Independent Statistics and Analysis
U.S. Energy Information Administration

Short-Term Energy Outlook

STEO

July 2024

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Short-Term Energy Outlook

Overview

U.S. energy market indicators	2023	2024	2025
Brent crude oil spot price (dollars per barrel)	**$82**	**$86**	**$88**
Retail gasoline price (dollars per gallon)	**$3.50**	**$3.40**	**$3.50**
U.S. crude oil production (million barrels per day)	**12.9**	**13.2**	**13.8**
Natural gas price at Henry Hub (dollars per million British thermal units)	**$2.50**	**$2.50**	**$3.30**
U.S. liquefied natural gas gross exports (billion cubic feet per day)	**12**	**12**	**14**
Shares of U.S. electricity generation			
Natural gas	42%	41%	40%
Coal	17%	17%	16%
Renewables	21%	23%	25%
Nuclear	19%	19%	19%
U.S. GDP (percentage change)	**2.5%**	**2.4%**	**1.8%**
U.S. CO_2 emissions (billion metric tons)	**4.8**	**4.8**	**4.8**

Data source: U.S. Energy Information Administration, *Short-Term Energy Outlook,* July 2024

- **Hurricane Beryl.** We completed modeling and analysis for this report on July 3, and it does not include any potential effects from Hurricane Beryl. The hurricane hit the Texas Gulf Coast, a major hub for the U.S. energy industry, on July 8. EIA will continue to monitor the effects of the hurricane c
- **Crude oil prices.** Brent crude oil prices in our forecast average $89 per barrel (b) in the second half of 2024 (2H24), up from $84/b in 1H24. Higher prices in the second half of the year result from our forecast of persistent withdrawals from global oil inventories. We estimate global oil inventories decreased by 0.5 million barrels per day (b/d) in 1H24 and will fall by 0.7 million b/d in 2H24. Inventory withdrawals stem in part from OPEC+ production cuts, which the group announced in early June would remain at current levels until at least the end of September.
- **Gasoline expenditures.** A combination of falling gasoline prices, increased vehicle efficiency, and rising incomes mean U.S. households will spend about 2.3% of disposable income on gasoline in 2024 and 2.2% in 2025, less than average for the 2015–2023 period. Our regular grade retail gasoline price forecast of around $3.50 per gallon (gal) for 2025 is slightly less than the 2023 annual average and $0.50/gal less than the 2022 annual average.
- **Natural gas prices.** We forecast the Henry Hub natural gas spot price will average almost $2.90 per million British thermal units (MMBtu) in 2H24, up from $2.10/MMBtu in 1H24. Natural gas prices fell in early 2024 because of mild winter weather that reduced demand for natural gas for space heating. However, low prices reduced natural gas-directed drilling and led producers to curtail some

production, and we expect dry production of U.S. natural gas in 2H24 to remain near 104 billion cubic feet per day (Bcf/d) compared with a record of more than 106 Bcf/d in December 2023.

- **Natural gas inventories.** At the end of June, there was 19% more natural gas in U.S. inventories than the five-year average (2019–2023). We expect less natural gas injected into storage than the five-year average this summer season because of relatively flat production in 2H24 and a seasonal increase in demand from the electric power sector. We forecast inventories will end the injection season in October with 6% more natural gas in storage than the five-year average.

- **Electricity generation.** The U.S. electric power sector generated 5% more electricity in 1H24 than 1H23 because of a hotter-than-normal start to summer and increasing power demand from the commercial sector. We expect a 2% increase in U.S. generation in 2H24 compared with 2H23, with solar power, the fastest growing U.S. source, generating 36 billion kilowatthours (BkWh) more electricity in 2H24 than in 2H23 (an increase of 42%).

- **Electricity generation**. After reviewing the responsiveness of fossil fuel generation to natural gas prices, we now expect more power generation from coal and less from natural gas than we did in our previous forecast, especially during the winter. In the June *Short-Term Energy Outlook*, we had forecast 18 BkWh less coal generation in 2H24 than in 2H23, we now forecast 10 BkWh more. We had also forecast that 2H24 natural gas generation would be relatively similar to 2H23. We now forecast 21 BkWh less.

