the limited ability of coal power plants to act as an alternative source of generation. We forecast the U.S. natural gas generation share will average 37% in 2022, about the same as last year. The forecast natural gas share averages 36% in 2023 as the share of generation from renewable sources increases.

- We forecast the U.S. residential electricity price will average 14.6 cents/kWh between June and August 2022, up 4.8% from summer 2021. The forecast summer commercial sector price averages 12.0 cents/kWh (up 4.7%) and the forecast industrial sector price averages 7.7 cents/kWh (up 3.2%). Higher retail electricity prices largely reflect higher wholesale power prices and higher natural gas prices. We expect the summer increases in retail residential electricity prices will range from an increase of 2.4% in the West South Central region to a 16.1% increase in New England.
• U.S. coal production in the forecast increases by 23 million short tons (MMst) (3.9%) in 2022 to 601 MMst and then declines by 13 MMst (2.1%) to 588 MMst in 2023. The forecast increase occurs despite our expectation that coal use in the electric power sector will decline. We expect rising coal production will replenish electric power sector inventories and contribute to U.S. coal exports.

• We expect energy-related carbon dioxide (CO₂) emissions in the United States to increase 1.3% in 2022 and fall by 0.7% in 2023. Forecast emissions increases in 2022 primarily reflect growth in transportation demand.

Petroleum and Natural Gas Markets Review

Crude oil

**Prices:** The front-month futures price for Brent crude oil settled at $117.61 per barrel (b) on June 2, 2022, an increase of $10.03/b from the May 2, 2022 price of $107.58/b. The front-month futures price for West Texas Intermediate (WTI) crude oil for delivery at Cushing, Oklahoma, increased by $11.70/b during the same period, settling at $116.87/b on June 2 (Figure 1).

The average front-month Brent price in May was $112/b, which was higher than the April average of $106/b and about the same as the March average. Crude oil prices increased at the end of May as COVID-19 restrictions began to ease in Shanghai and Beijing and after the EU announced it will reduce crude oil imports from Russia by 90% by the end of the year. These factors contributed additional upward pressure on prices that have been high because of low inventory levels globally and uncertain supply from Russia following its full-scale invasion of Ukraine.

Many of the key uncertainties that we noted in last month’s STEO remain, including:
• The impact of sanctions on Russia in relation to its full-scale invasion of Ukraine and the ongoing effects of current sanctions and private-sector actions

• The potential for new sanctions on Russia, and the pace that the EU implements its partial ban on energy imports from Russia

• The pace of petroleum demand growth through the summer and the potential for demand destruction because of high retail fuel prices

• The volume and timing of new crude oil production that will come online at price levels near or above $100/b

• Renewed concerns over potential resurgences in COVID-19 cases and the nature of individual, business, and government responses

• The ongoing impact of the coordinated release of petroleum supplies from strategic reserves in the United States and in Europe

• Other geopolitical uncertainties related to Libya, the ceasefire in Yemen, or potential new developments on an Iran deal

Although crude oil prices remain high because of low oil inventories and significant geopolitical uncertainty, we estimate that world production of petroleum and other liquids has returned to within 1% of its pre-pandemic level in March 2020. We estimate that U.S. production of crude oil and other liquids averaged 19.9 million b/d in May, which was within 3% of January 2020’s record high production of 20.5 million b/d. We also estimate that OPEC crude oil and other liquids production has returned to pre-pandemic levels: May OPEC production was 33.7 million b/d, 1% higher than the first quarter of 2020 (1Q20) OPEC production of 33.4 million b/d. Furthermore, OPEC+ announced on June 2 that they will increase crude oil production targets for July and August. We forecast that OPEC crude oil and total liquid fuels production will increase to 34.6 million b/d in 3Q22, the highest since 2Q19.

