The August Short-Term Energy Outlook (STEO) remains subject to heightened levels of uncertainty because mitigation and reopening efforts related to the 2019 novel coronavirus disease (COVID-19) continue to evolve. Reduced economic activity related to the COVID-19 pandemic has caused changes in energy demand and supply patterns in 2020. Uncertainties persist across the U.S. Energy Information Administration’s (EIA) outlook for all energy sources, including liquid fuels, natural gas, electricity, coal, and renewables. The STEO is based on U.S. macroeconomic forecasts by IHS Markit, which assume U.S. gross domestic product declined by 5.2% in the first half of 2020 from the same period a year ago and will rise from the third quarter of 2020 through 2021.

- Daily Brent crude oil spot prices averaged $43 per barrel (b) in July, up $3/b from the average in June and up $25/b from the multiyear low monthly average price in April. EIA expects monthly Brent spot prices will average $43/b during the second half of 2020 and rise to an average of $50/b in 2021.

- U.S. regular gasoline retail prices averaged $2.18 per gallon (gal) in July, an increase of 10 cents/gal from the average in June but 56 cents/gal lower than at the same time last year. EIA expects that gasoline prices will gradually decrease through the rest of the summer to reach an average of $2.04/gal in September before falling to an average of $1.99/gal in the fourth quarter. Forecast U.S. regular gasoline retail prices will average $2.23/gal in 2021, compared with an average of $2.12/gal in 2020.

- EIA expects high inventory levels and surplus crude oil production capacity will limit upward price pressures in the coming months, but as inventories decline into 2021, those upward price pressures will increase. EIA estimates global liquid fuels inventories rose at a rate of 6.4 million barrels per day (b/d) in the first half of 2020 and expects they will decline at a rate of 4.2 million b/d in the second half of 2020 and then decline by 0.8 million b/d in 2021.

- EIA estimates that demand for global petroleum and liquid fuels averaged 93.4 million b/d in July. Demand was down 9.1 million b/d from July 2019, but it was up
from an average of 85.0 million b/d during the second quarter of 2020, which was
down 15.8 million b/d from year-ago levels. EIA forecasts that consumption of
petroleum and liquid fuels globally will average 93.1 million b/d for all of 2020,
down 8.1 million b/d from 2019, before increasing by 7.0 million b/d in 2021.
Reduced economic activity related to the COVID-19 pandemic has caused changes in
energy supply and demand patterns in 2020.

- EIA estimates that global liquid fuels production averaged 91.8 million b/d in the
  second quarter of 2020, down 8.6 million b/d year over year. The decline reflects
  voluntary production cuts by the Organization of the Petroleum Exporting Countries
  (OPEC) and partner countries (OPEC+), and reductions in drilling activity and
  production curtailments in the United States because of low oil prices. In the
  forecast, the global supply of oil continues to decline to 90.4 million b/d in the third
  quarter of 2020 before rising to an annual average of 99.4 million b/d in 2021.

- EIA estimates that U.S. liquid fuels consumption averaged 16.2 million b/d in the
  second quarter of 2020, down 4.1 million b/d (20%) from the same period in 2019.
  The decline reflects travel restrictions and reduced economic activity related to
  COVID-19 mitigation efforts. EIA expects U.S. oil consumption will generally rise
  through the end of 2021. EIA forecasts U.S. liquid fuels consumption will average
  18.9 million b/d in the third quarter of 2020 (down 1.8 million b/d year over year)
  before rising to an average of 20.0 million b/d in 2021. Although the 2021 forecast
  level is 1.6 million b/d more than EIA’s forecast 2020 consumption, it is 0.4 million
  b/d less than the 2019 average.

- EIA has lowered U.S. crude oil production estimates for 2020 by 370,000 b/d from
  the previous STEO. EIA expects crude production to average 11.3 million b/d in 2020
  and 11.1 million b/d in 2021, down from 12.2 million b/d in 2019. Recently released
  EIA data show that average monthly U.S. oil production for May was 1.2 million b/d
  lower than the July STEO forecast, indicating more extensive production
  curtailments than previously estimated. Also, EIA’s August STEO assumes that the
  Dakota Access Pipeline will remain operational. A U.S. District Court ordered on July
  6 the temporary closure of the Dakota Access Pipeline beginning in early August. A
  U.S. appeals court has overturned the lower court decision, allowing the pipeline to
  remain running while further litigation proceedings continue.