Notable forecast changes

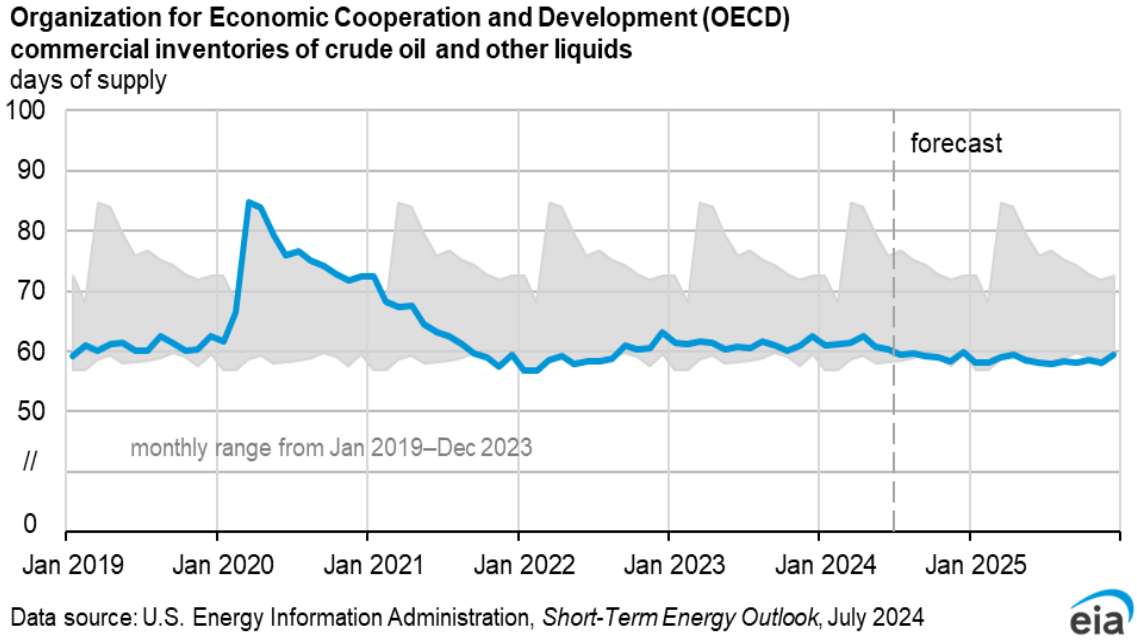
Current forecast: July 9, 2024; previous forecast: June 11, 2024	**2024**	**2025**
Electric power sector consumption from coal (billion kilowatthours)	**688**	**674**
Previous forecast	655	609
Percentage change	5.1%	10.8%
Electric power sector coal inventories (million short tons)	**115**	**85**
Previous forecast	131	138
Percentage change	-11.9%	-38.5%

Data source: U.S. Energy Information Administration, *Short-Term Energy Outlook*

Global Oil Markets

Global oil prices and inventories

The Brent crude oil spot price averaged $82 per barrel (b) in June, unchanged from May. Prices fell to $75/b on June 4 following the OPEC+ meeting on June 2, when the group announced that 2.2 million barrels per day (b/d) of voluntary cuts would gradually be unwound beginning in the fourth quarter of 2024 (4Q24). Prices fell following this announcement as market participants assessed that unwinding production cuts could cause a significant increase in global oil inventories. The Brent crude oil spot price has since reached $88/b as of July 3, as market participants have reassessed the announcement based on current global inventory levels and the indication by OPEC+ that production cuts remain subject to market conditions.



We expect oil prices will increase from an average of $82/b in June to $89/b for the remainder of 2024 and $91/b in 1Q25. Total oil inventories in the OECD remain near the lower bound of their recent five-year range (2019–2023). We expect that OPEC+ will produce less crude oil than the group's announced targets through the rest of the forecast period, which will reduce global oil inventories through mid-2025 and keep OECD inventories near the bottom of the range. Global oil inventories decreased by an estimated 0.6 million b/d in 2Q24, and we expect they will decrease by 0.8 million b/d on average from 3Q24 through 1Q25.

We anticipate that the market will gradually return to moderate inventory builds in 2025 after the expiration of voluntary OPEC+ supply cuts in 4Q24 and after forecast supply growth from countries outside of OPEC+ begins to offset growth in global oil demand. Beginning in 3Q25 we estimate that global oil inventories will increase at an average of 0.3 million b/d and will increase by 0.4 million b/d in 4Q25. We forecast the Brent price will average $88/b in 2025, as growing inventories reduce oil prices in the second half of next year.

Uncertainty remains around heightened tensions in the Middle East, and an escalation in Houthi attacks on shipping vessels around the Red Sea. These attacks have largely cut off the shipping channel for many oil shipments. Although these attacks have yet to directly reduce oil supply, the potential for further escalation and the lack of any potential resolution around the Red Sea attacks has added higher shipping costs and an ongoing risk premium to oil prices in the near term.

Global oil production and consumption

Although OPEC+ cuts are limiting world oil production growth, we estimate that growth outside of OPEC+ remains strong. We expect that global production of petroleum and other liquid fuels will increase by 0.6 million b/d in 2024. We expect OPEC+ liquid fuels production to decrease by 1.3 million b/d in 2024, while production outside of OPEC+ increases by 1.9 million b/d, led by growth in the United States, Canada, Guyana, and Brazil. We expect that global production of liquid fuels will increase by 2.2 million b/d in 2025, as the OPEC+ voluntary production cuts unwind throughout the year. OPEC+ production increases by 0.7 million b/d combined with 1.4 million b/d of production growth from countries outside of OPEC+ in 2025.