After seven consecutive quarters of global oil inventory draws from 3Q20 to 1Q22, we forecast that oil stocks in OECD will generally increase but remain below their five-year average levels until 4Q23. However, in response to the EU ban on seaborne imports of crude oil from Russia and previous sanctions on Russia, we forecast that Russia’s oil production will decrease from 11.3 million b/d in 1Q22 to 9.3 million b/d in 4Q23. Our forecast reflects the EU’s announcement that it will impose its crude oil import ban in six months. We assume that about 80% of the crude oil subject to the EU import ban will find alternative buyers, mainly in Asia. Our forecast does not reflect restrictions on shipping insurance, as details regarding such restrictions were not available when we finalized this forecast on June 2. The possibility that these sanctions or other potential future sanctions reduce Russia’s oil production by more than expected creates upward risks for crude oil prices during the forecast period. We forecast the Brent crude oil price will average $111/b in 3Q22 and $97/b in 2023.
**Ratio of S&P 500 to Brent crude oil:** The value of the S&P 500, an equity index of widely traded U.S. public companies, has been decreasing both in nominal value and in terms of its ratio to the price of Brent crude oil. After peaking in April 2020 when the value of the S&P 500 index was 104 times the value of Brent crude oil, the ratio has decreased to 36 in May 2022 (Figure 2).

![Figure 2. Ratio of S&P 500 to the price of Brent crude oil ratio (monthly average)](image)

Historically, the ratio between the S&P 500 and crude oil prices changes when factors specific to oil supply or demand affect oil prices more than general economic growth alone would. Most of the decrease in the ratio since April 2020 can be attributed to increasing crude oil prices. Front-month future prices for Brent crude oil averaged $27/b in April 2020 and averaged $112/b in May 2022 (Figure 3). Although the S&P 500 index has also increased since April 2020, it has decreased in recent months from its December 2021 highs, and this decline explains much of the decrease in the ratio in 2022.

![Figure 3. S&P 500 and Brent crude oil prices](image)
In the second half of 2020 (2H20) and much of 2021, the ratio between the S&P 500 and crude oil prices was stable because economic growth was reflected in rising profitability of companies as well as higher demand and prices for oil. However, recently, crude oil prices have been driven mostly by sector-specific, supply-side restraints that have lingered since the onset of the COVID-19 pandemic and that have become more prominent following Russia’s full-scale invasion of Ukraine.

Rising oil prices have contributed to inflation and have increased input costs for companies. Inflation concerns have led the Federal Reserve to increase interest rates, which has further increased company borrowing costs. Higher input costs from inflation combined with increased borrowing costs could lead to lower net income for companies in the S&P 500, a factor that may be contributing to lower equity prices. Aside from some of the companies that produce and refine petroleum, which make up less than 3% of the S&P 500, companies in the S&P 500 have mostly experienced decreasing stock values while crude oil prices remain elevated. The S&P 500 decreased in value by 12% from the January average to May average although the Brent crude oil price has increased 31%.

**Open interest:** The average daily open interest of Brent and WTI oil futures markets have generally been declining since February 2021. Open interest is a measure of the total outstanding number of contracts for a commodity at a single point in time, and a decreasing open interest indicates that the number of unsettled contracts for the commodity is decreasing because either traders are not opening positions for the commodity or traders are closing positions. The average daily open interest for Brent was 1.88 million contracts in May, the lowest since July 2015, and for WTI was 1.74 million, the lowest since July 2016 (Figure 4).

![Figure 4. Average daily open interest in Brent and WTI futures contracts](image)

Based on the weekly U.S. Commodity Futures Trading Commission (CFTC) Commitments of Traders data, WTI futures open interest declined from the first week of 2022 to the week ending
May 24 as a result of the closure of long and short positions by Producers and Merchants as well as Swap Dealers. The Producers and Merchants category and Swap Dealers category typically represent participants in the futures market whose primary purpose is risk management in the production or processing of a commodity. Fewer futures contracts held by these traders suggest some producers or end users could be reducing their hedging activity, in part, because higher commodity prices and higher volatility are likely making it more expensive to hedge. In addition, higher interest rates may be increasing the costs of opening a futures position, such as higher margin rates.

**Petroleum products**

**Gasoline prices:** The front-month futures price of RBOB (the petroleum component of gasoline used in many parts of the country) settled at $4.19 per gallon (gal) on June 2, up 68 cents/gal from May 2 (Figure 5). The RBOB–Brent crack spread (the difference between the price of RBOB and the price of Brent crude oil) settled at $1.39/gal on June 2, up 44 cents/gal during the same period.

