EIA delayed the release of the March STEO update by one day to incorporate recent significant global oil market developments. On March 9, Brent crude oil front-month futures prices fell below $35/b, a 24% daily decline and the second largest daily price decline on record. Prices fell following the March 6 meeting between members of the Organization of the Petroleum Exporting Countries (OPEC) and its partner countries, which ended without an agreement on production levels amid market expectations for declining global oil demand growth in the coming months. In addition to the following highlights, EIA has provided a short summary of the March STEO forecast in the crude oil section of the Petroleum and Natural Gas Markets Review (PNGMR).

As a result of the outcome of the March 6 OPEC meeting, EIA’s forecast assumes that OPEC will target market share instead of a balanced global oil market. EIA forecasts OPEC crude oil production will average 29.2 million barrels per day (b/d) from April through December 2020, up from an average of 28.7 million b/d in the first quarter of 2020. EIA forecasts OPEC crude oil production will rise to an average of 29.4 million b/d in 2021. The OPEC production data in the March STEO include Ecuador, which finalized its withdrawal from OPEC at the March 6 meeting. Beginning with the April 2020 STEO, EIA will include Ecuador’s production volumes in non-OPEC data.

EIA expects global petroleum and liquid fuels consumption will average 99.1 million b/d in the first quarter of 2020, a decline of 0.9 million b/d from the same period in 2019. EIA expects global petroleum and liquid fuels demand will rise by less than 0.4 million b/d in 2020 and by 1.7 million b/d in 2021. Lower global oil demand growth for 2020 in the March STEO reflects a reduced assumption for global economic growth along with reduced expected travel globally because of the 2019 novel coronavirus disease (COVID-19).

EIA expects that global liquid fuels inventories will grow by an average of 1.0 million b/d in 2020 after falling by about 0.1 million b/d in 2019. EIA expects inventory builds will be largest in the first half of 2020, rising at a rate of 1.7 million b/d because of slow oil demand growth. Firmer demand growth as the global economy strengthens and slower supply growth will contribute to balanced markets in the fourth quarter of 2020 and
global oil inventory draws in 2021. EIA expects global liquid fuels inventories will decline by 0.4 million b/d in 2021.

- EIA forecasts Brent crude oil prices will average $43/b in 2020, down from an average of $64/b in 2019. For 2020, EIA expects prices will average $37/b during the second quarter and then rise to $42/b during the second half of the year. EIA forecasts that average Brent prices will rise to an average of $55/b in 2021, as declining global oil inventories put upward pressure on prices.

- EIA forecasts U.S. crude oil production will average 13.0 million b/d in 2020, up 0.8 million b/d from 2019, but then fall to 12.7 million b/d in 2021. The forecast decline in 2021 is in response to lower oil prices and would mark the first annual U.S. crude oil production decline since 2016. EIA models show oil prices affect production after about a six-month lag. Despite forecast annual average growth of 0.8 million b/d in 2020, EIA expects monthly U.S. crude oil production to begin declining around May, with production falling from 13.2 million b/d in May to 12.8 million b/d in December 2020.

- Based on the lower crude oil price forecast, EIA expects U.S. retail prices for regular grade gasoline to average $2.14 per gallon (gal) in 2020, down from $2.60/gal in 2019. EIA expects retail gasoline prices to fall to a monthly average of $1.97/gal in April before rising to an average of $2.13/gal from June through August.

**Natural gas**

- In February, the Henry Hub natural gas spot price averaged $1.91 per million British thermal units (MMBtu). Warmer-than-normal temperatures in February reduced demand for space heating and put downward pressure on prices. EIA forecasts that prices will begin to rise in the second quarter of 2020 as U.S. natural gas production declines and natural gas use for power generation increases the demand for natural gas. EIA expects prices to average $2.22/MMBtu in the third quarter of 2020. EIA forecasts that Henry Hub natural gas spot prices will average $2.11/MMBtu in 2020. EIA expects that natural gas prices will then increase in 2021, reaching an annual average of $2.51/MMBtu.