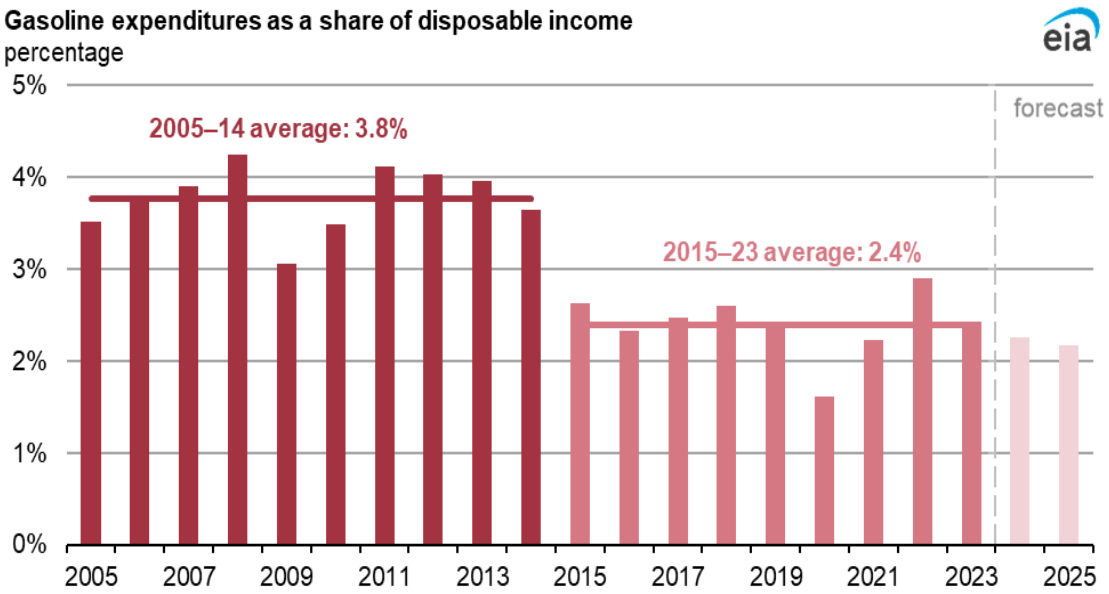
We forecast that global consumption of liquid fuels will increase by 1.1 million b/d in 2024 and 1.8 million b/d in 2025. Most of the expected demand growth is from non-OECD countries. In 2024, consumption of liquid fuels by non-OECD countries increases by 1.2 million b/d, offsetting a small decline in OECD, particularly in Europe and Japan. In 2025, non-OECD consumption rises by 1.4 million b/d, mostly in China, where we expect consumption will increase by 0.4 million b/d, and India, with a 0.3 million b/d increase. We expect OECD consumption rises by 0.4 million b/d, led by consumption growth in the United States.

U.S. Petroleum Products

Gasoline expenditures

We forecast aggregate U.S. expenditures on gasoline will decrease as a share of disposable income this year and next. A combination of falling real gasoline prices and increasing vehicle efficiency resulting from higher fuel economy in internal combustion engines as well as shifts to hybrid and battery electric vehicles means we expect aggregate gasoline expenditures will be less in 2024 and 2025 compared with 2023. Additionally, rising incomes mean U.S. aggregate expenditures on gasoline will represent about 2.3% of disposable income in 2024 and 2.2% in 2025, which would be slightly less than the 2015–23 average and approaching two percentage points less than the 2005–14 average.

Personal disposable income represents individual or household income after federal, state, and local taxes. We use the same methodology in this report that we outlined in a May 2022 *Short-Term Energy Outlook* supplement. We calculated our gasoline expenditures forecast by multiplying our all grades retail gasoline price times our forecast for annual gasoline consumption. Our forecast for disposable personal income comes from the S&P Global Insights U.S. macroeconomic model. Because gasoline prices, consumption, and personal disposable income are highly uncertain and subject to many different economic forces, our current forecast could be significantly different if any of these variables change this year or next.



Data source: U.S. Energy Information Administration, *Short-Term Energy Outlook*, July 2024 and U.S. Bureau of Economic Analysis

We forecast regular-grade gasoline prices will average around $3.50 per gallon in 2025 and gasoline consumption will average 8.9 million b/d. Continued increases in vehicle efficiency mean U.S. drivers will drive more miles in 2025 than before, but we expect 1% less U.S. gasoline consumption than in 2023 and 5% less than the record set in 2018. Growth in real disposable income also reduces the percentage devoted to gasoline purchases. Real disposable income grew at a compound annual growth rate of more than 2% per year from 2005 to 2023, making it nearly 50% higher in 2023 than it was in 2005.