![Figure 5. Historical RBOB front-month futures prices and crack spreads](chart)

Data Source: CME Group, Bloomberg L.P.

Rising crude oil prices and the news of the EU’s phasing out of crude oil and petroleum product imports from Russia contributed to a rising gasoline wholesale price and crack spread during the first trading days of June. High crack spreads in the middle of the month contributed to monthly average crack spreads of $1.13/gal during May, an increase from $0.73/gal in April. Relatively lower refinery production (compared with pre-COVID levels), lower imports in April, and increasing seasonal demand for gasoline moving into the summer have contributed to lower gasoline inventories in the United States. The low inventories are most pronounced along the East Coast, the highest demand region in the United States, which has in turn contributed to higher gasoline prices in the region, including at New York Harbor (NYH). Far more gasoline is
consumed in the East Coast than is produced, and imports and transfers from other regions in the United States help meet its consumption needs.

In April, low inventories along the East Coast were partially offset by higher inventories along the Gulf Coast and in the Midwest (although capacity to transfer gasoline from the Midwest to the East Coast is more limited than capacity to transfer from the Gulf Coast). By the end of April, gasoline inventories on the East Coast were 14 million barrels below their five-year (2017–2021) average levels (Figure 6). At the same time, combined Gulf Coast and Midwest inventories were almost 2 million barrels above their five-year average level. In May, East Coast gasoline inventories remained low and did not decrease much further, while Midwest and Gulf Coast inventories drew down substantially. On May 27, combined Gulf Coast and Midwest inventories were down by 6 million barrels from their end-April levels while East Coast gasoline inventories were down by almost 1 million barrels. As a result, net inventories in the United States continued to decrease through the month, contributing to increased crack spreads to meet increased demand for gasoline.

Ultra-low sulfur diesel prices: The front-month futures price for ultra-low sulfur diesel (ULSD) for delivery in New York Harbor settled at $4.21/gal on June 2, almost unchanged from May 2 (Figure 7). The ULSD-Brent crack spread (the difference between the price of ULSD and the price of Brent crude oil) decreased by 24 cents/gal during the same period and settled at $1.41/gal on June 2.

![Figure 6. Weekly total gasoline inventory minus rolling 5-year average](image-url)
Front-month ULSD prices and crack spreads in May fell from recent record highs at the end of April, albeit to levels much higher than the historical norm. The ULSD-Brent crack spread averaged $1.27/gal during May, 8 cents/gal less than the all-time average high of $1.35/gal during April but still 30 cents/gal higher than the second-highest recorded monthly average of 97 cents/gal in March 2022. In real terms, the last time crack spreads were close to these levels was in May 2008, when the crack spread averaged 86 cents/gal when adjusted to 2022 dollars. The ULSD front-month futures price averaged $3.92/gal during May, 6 cents/gal higher than April.

Tight global distillate markets and low domestic inventories kept ULSD prices high in May. U.S. distillate inventories increased for the first time this year, building by 2.5 million barrels (2.3%) over April. However, inventories remained 25% below the five-year average. We estimate domestic consumption averaged 3.9 million b/d in May, a 2% increase over April and the first time consumption increased from April to May since 2018. We estimate distillate imports, which would normally increase to help rebuild low inventories and moderate prices, were below the five-year average at 145,000 b/d for the four weeks ending May 27. If confirmed in monthly data, this recent decrease in distillate imports would signal that global demand remains strong as markets continue to adjust to sanctions on Russia’s exports, reduced export quotas in China, and overall lower global refinery capacity.

**ULSD-RBOB future price spreads:** Front-month ULSD and RBOB futures typically follow seasonal trends: RBOB trades at a premium in the summer months during the peak summer driving season and ULSD trades at a premium when heating fuel demand is highest in the winter (Figure 8). Gasoline prices usually start trading at a premium to ULSD prices in March when the RBOB futures contract represents the more expensive summer grade of gasoline. However, global demand for distillate and reduced distillate exports from Russia, a major exporter of distillate fuel to Europe, have disrupted this trend. ULSD front-month futures traded at an average
monthly premium to RBOB of 61 cents/gal in April, the highest April premium in real terms in data going back to 2006. Although ULSD has previously traded at a premium during the spring, typically with historically low gasoline prices, RBOB prices in real terms are currently at a nine-year high and RBOB crack spreads are higher than seasonal norms. The ULSD-RBOB spread decreased to 14 cents/gal in May but remains elevated compared with the historical average. ULSD futures prices were relatively flat in May while RBOB futures prices increased by 16% from the start of the month.