**Natural Gas**

- In July, the Henry Hub natural gas spot price averaged $1.77 per million British
  thermal units (MMBtu). EIA expects natural gas prices will generally rise through the
  end of 2021 but the sharpest increases will be during this fall and winter when they
  rise from an average of $2.11/MMBtu in September to $3.14/MMBtu in February.
  EIA expects that rising demand heading into winter, combined with reduced
production, will cause upward price pressures. EIA forecasts that Henry Hub natural gas spot prices will average $2.03/MMBtu in 2020 and $3.14/MMBtu in 2021.

- EIA estimates that total U.S. working natural gas in storage ended July at about 3.3 trillion cubic feet (Tcf), 15% more than the five-year (2015–19) average. In the forecast, inventories rise by 2.0 Tcf during the April-through-October injection season to reach nearly 4.0 Tcf on October 31.

- EIA expects that total U.S. consumption of natural gas will average 82.4 billion cubic feet per day (Bcf/d) in 2020, down 3.0% from 2019. The largest decline in consumption occurs in the industrial sector, which EIA forecasts will average 22.0 Bcf/d in 2020, down 1.0 Bcf/d from 2019, as a result of reduced manufacturing activity. The decline in total U.S. consumption also reflects lower heating demand in early 2020, contributing to residential and commercial demand in 2020 averaging 12.8 Bcf/d (down 0.9 Bcf/d from 2019) and 8.8 Bcf/d (down 0.8 Bcf/d from 2019), respectively.

- U.S. dry natural gas production set an annual record in 2019, averaging 92.2 Bcf/d. EIA forecasts dry natural gas production will average 88.7 Bcf/d in 2020, with monthly production falling from its monthly average peak of 96.2 Bcf/d in November 2019 to 82.7 Bcf/d by April 2021, before increasing slightly. Natural gas production declines the most in the Permian region, where EIA expects low crude oil prices will reduce associated natural gas output from oil-directed rigs. EIA’s forecast of dry natural gas production in the United States averages 84.0 Bcf/d in 2021. EIA expects production to begin rising in the second quarter of 2021 in response to higher natural gas and crude oil prices.

- EIA estimates that U.S. liquefied natural gas (LNG) exports will average 5.5 Bcf/d in 2020 and will average 7.3 Bcf/d in 2021. EIA expects that U.S. LNG exports will decline through the end of the summer as a result of reduced global demand for natural gas. U.S. exports of LNG in July 2020 averaged 3.1 Bcf/d, which is about the same as in May 2018, when the available liquefaction capacity was about one-third of the current capacity. Declines in global natural gas demand associated with COVID-19 mitigation efforts, high natural gas storage inventories in Europe and Asia, and an on-going expansion in LNG liquefaction capacity have contributed to natural gas and LNG prices reaching all-time historical lows. Low international prices have affected the economic competitiveness of U.S. LNG exports and have led to numerous cargo cancellations, particularly at the Sabine Pass, Corpus Christi, and Freeport LNG export terminals. EIA expects LNG exports from the United States to remain low in the next few months. Based on numerous trade press reports, EIA estimates about 45 cargoes have been canceled for upcoming August shipments and about 30 cargoes have been canceled for September shipments.
Electricity, coal, renewables, and emissions

- EIA forecasts 3.6% less electricity consumption in the United States in 2020 compared with 2019. The largest decline on a percentage basis is in the commercial sector, where EIA expects retail sales of electricity to fall by 7.4% this year. Forecast industrial retail electricity sales fall by 5.8%. EIA forecasts residential sector retail sales will increase by 2.0% in 2020. Milder winter temperatures earlier in the year led to lower consumption for space heating, but that factor is offset by increased summer cooling demand and an assumed increase in electricity use by more people working from home. In 2021, EIA forecasts total U.S. electricity consumption will rise by 0.8%.