Following crude oil and gasoline price increases in the early 2000s, gasoline expenditures averaged 3.8% of U.S. disposable income between 2005 and 2014. After crude oil prices declined almost 50% in 2015, expenditures averaged 2.4% of disposable income through 2023. Although we forecast crude oil prices will increase in 2024 and 2025, retail gasoline prices will remain lower than in 2023 because of declining refiner margins. In addition, we forecast the U.S. vehicle fleet will get 3% more miles per gallon in 2025 than in 2023, reducing gasoline consumption and expenditures. We expect 5% more real disposable income in the United States in 2025, outpacing growth in gasoline expenditures.

Expenditures will differ across the United States depending on region, household income, and driving habits. Households with older, less efficient vehicles or in regions of the country with higher gasoline prices will spend more than those households that drive less or are in regions with lower gasoline prices.

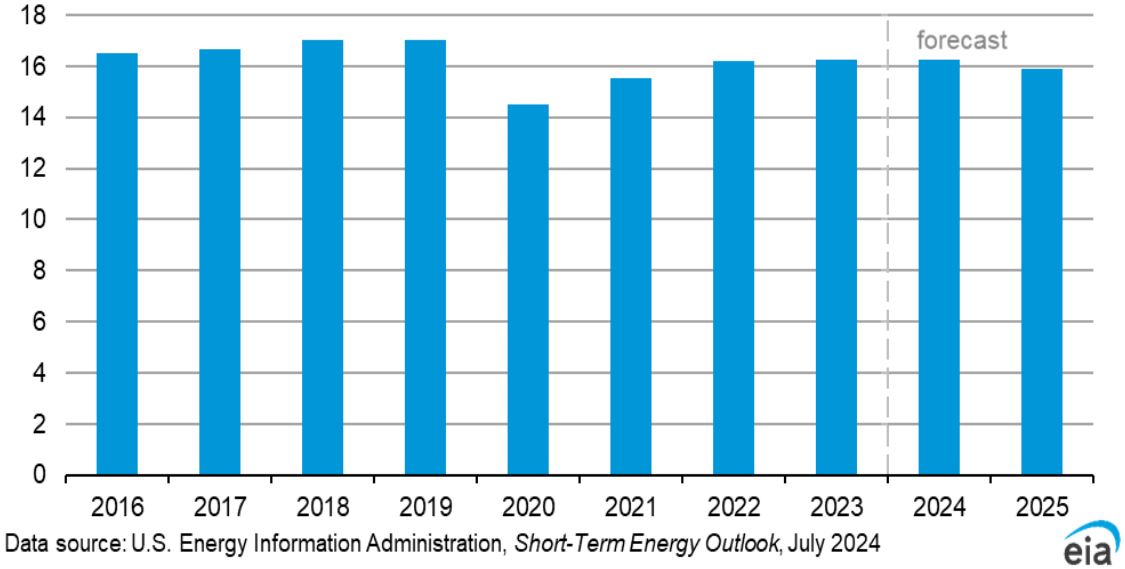
U.S. transportation fuel production

Following a planned refinery closure next year, net production by U.S. refineries and blenders of the three largest transportation fuels (motor gasoline, distillate fuel oil, and jet fuel) will decline by 2%, or 0.4 million b/d between 2023 and 2025. Initially planned to close by the end of 2023, LyondellBasell announced last year its 264,000-b/d Houston refinery would remain open until early 2025. This refinery is in the Texas Gulf Coast region, where these transportation fuels made up an average of 86% of refinery output in 2023, the most on record for the region. In addition to the refinery closure, we

forecast 2025 U.S. refinery utilization will average about one percentage point less than in 2023 because of lower refining margins, meaning other refiners will not offset the lost production by increasing refinery throughput. In other years when U.S. refiners closed capacity, utilization increased and mostly offset the loss of petroleum production.

Despite the decline in fuel output, we do not expect significant changes to U.S. petroleum product availability or crack spreads because new refineries opening in other countries will add to world petroleum supply. Although not up to full utilization, Nigeria's 650,000-b/d Dangote refinery will likely be able to offset most petroleum product losses in the Atlantic Basin market following two planned refinery closures in the United States and the United Kingdom in 2025. The planned closure of the Grangemouth refinery in the United Kingdom in early 2025 may reduce transportation fuel supply by around 0.1 million b/d in the region.