- U.S. dry natural gas production set a record in 2019, averaging 92.2 billion cubic feet per day (Bcf/d). Although EIA forecasts dry natural gas production will average 95.3 Bcf/d in 2020, a 3% increase from 2019, EIA expects monthly production to generally decline through 2020, falling from an estimated 96.5 Bcf/d in February to 92.3 Bcf/d in December. The falling production mostly occurs in the Appalachian and Permian regions. In the Appalachian region, low natural gas prices are discouraging producers from engaging in natural gas-directed drilling, and in the Permian region, low oil prices reduce associated gas output from oil-directed wells. In 2021, EIA forecasts dry natural gas production will rise from December 2020 levels in response to higher prices. Forecast dry natural gas production for 2021 averages 92.6 Bcf/d.
• EIA estimates that total U.S. working natural gas in storage ended February at 2.1 trillion cubic feet (Tcf), 9% more than the five-year (2015–19) average. EIA forecasts that total working inventories will end March at 1.9 Tcf, 12% more than the five-year average. In the forecast, inventories rise by almost 2.1 Tcf during the April through October injection season to reach almost 4.0 Tcf on October 31.

Electricity, coal, renewables, and emissions

• EIA expects the annual share of U.S. utility-scale electricity generation from natural gas-fired power plants will remain relatively steady through the forecast; it was 37% in 2019, and EIA forecasts it will average 39% in 2020 and 37% in 2021. Coal’s forecast share of electricity generation falls from 24% in 2019 to 21% in both 2020 and 2021. Electricity generation from renewable energy sources rises from a share of 17% last year to 19% in 2020 and to 21% in 2021. The increase in the renewables share is the result of additions to wind and solar generating capacity. The nuclear share of generation averaged 20% in 2019 and is expected to remain about the same in 2020 and 2021.

• EIA forecasts that U.S. coal production will total 573 million short tons (MMst) in 2020, down 117 MMst (17%) from 2019. Lower production reflects declining demand for coal in the electric power sector and lower demand for U.S. exports. EIA forecasts that electric power sector demand for coal will fall by 86 MMst (16%) in 2020. EIA expects that U.S. coal production will stabilize in 2021 as export demand rises and U.S. power sector demand for coal increases slightly because natural gas prices increase.

• After decreasing by 2.8% in 2019, EIA forecasts that energy-related carbon dioxide (CO2) emissions will decrease by 2.2% in 2020 and by 0.4% in 2021. Declining emissions in 2020 reflect forecast declines in total U.S. energy consumption because of energy efficiency and weather effects, particularly as a result of warmer-than-normal temperatures in January and February. A forecast return to normal temperatures in 2021 results in a slowing decline in emissions. 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

Markets for oil, as well as other commodities and equities, have experienced significant volatility and price declines since the final week in February amid concerns over the economic effects of the 2019 novel coronavirus disease (COVID-19). In addition, oil markets, in particular, have responded more recently to the outcome of the OPEC and partners meeting on March 6 with decreased oil prices that affected financial markets.

Brent and West Texas Intermediate (WTI) crude oil prices settled at $34.36 per barrel (b) and $31.13/b on March 9, respectively, declines of $20.09/b and $18.98/b from February 3, 2020 (Figure 1). On March 9, Brent and WTI front-month futures prices declined by 24% and 25%, respectively, the second largest one-day decline in each of their respective futures price histories.

EIA acknowledges significant uncertainty amid a highly volatile market environment. Several recent developments have contributed to significant revisions in EIA’s outlook for global oil demand and supply:

- Slowing forecasts for global economic growth, primarily as a result of COVID-19, have led to significant downward revisions in EIA’s global oil demand forecast. Reports of new cases of the virus in countries outside of China have led to restrictions on international and domestic travel as well as reduced activity among global manufacturers.
- As a result of the March 6 OPEC and partners meeting, EIA no longer assumes production management from OPEC members or partner countries that were previously voluntarily reducing production. Previously, EIA assumed OPEC would limit production in 2020 and 2021 to target relatively balanced global oil markets.
Lower forecast crude oil prices lead to lower U.S. crude oil production, as a result of a price-induced reduction in drilling and completion activity.