- EIA expects the share of U.S. electric power sector generation from natural gas-fired power plants will increase from 37% in 2019 to 40% this year. In 2021, the forecast natural gas share declines to 35% in response to higher natural gas prices. Coal’s forecast share of electricity generation falls from 24% in 2019 to 18% in 2020 and then increases to 22% in 2021. Electricity generation from renewable energy sources rises from 17% in 2019 to 20% in 2020 and to 22% in 2021. The increase in the share from renewables is the result of expected additions to wind and solar generating capacity. EIA expects a decline in nuclear generation in both 2020 and 2021, reflecting recent and upcoming retirements of nuclear generating capacity.

- EIA forecasts that renewable energy will be the fastest-growing source of electricity generation in 2020. EIA expects the electric power sector will add 23.2 gigawatts (GW) of new wind capacity and 12.9 GW of utility-scale solar capacity in 2020. However, these future capacity additions are subject to a high degree of uncertainty, and EIA continues to monitor reported planned capacity builds.

- U.S. coal consumption, which dropped to its lowest point since April, totaled 95 MMst in the second quarter of 2020. EIA expects coal consumption to rise to a seasonal peak of 127 MMst in the third quarter but remain lower than 2019 levels through the end of 2020. EIA estimates that U.S. coal consumption will decrease by 26% in 2020 and increase by 20% in 2021. EIA estimates that total U.S. coal production in 2020 will decrease by 29% from 2019 levels to 502 MMst. In 2021, EIA expects higher demand and rising natural gas prices to lead to a recovery in coal production of 12%, with a total annual production level of 564 MMst.

- EIA forecasts that U.S. energy-related carbon dioxide (CO2) emissions, after decreasing by 2.8% in 2019, will decrease by 11.5% (588 million metric tons) in 2020. This record decline is the result of less energy consumption related to restrictions on business and travel activity and slowing economic growth related to COVID-19 mitigation efforts. CO2 emissions decline with reduced consumption of all fossil fuels, particularly coal (24.9%) and petroleum (11.6%). In 2021, EIA forecasts that energy-related CO2 emissions will increase by 5.6%, as the economy recovers.
and stay-at-home orders are lifted. Energy-related CO2 emissions are sensitive to changes in weather, economic growth, energy prices, and fuel mix.

Petroleum and natural gas markets review

Crude oil

Prices: The front-month futures price for Brent crude oil settled at $45.09 per barrel (b) on August 6, 2020, an increase of $3.06/b from July 1, 2020. The front-month futures price for West Texas Intermediate (WTI) crude oil for delivery at Cushing, Oklahoma, increased by $2.13/b during the same period, settling at $41.95/b on August 6 (Figure 1).

Crude oil prices developed a narrow trading range in July as price volatility declined to the lowest levels since January 2020. Global petroleum demand continued to recover in July, but continued growth in global coronavirus cases could bring renewed lockdown measures and presents considerable uncertainty to global oil demand for the remainder of the year. World oil-weighted real gross domestic product (GDP) declined 9.3% in the second quarter of 2020—one of the largest declines for any quarter on record—however, a number of leading indicators suggest increases in economic activity since then in some sectors, such as manufacturing. Despite the continued demand-side uncertainty, global petroleum production remains subdued from rapid declines in U.S. crude oil production as well as oil supply management from members of the Organization of the Petroleum Exporting Countries (OPEC) and partner countries (OPEC+). The group plans to ease production cuts by nearly 2 million barrels per day (b/d) in August, but it is committed to monitoring global inventory levels and could adjust production levels lower if global demand growth slows.
The U.S. Energy Information Administration (EIA) forecasts high petroleum stock withdrawal rates will put modest upward price pressure from current prices through the end of 2020. However, the currently high inventory levels (as a result of the large stock builds from January through May 2020) are forecast to mitigate any significant increase in prices. EIA forecasts Brent crude oil prices will increase to $44/b by the end of the year, slightly higher than the July 2020 average price. Global inventory withdrawals through the end of 2021 will put upward pressure on crude oil prices, which EIA forecasts will average $50/b in 2021.