U.S. refinery and blender net production of finished motor gasoline, distillate fuel oil, and jet fuel
million barrels per day

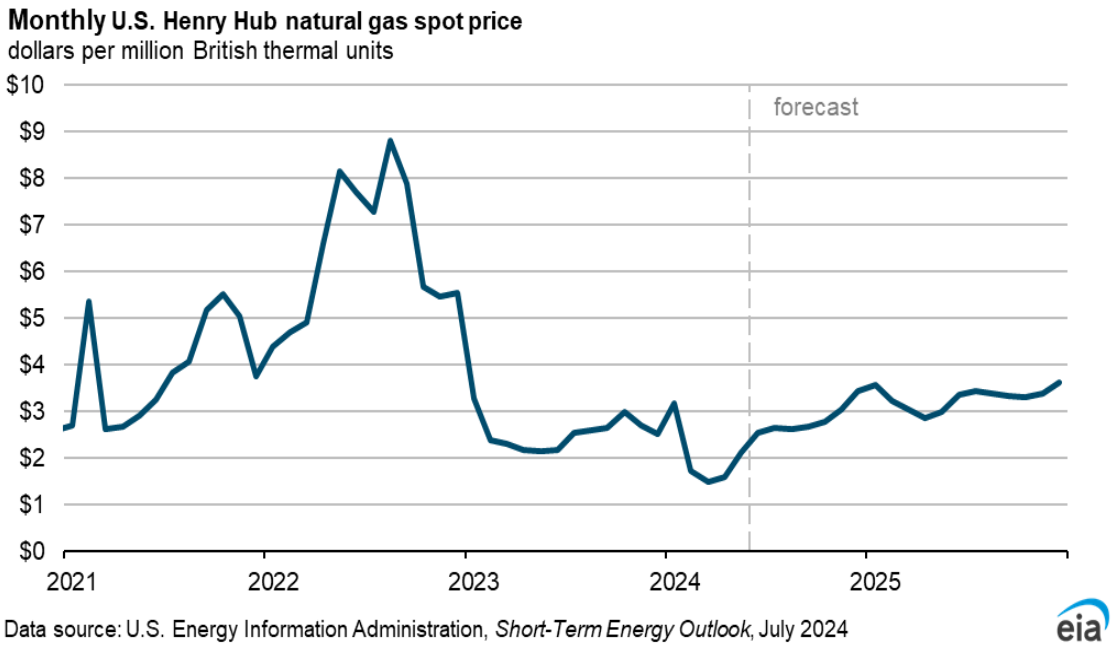


Data source: U.S. Energy Information Administration, *Short-Term Energy Outlook*, July 2024

Natural Gas

Natural gas prices

We expect that the Henry Hub natural gas spot price will average almost $2.90 per million British thermal units (MMBtu) in the second half of this year, up from an average of about $2.10/MMBtu in the first half of 2024 (1H24). Our July price forecast is similar to our June price forecast, which we increased from the prior month because of our revised forecast drop in U.S. natural gas production in 2024.



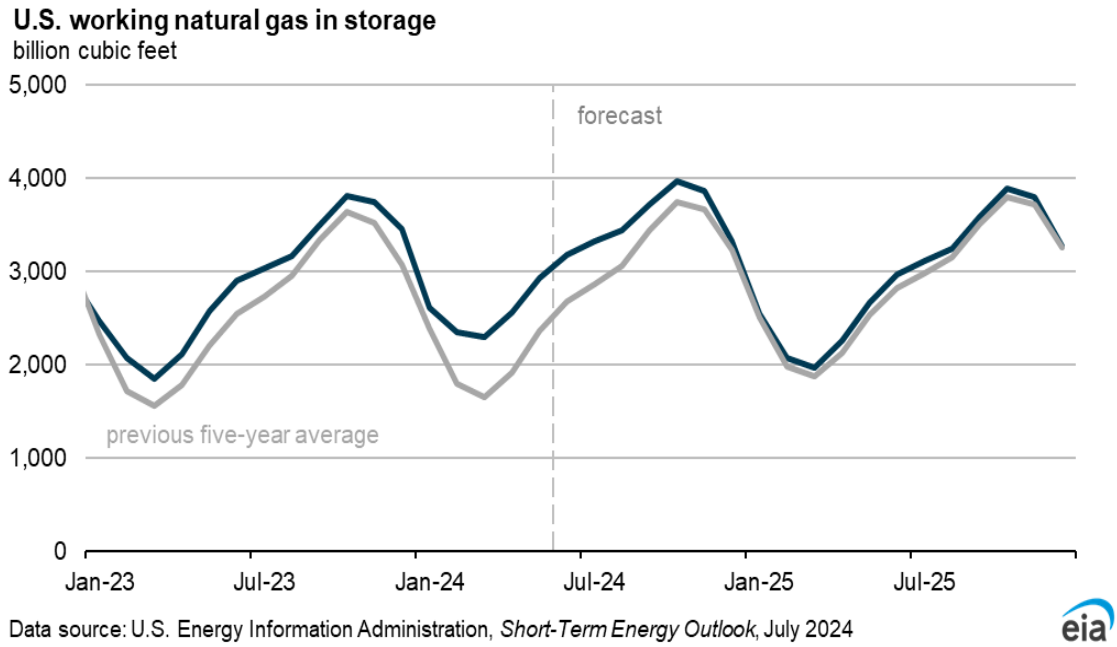
We expect U.S. dry natural gas production to decrease slightly in 2024 because of less natural gas-directed drilling and production curtailments in 1H24 due to low natural gas prices. Less production this year has helped keep natural gas injections into storage so far this injection season (April–October) below the five-year average (2019–2023).