Figure 8. ULSD-RBOB front-month futures price spread
dollars per gallon

![ULSD-RBOB front-month futures price spread](image)

Data Source: CME Group, Bloomberg L.P.

**Regional refinery crack spreads:** Inventories for gasoline and diesel in the United States are low at the same time that they are similarly low in Europe and elsewhere in the Atlantic Basin, contributing to broad increases in crack spreads for both products. The reduction in refining capacity along the East Coast appears to have contributed to particularly high product price premiums. The 3:2:1 crack spread (reflecting the price of two barrels of gasoline and one barrel of diesel, minus three barrels of crude oil) at NYH increased far more than the same spread in Europe or along the U.S. Gulf Coast in April and May (Figure 9). The Northwest Europe (NWE) 3:2:1 crack spread is often lower than the U.S. Gulf Coast or NYH crack spreads, which reflects the relatively higher demand for gasoline in the United States and the larger weighting that gasoline has in the 3:2:1 spread calculation. Higher U.S. crack spreads suggest greater market pressure to increase refinery production from U.S. markets than markets in Europe, based on the wholesale prices of gasoline, diesel, and crude oil (although the 3:2:1 crack spread does not account for other factors such as regulatory costs, electricity prices, variations in crude oil input costs, or the value of other refined products).
Initially, the impact of Russia’s full-scale invasion of Ukraine coincided with a narrowing difference between North American and European crack spreads. In March 2022, the NYH monthly average 3:2:1 crack spread was 56% higher than NWE, reaching its narrowest point in percentage terms since before the onset of the COVID-19 pandemic. The narrowing likely reflected the impact of higher petroleum product prices in Europe related to concerns that European importers may stop taking gasoline and diesel volumes from Russia. However, the difference between the crack spreads has since widened to 74% in May, reflecting increasing demand and low inventories for diesel and for gasoline, particularly on the U.S. East Coast. We expect crack spreads for gasoline and distillate to decrease in 3Q22 as increasing refinery runs partially reduce prices compared with their current levels. However, the impact of capacity constraints—both in the United States and globally—will continue to limit increases in both production and inventories and will contribute to above-average crack spreads, on top of higher crude oil prices, through the end of 2022.

**Natural gas**

**Prices:** On June 2, 2022, the front-month natural gas futures contract for delivery at the Henry Hub settled at $8.49 per million British thermal units (MMBtu), up $1.01/MMBtu from May 2, 2022 (Figure 10). The average closing price for front-month natural gas futures contracts in May was $8.16/MMBtu, the highest May monthly average in real terms since May 2008.
High demand for natural gas in the electric power sector and for U.S. liquefied natural gas (LNG) exports amid relatively flat natural gas production thus far in 2022 has kept U.S. natural gas inventories below the five-year (2017–2021) average and has contributed to high natural gas prices. Natural gas stock builds in May were 386 billion cubic feet (Bcf), compared with the five-year average build of 417 Bcf. At the end of May, natural gas inventories were 1,983 Bcf, which was 351 Bcf (15%) lower than the five-year average. The below-average storage builds at the beginning of this injection season along with our forecast of average storage injections this summer mean that we expect natural gas inventories to begin the winter heating season below average.

Natural gas consumption in the electric power sector averaged 30.2 Bcf/d in May, which was 3.9 Bcf/d higher than last year and 4.2 Bcf/d higher than the five-year average. We estimate U.S. LNG exports averaged 11.6 Bcf/d in May, which was 1.5 Bcf/d higher than last year and 0.2 Bcf/d higher than the average from January through April 2022. High exports are being supported by high international LNG prices, as well as by additional export capacity created by a new U.S. LNG export facility, Calcasieu Pass LNG, which continues to ramp up exports.