**Oman crude oil price spreads:** Recent movements in crude oil price spreads could indicate a slowdown in refinery purchases and demand in Asia. The Dubai Mercantile Exchange’s Oman crude oil futures contract is a benchmark crude oil contract that reflects oil produced in the Middle East and exported to Asia. The five-day moving average of Oman crude oil’s 1st–3rd futures contract price spread developed slight backwardation (when near-term prices are higher than longer-dated ones) from mid-June through mid-July, but it declined to -79 cents/b as of August 6 (Figure 2). The contract may have developed backwardation as a result of increased crude oil purchases and refinery runs among Chinese refiners, who increased refinery runs to more than 14 million b/d in June, an all-time high for any month. Since mid-July, however, extreme flooding in the Yangtze region is contributing to declines in Chinese economic activity and refinery utilization, which is likely contributing to declines in the Oman 1st–3rd spread. In addition, the planned increase in several Middle Eastern OPEC members’ crude oil production in August is also likely contributing to reduced Oman crude oil futures price spreads.

**Crude oil prices and the U.S. dollar index:** Brent crude oil prices have exhibited high negative correlation with the U.S. dollar index since the end of June. The U.S. dollar index measures the value of the U.S. dollar against six currencies’ exchange rates: the euro, Japanese yen, British pound, Canadian dollar, Swiss franc, and Swedish krona. A decrease in the index means the dollar is depreciating against this group of currencies. The U.S. dollar index declined to 92.8 as of August 6, the lowest level in more than two years (Figure 3). In general, a depreciation of the
U.S. dollar index with other currencies reflects differences in market participants’ expectations of economic growth in the United States compared with other countries. The euro represents 58% of the currency weighting in the U.S. dollar index, and suggests economic growth expectations are increasing in Eurozone countries, supported by a combination of the €750 billion fiscal stimulus package, European Central Bank monetary policy support, and slowing growth in COVID-19 cases. Because Brent crude oil is priced in U.S. dollars, a depreciation in the U.S. dollar also makes crude oil imports relatively less expensive for countries that use the euro, which tend to be net crude oil importers. From June 1 to August 6, for example, Brent crude oil prices increased 18% in U.S. dollars but only 10% in euros as a result of the euro’s appreciation against the U.S. dollar.

**Figure 3. Brent crude oil price vs. the value of the U.S. dollar**

Since energy is a significant input into other areas of the economy and is an important variable cost for businesses and consumers, changes in crude oil prices affect market participants’ expectations of future rates of inflation. The difference in yield between the five-year Treasury rate and five-year Treasury Inflation Protected Securities (TIPS) is an indicator of market participants’ inflation expectations during the next five years, and the difference increased from 1.17% on July 1 to 1.52% on August 5 (Figure 4). According to the latest Federal Open Market Committee meeting, the U.S. Federal Reserve plans to target interest rates near 0% until its targets of full employment and inflation of 2% are met. Partially as a result of accommodative monetary policy, market expectations for inflation during the next five years have increased from March’s low of near 0%. However, inflation expectations remain less than the Federal Reserve’s 2% target and are still at some of the lowest levels in the past five years.
Petroleum products

Gasoline prices: The front-month futures price of reformulated blendstock for oxygenate blending (RBOB, the petroleum component of gasoline used in many parts of the country) settled at $1.23 per gallon (gal) on August 6, up 1 cent/gal from July 1, 2020 (Figure 5). The RBOB–Brent crack spread (the difference between the price of RBOB and the price of Brent crude oil) decreased by 6 cents/gal to settle at 15 cents/gal during the same period. The crack spread averaged lower than the five-year (2015–19) minimum for the fifth consecutive month in July.

Gasoline consumption, production, and inventory levels moved toward pre-COVID-19 levels in July. Meanwhile, the crack spread traded in a narrow 6 cent/gal range from July 1 to July 30 before declining 4 cents/gal on July 31. EIA estimates that July 2020 gasoline consumption was...
8.7 million barrels per day (b/d), an increase of 0.2 million b/d (2%) from June 2020 and a decrease of 0.8 million b/d (9%) from July 2019. July 2020 gasoline consumption was 9% lower than the month’s five-year (2015–19) average but marked a modest return toward normal levels when compared with June 2020, which was 12% lower than its five-year average, and April 2020, which bottomed out at 37% lower than its five-year average. Similarly, EIA estimates July production closer to its five-year average. July 2020 gasoline production was 12% lower than the month’s five-year average, but June was 15% lower than its five-year average and April troughed at 36% lower than its five-year average. Inventories of total gasoline in July decreased 3.9 million barrels (2%) from June to 248 million barrels. As consumption, production, and inventories have moved closer to their five-year averages, U.S. average retail gasoline prices have stabilized. Four of the five weeks from June 29 to August 3 had less than 1 cent/gal week-to-week changes. Before the week starting June 29, there were only two such weeks in 2020.