U.S. natural gas storage inventories were 19% above the five-year average (2019–2023) at the end of June after ending the withdrawal season on March 31 at 39% above the five-year average. We expect natural gas storage injections to continue to fall below the five-year average this injection season because of relatively flat production through 2H24 and a summer increase in demand from the electric power sector. As a result, the surplus of natural gas in storage will be further reduced, and we expect that inventories will end the summer injection season on October 31 at almost 3,970 billion cubic feet, still 6% above the five-year average and 4% more than inventories at the end of the 2023 injection season.

As U.S. storage inventories draw down close to the five-year average by the end of injection season and with new demand from liquefied natural gas export projects coming on line in late 2024 and mid-2025, we expect natural gas prices to rise to an average of $3.30/MMBtu in 2025. Because of rising prices, we expect dry natural gas production to increase by 2% next year.

The Mountain Valley Pipeline in the Appalachia region, which provides additional takeaway capacity for natural gas production in the Appalachian Basin, started operations in June. We do not expect the full 2 billion cubic feet per day of capacity to be utilized until next year because of constraints downstream of the interconnection with the Transcontinental Gas Pipeline in Pittsylvania County, Virginia.

If production or storage injections are lower than our forecast and/or natural gas consumption in the electric power sector is greater than we expect, prices could be higher than in our forecast.



Electricity, Coal, and Renewables

Electricity generation

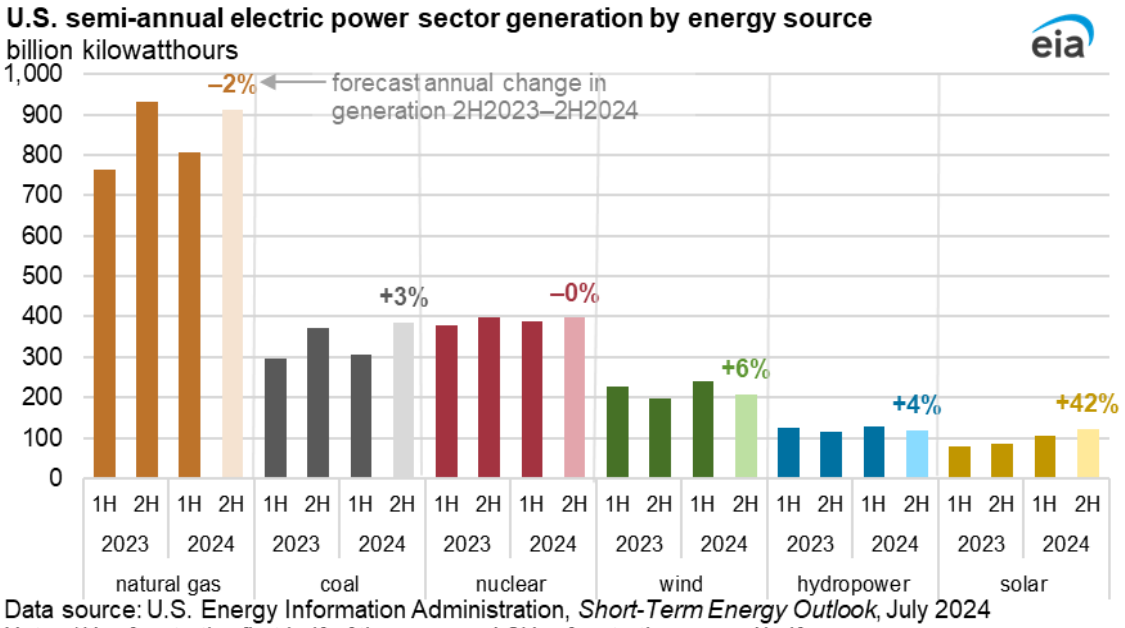
During the first half of 2024 (1H24), the U.S. electric power sector generated 5% more electricity than during the same period in 2023 in response to a hotter-than-normal start to summer and increasing power demand from the commercial sector. We expect 2% more U.S. generation in 2H24 than in 2H23 as growth in commercial demand slows because of our expectation that space cooling use in that sector will be similar to 2H23.