**Futures price spreads:** The natural gas 1st–13th price spread averaged $3.37/MMBtu in May, the highest average monthly backwardation (where near-term contract prices are higher than longer-dated contract prices) on record (Figure 11). Natural gas futures prices have been increasingly backwardated since early March. The 1st–13th price spread averaged $1.28/MMBtu in March and $2.36/MMBtu in April. Often, the 1st–13th price spread increases when natural gas inventories are below the five-year range, and the price spread often decreases when inventories are above the five-year range. Low storage inventories to start the injection season, lower-than-expected production levels compared with late 2021 production levels, continued high demand for U.S. LNG exports, and high demand from the electric power sector are all
contributing to near-term natural gas prices being much higher now compared with natural gas futures prices for delivery next year.

![Figure 11. Natural gas 1st – 13th futures price spread](Image)

We expect Henry Hub natural gas prices to remain high throughout the summer, averaging $8.69/MMBtu in 3Q22, because opportunities for natural gas-to-coal switching for power generation have been limited by rail capacity for fuel delivery, low coal stocks in the electric power sector, reduced coal mining capacity, and rising generation form renewable sources. Additionally, we expect U.S. natural gas production increases will take several months to emerge, and continued high levels of LNG exports will contribute to high natural gas demand.

**Ethane-natural gas price spread:** U.S. production of ethane, a hydrocarbon gas liquid (HGL) produced primarily in natural gas processing plants, has grown rapidly since 2013. Ethane is primarily used in the petrochemical industry, where it is used as a feedstock at ethylene crackers. Ethane is typically priced at a premium to natural gas because it reflects the costs of extracting it from the natural gas production stream and transporting it to a petrochemical facility. The premium of ethane to natural gas averaged 47 cents/MMBtu in 2021 and 86 cents/MMBtu in 1Q22, but it decreased in April and May (Figure 12).
The monthly premium averaged 17 cents/MMBtu in April, and the price of ethane fell to 1 cent/MMBtu below the price of natural gas in May, as the value of natural gas for use as energy increased. When the price of ethane decreases relative to the price of natural gas, it becomes less economical to extract ethane from natural gas production streams. This situation can lead to more ethane rejection, which is when natural gas processing plant operators choose to leave ethane in the processed natural gas (provided the processed natural gas meets pipeline specifications) and sell it into the natural gas market. More ethane rejection means more ethane will be sold as natural gas, increasing the supply of natural gas. Additionally, because ethane contains more energy than natural gas for the same volume, more ethane rejection increases the energy content of the natural gas stream. More ethane rejection also means a reduction in the amount of ethane supplied to petrochemical facilities or to export facilities. At the same time, rates of ethane rejection are determined by factors other than ethane’s price spread with natural gas, such as ethylene margins in the petrochemical sector, individual contract specifications with producers and consumers, and the share of ethane allowed in the natural gas stream by pipeline specification.

Ethane consumption, both domestic and international, grew throughout 2021. We expect U.S. consumption to grow further in 2022 because of additions in U.S. petrochemical capacity, as three new crackers—Baystar and Gulf Coast Growth Ventures in Texas and Shell Chemical Appalachia in Pennsylvania—ramp up production. In addition, a cracker designed to use ethane imported from the United States as a feedstock is expected to come online in China, contributing to our expectation that U.S. ethane exports will increase.
Notable forecast changes

- This STEO incorporates the assumption that the EU will ban seaborne crude oil and petroleum product imports from Russia. We assume the crude oil import ban will be imposed in six months and the petroleum product import ban in eight months. This forecast does not reflect restrictions on shipping insurance, as details regarding such restrictions were not available when we finalized this forecast on June 2. Preliminary estimates for Russia’s total liquid fuels production in May show growth of 0.1 million b/d in May compared with April. Our previous forecast was for a 0.5 million b/d month-over-month decline. This change in the May production results in a 0.6 million b/d net increase in Russia’s production for May 2022 compared with last month’s forecast. We now expect Russia’s production to decline by 1.1 million b/d from May 2022 through the end of 2023. In the May STEO, we expected a decline of 0.8 million b/d over that period.

- You can find more information in the detailed table of forecast changes.

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