**Demand:** Both lower assumed global economic growth and reduced global travel contribute to EIA’s forecast of 0.4 million barrels per day (b/d) for global oil demand growth in 2020, a reduction from the January STEO forecast of 1.3 million b/d (EIA’s January STEO did not include COVID-19-related demand effects). Most of the reduction is in China, where EIA lowered expected growth for 2020 to 0.1 million b/d, down from a forecast of 0.5 million b/d in the January STEO. EIA also made significant downward revisions to the demand forecasts for Japan, South Korea, and Italy.

The reduced demand forecast has three main drivers: lower assumptions of economic growth, less expected air travel, and other reductions in demand not captured by these two categories. Based on forecasts from Oxford Economics, EIA reduced its assumption for 2020 global oil-weighted growth in gross domestic product (GDP) to 2.1% from the assumption of 2.4% in the January STEO. Updated information on flight cancellations also led EIA to revise its assumptions for the direct loss of jet fuel consumption from reduced air travel in the first and second quarters of 2020. Finally, EIA assumes additional lost oil demand not captured by GDP and air travel. Notable among these factors are more lost demand in China’s petrochemical sector and more lost demand from road travel in China. However, these estimates are based on preliminary data, along with assumptions about the severity and duration of effects on oil demand, in the absence of actual data.

This forecast assumes the demand effects from COVID-19 will diminish by the third quarter of 2020, with demand growth resuming its previous trend through the remainder of the forecast.

**OPEC supply:** The outcome of the March 6 OPEC meeting has caused EIA to revise its OPEC crude oil production forecast. After the March 6 meeting, OPEC and partner countries did not agree to further production cuts beyond those currently expiring March 31, 2020. In contrast to the February STEO, EIA no longer expects active production management to target balanced global oil markets among OPEC members or partner countries. These countries had been limiting production under the Declaration of Cooperation, initially agreed to in December 2016.

EIA expects OPEC crude oil production will average 29.1 million b/d in the second and third quarters 2020, up from 28.7 million b/d in the first quarter of 2020. However, production levels targeted by OPEC amid low oil demand are uncertain, and realized levels will have a significant effect on crude oil prices. Unplanned supply outages in Libya add additional uncertainty to the OPEC forecast. Crude oil production in Libya has declined by 1.0 million b/d since December 2019, and EIA estimates February production in Libya averaged 150,000 b/d.

**Prices and inventories:** EIA forecasts Brent crude oil prices will average $43/b in 2020, down from a forecast of $65/b in the January STEO, and then increase to an average of $55/b in 2021. EIA forecasts the decline in liquid fuels demand combined with an increase in OPEC production during the next two quarters will contribute to significant increases in global liquid fuels
inventories. EIA forecasts global oil inventory builds in the first half of 2020 to average 1.7 million b/d before moving to a balanced market in the fourth quarter.

With demand growth accelerating and U.S. crude oil production declining in 2021, EIA forecasts inventory withdrawals to average 0.4 million b/d for the year. EIA expects these consistent inventory withdrawals will put upward pressure on crude oil prices and bring Brent crude oil prices to $60 by the end of next year. However, the recovery of global oil demand in late 2020 and 2021, the response of U.S. crude oil production to low prices, and the production decisions of OPEC amid these factors are all highly uncertain.

**U.S. crude oil production:** EIA forecasts U.S. crude oil production will average 13.0 million b/d in 2020 and fall to 12.7 million b/d in 2021. These estimates are 0.3 million b/d and 1.1 million b/d lower than in the January STEO. If realized, a production decline next year would be the first year-on-year decline in production since 2016.

Lower crude oil output in the forecast results from lower crude oil prices leading to a reduction in drilling and completion activity. For 2020, EIA’s WTI crude oil price forecast averages $38/b for the year, a decline of $19/b from 2019 levels, and $21/b lower than forecast in the January STEO. EIA models show about a six-month lag between changes in crude oil price and changes in wellhead production. Given that lag, EIA expects recent declines in price to lower production beginning in the third quarter of 2020.