**Ultra-low sulfur diesel prices:** The ultra-low sulfur diesel (ULSD) front-month futures price for delivery in New York Harbor settled at $1.25/gal on August 6, 2020, up 5 cents/gal from July 1, 2020 (Figure 6). The ULSD–Brent crack spread (the difference between the price of ULSD and the price of Brent crude oil) decreased by 2 cents/gal to settle at 18 cents/gal during the same period.

The July ULSD–Brent crack spread traded in its narrowest range in 2020 so far, ranging from $0.19 to $0.22. Part of this stability in the crack spread can likely be attributed to the fact that distillate consumption changed very little from June to July. However, July 2020 consumption was 0.4 million b/d lower (10%) than the year ago levels, and it was also the month’s lowest consumption level since 2009. Meanwhile, net exports of distillate increased from June by 5% to an estimated 1.2 million b/d. Inventory levels increased by 2.7 million barrels from June to 180.0 million barrels in July, the highest for any month since 1982. Compared with July 2019, inventory levels are up 31%.
**Crack spread correlations:** Historically, a day-to-day change in the RBOB–Brent crack spread tends to correlate positively with the day-to-day change in the ULSD–Brent crack spread. That is, both RBOB and ULSD crack spreads tend to increase or decrease on a daily basis and it is less likely for one to increase and the other to decrease on a given day. As a result of several factors—including economic trends, refining yields, and seasonality—one month may have a stronger correlation than others. Based on the average from 2016 (the first year of the current Brent futures expiration calendar) to 2019, June and July correlations are typically some of the highest for the year (Figure 7). In 2020, June and July had correlation coefficients of 0.69 and 0.16, respectively.

In June 2020, the strength of the relationship between the day-to-day changes of the two crack spreads was stronger than usual. June’s correlation coefficient of 0.69 was higher than that for 43 of the 48 months (90%) from 2016 to 2019. Meanwhile, July 2020 showed a weaker-than-usual correlation coefficient of 0.16, which was greater than only 13 of the 48 months (27%). The high correlation in June can likely be attributed in part to the fact that as more of the economy opened up, expectations for economic activity likely drove both crack spreads upward. As economic optimism subsided in July with increasing COVID-19 cases, the prospect of further economic lockdowns may be having a greater effect on RBOB crack spreads.

**Natural Gas**

**Prices:** The front-month natural gas futures contract for delivery at the Henry Hub settled at $2.17 per million British thermal units (MMBtu) on August 6, up 49 cents/MMBtu from July 1 (Figure 8). Futures prices increased substantially at the beginning of August. Before August 3, the front-month futures price had settled higher than $2/MMBtu only once since January 17, 2020.
Natural gas prices received support from strong demand from natural gas-fired power generation. EIA estimates that natural gas consumption for power generation rose to 43.6 billion cubic feet per day (Bcf/d) in July 2020, higher than any month on record. Consumption from the electric power sector was partially offset by a decrease in industrial natural gas consumption, which declined 1.4 Bcf/d in July compared with the previous year, likely because of slower economic activity. Liquefied natural gas (LNG) exports also fell substantially as international natural gas demand growth slowed. EIA estimates that in July U.S. LNG exports decreased 5.0 Bcf/d (62%) from their peak in January 2020.

Natural gas production has also fallen as producers have cut back on drilling and completion activities as a result of lower oil and natural gas prices. EIA estimates that U.S. natural gas production declined to 86.8 Bcf/d in July, down 9.5 Bcf/d from the peak in November 2019. The decrease in natural gas production and the increase in consumption for power generation contributed to lower-than-average natural gas injections into inventory in July. However, much more natural gas is currently in storage than average. For the week ending July 31, natural gas inventories were 3,274 billion cubic feet (Bcf), 429 Bcf (15%) higher than the five-year (2015–19) average.