Solar power is the fastest growing source of electricity in the United States. We expect 36 billion kilowatthour (BkWh) more electricity to be generated in the United States from solar in 2H24 than in 2H23, an increase of 42%. We forecast 6% more U.S. wind generation during 2H24--12 BkWh more than in 2H23—driven by more wind turbines coming on line, and we forecast 4% (5 BkWh) more hydropower, as a result of slightly improved water supply conditions this year.

Although natural gas continues to be the largest source of U.S. electricity generation, we expect 21 BkWh, or 2% less natural gas generation in 2H24 than in 2H23. This forecast decline is due to more generation from renewable sources as well as our expectation of 7% higher Henry Hub natural gas prices in 2H24 than in 2H23.

We expect higher natural gas prices will drive a 10 BkWh (3%) increase in coal generation during 2H24.

After reviewing the responsiveness of fossil fuel generation to natural gas prices, we have revised our power generation forecast to include more generation from coal and less from natural gas than previously expected, especially in the winter months. In the June *Short-Term Energy Outlook*, we had forecast 18 BkWh less 2H24 coal generation than 2H23, and we had forecast that 2H24 natural gas generation would be relatively similar to 2H23.



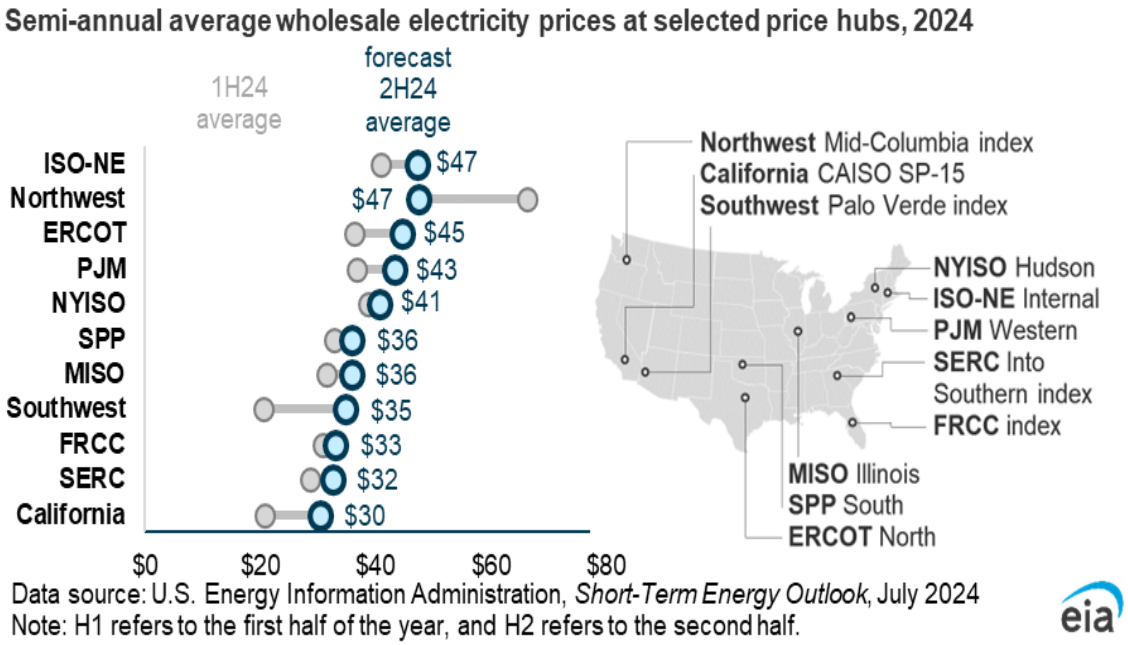
Data source: U.S. Energy Information Administration, *Short-Term Energy Outlook*, July 2024
Note: 1H refers to the first half of the year, and 2H refers to the second half.

Wholesale power prices

As a result of rising U.S. natural gas prices, we expect that wholesale power prices during 2H24 will exceed average prices during 1H24 in most regions. Although we expect temperatures for the rest of the summer to be close to the 10-year average, temporary heat waves in the remaining summer months could cause spikes in wholesale power prices.

The lowest wholesale prices in 1H24 were in the Southwest and in California, where prices averaged around $20 per megawatthour (MWh). Forecast wholesale prices in those two regions rise into the low $30/MWh range in 2H24.

The Northwest experienced high power prices in 1H24, averaging $66/MWh, reflecting high regional natural gas prices, less hydroelectric generation, and increased power demand from Canada. We forecast average wholesale prices in the Northwest will fall to average less than $50/MWh in 2H24. Forecast wholesale prices in 2H24 at other major hubs are higher than 1H24 prices by less than $10/MWh.