For 2021, EIA expects WTI prices will rise to an average of $50/b, which EIA expects will contribute to U.S. crude oil production rising again by the fourth quarter of 2020.

EIA estimates that onshore crude oil production in the Lower 48 states will average 10.6 million b/d in 2020, an increase of 0.7 million b/d from 2019 levels, and then fall by 0.4 million b/d to average 10.2 million b/d in 2021. In 2020, production growth comes largely from the Permian region. In 2021, the production declines are mostly attributed to the Bakken and Eagle Ford regions, with the Permian region expected to see flat growth.

**Natural Gas**

**Prices:** The front-month natural gas futures contract for April delivery at the Henry Hub settled at $1.78 per million British thermal units (MMBtu) on March 9, down 4 cents/MMBtu from February 3 (Figure 2). Warmer-than-normal weather patterns continued to keep prices at historically low levels.
Natural gas stocks: Despite warmer-than-normal temperatures during February, 5% more natural gas was withdrawn from underground storage during the four weeks ending February 28, 2020 than the five-year (2015–19) average, which likely reflected growth in natural gas consumption for power generation. However, there was more natural gas in underground storage at the end of February than the five-year average (Figure 3). This February contrasts with the relatively cold conditions during February 2019, when storage levels at the end of the month fell 24% lower than the five-year (2014–18) average. More natural gas in storage this year relative to both the five-year average and year-ago levels contributed to 78 cents/MMBtu lower Henry Hub spot prices in February 2020 compared with February 2019. EIA expects natural gas in storage to build at a rate close to the five-year average during the upcoming April–October injection season, and forecasts that natural gas in storage will end October at almost 4.0 trillion cubic feet, 6% more than the five-year average. With rising temperatures in the coming months causing increased use of natural gas for power generation, EIA expects Henry Hub prices to rise to an average of $2.22/MMBtu in the third quarter of 2020. Although that level would be an increase from current levels, it would be 16 cents/MMBtu lower than in the third quarter of 2019.
International natural gas prices: Europe and Asia have also experienced warmer-than-normal winter weather. As a result, natural gas benchmarks for Europe (the Title Transfer Facility, or TTF, and the National Balancing Point, or NBP) and Asia (Japan-Korea Marker, or JKM) have followed an even steeper downward trend compared with the Henry Hub contract (Figure 4). At the end of February, the JKM price reached near parity with TTF, although it typically trades at a premium. The decline of global natural gas prices and narrowing of spreads between markets likely reflects lower demand levels and reduced need for imports in European and Asian markets. EIA expects U.S. LNG exports will average 5.3 Bcf/d in the second quarter of 2020, down by 0.5 Bcf/d from the February STEO.
Notable forecast changes

- EIA significantly revised its short-term outlooks for global oil supply, demand, and prices compared with the February STEO. These updates largely resulted from updated data and assumptions about the effects of the 2019 novel coronavirus disease (COVID-19) on global oil demand and assumptions regarding OPEC’s crude oil production following its March 6 meeting. In order to incorporate changed assumptions regarding the OPEC meeting, EIA is releasing this STEO update one day later than scheduled. These changes in global oil assumptions are wide ranging and are summarized in EIA’s forecast changes table.

- EIA expects Henry Hub natural gas spot prices to average $2.11 per million British thermal units in 2020, 10 cents/MMBtu lower than last month’s forecast.

- EIA forecasts that U.S. liquefied natural gas exports will average 5.3 billion cubic feet per day (Bcf/d) in the second quarter of 2020 and 6.3 Bcf/d in the third quarter of 2020. These forecasts are 0.5 Bcf/d and 0.2 Bcf/d lower, respectively, than forecast in the February STEO because of less expected global demand for natural gas.

- EIA expects U.S. coal exports in 2020 to average 78 million short tons, which is 9% lower than forecast in the February STEO. The lower forecast reflects less expected global demand for U.S. coal in this forecast compared with last month.

- For more information, see the detailed table of STEO forecast changes.