**Natural gas futures contract price spreads:** The natural gas 1st–13th futures contract price spread fell to -$1.02/MMBtu on June 25, 2020 (Figure 9), the lowest level since June 13, 2012. A negative 1st–13th futures price spread typically indicates that current inventories and supplies are ample to meet expected demand. This price spread declined in January and February 2020 after mild winter weather reduced natural gas demand, and it fell further in the spring after responses to the coronavirus pandemic lowered expectations for natural gas consumption and LNG exports. However, the 1st–13th futures price spread reversed course and increased sharply in the first week of August, settling -$0.52/MMBtu on August 6, 2020. Declining natural gas production and robust demand for natural gas for power generation contributed to higher near-term prices.
Notable forecast changes

- Because of the rapidly changing situation in energy markets, the U.S. Energy Information Administration’s (EIA) current forecast includes a significant number of notable forecast changes. You can find more information in the detailed table of forecast changes.

- EIA used the July 2020 IHS Markit macroeconomic forecast in this Short-Term Energy Outlook (STEO). The macroeconomic forecast assumes a smaller decline in U.S. gross domestic product (GDP) in 2020 of 6.1% compared with an assumed decline of 8.2% in the July STEO. EIA also assumes smaller increase in GDP in 2021 of 3.7% compared with 5.1% growth assumed in the previous forecast. In addition, the IHS forecast used in the August STEO includes average non-farm employment of 143.0 million for 2020 and 149.4 for 2021, up by 2.6 million jobs and 2.0 million jobs, respectively, from the previous forecast.

- EIA forecasts Brent crude oil spot prices will average $41 per barrel (b) in 2020 and $50/b in 2021 and West Texas Intermediate spot prices will average $39/b in 2020 and $46/b in 2021. The slight increase in 2020 prices reflect larger forecast stock draws in the second half of 2020.

- EIA expects U.S. consumption of petroleum and other liquid fuels will average 18.5 million barrels per day (b/d) in 2020 and 20.0 million b/d in 2021. The August STEO forecast is 120,000 b/d more in 2020 and 90,000 more in 2021 than the July STEO forecast. This August STEO reflects higher forecast consumption of gasoline, hydrocarbon gas liquids, and distillate. Higher assumed 2020 and 2021 employment levels in the August STEO, contribute to higher forecast gasoline consumption. Stronger assumed petrochemical industry growth and higher-than-anticipated ethane consumption data for May from EIA’s Petroleum Supply Monthly contribute to higher forecast hydrocarbon gas liquids consumption in 2020 and
2021 in this STEO. Also, stronger assumed U.S. GDP growth for 2020 contributes to the higher distillate consumption forecast in the August STEO. Reduced economic activity related to the COVID-19 pandemic has caused changes in energy supply and demand patterns in 2020.

- EIA estimates that liquefied natural gas (LNG) exports were 3.6 billion cubic feet per day (Bcf/d) in June (32 loaded cargoes) and 3.1 Bcf/d in July (28 loaded cargoes). Based on the available liquefaction capacity in operation, EIA estimates that about 46 cargoes were canceled in June and about 50 cargoes were canceled in July 2020, exceeding the reported number of canceled cargoes from earlier this summer for both months.

- EIA has extended its assumptions for the effect of increased working from home on retail sales of electricity to the commercial sector and the residential sector through the end of 2020. In previous STEO forecasts, this assumption only applied through the end of the third quarter of this year.

- EIA has increased the amount of electric power sector solar photovoltaic generating capacity expected to come online in 2021 to 12.2 gigawatts compared with expected additions of 11.4 gigawatts in the previous STEO. This change reflects new information received on the Form EIA-860 survey.

- EIA expects global consumption of petroleum and other liquid fuels will average 93.1 million b/d in 2020 and 100.2 million b/d in 2021. Those forecasts are 240,000 b/d and 290,000 b/d more, respectively, than in the July STEO. Factors driving the change in the forecast are adjustments to assumptions about lockdown restrictions in a number of countries and the construction of a number of new petrochemical crackers in China during the second half of 2020.

This report was prepared by the U.S. Energy Information Administration (EIA), the statistical and analytical agency within the U.S. Department of Energy. By law, EIA’s data, analyses, and forecasts are independent of approval by any other officer or employee of the United States Government. The views in this report therefore should not be construed as representing those of the U.S. Department of Energy or other federal agencies.