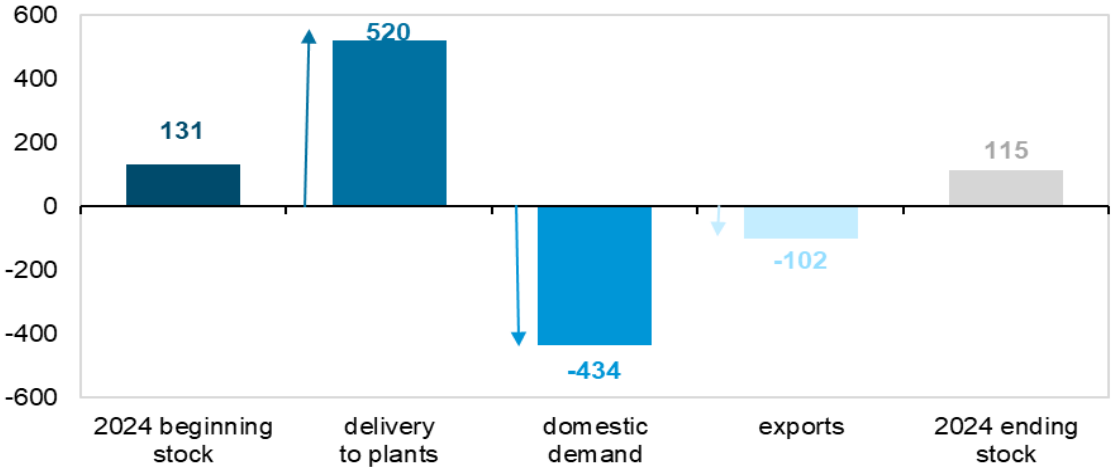


Coal markets

Hot weather in June helped increase coal consumption by the U.S. electric power sector by 37% from May. We expect coal-fired electric power consumption to increase an additional 19% in July and 3% in August, reaching 45 million short tons (MMst) in August, as utilities ramp up generation in response to summer air-conditioning needs. Based on our updated forecast of electricity demand that increases coal-fired generation, we expect the U.S. electric power sector will consume about 395 MMst of coal in 2024, with consumption falling by 2% in 2025. In response, we expect coal production to increase month over month by 10% in June, 6% in July, and 13% in August. In August, we expect 69% more U.S. coal consumption compared with May, while production will increase 33%.

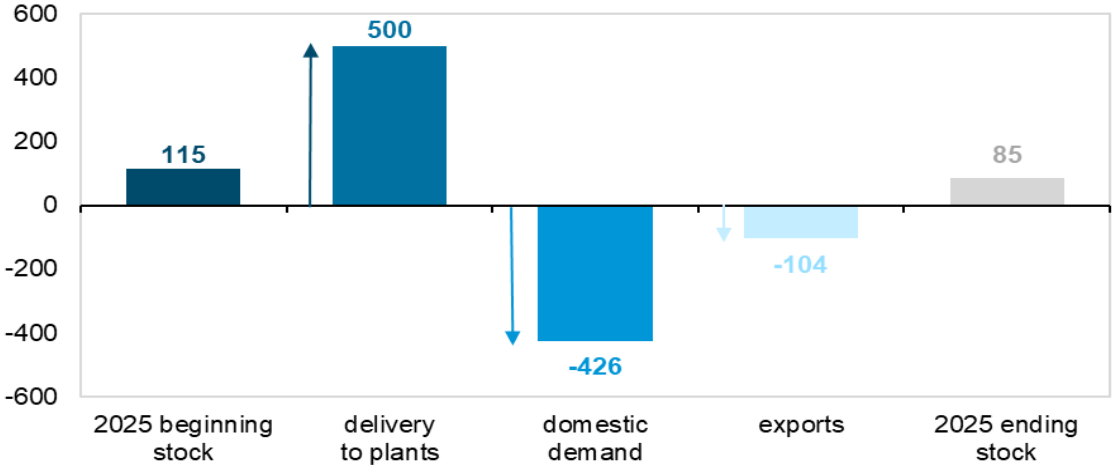
With growth in U.S. coal consumption outstripping production this summer, combined with exports ramping back up in the summer months after the Francis Scott Key bridge collapse in late March, we expect electric power coal stocks to drop to 113 MMst in August from 137 MMst in May. We expect stocks to start rising again in the fall as overall electricity generation falls, sharply reducing coal consumption. We forecast stocks will end the year at 115 MMst, 12% less than at the end of 2023. We expect stocks to end 2025 at 85 MMst because of less coal production and rising coal exports.

Composition of change in electric power coal stocks, 2024
million short tons



Data source: U.S. Energy Information Administration, Short-Term Energy Outlook, July 2024
Note: "Begining stock" = December 2023. "Delivery to plants" = production + imports + waste coal + primary stock draw + secondary stock draw. There is a small discrepancy term not shown here.

Composition of change in electric power coal stocks, 2025
million short tons



Data source: U.S. Energy Information Administration, Short-Term Energy Outlook, July 2024
Note: "Begining stock" = December 2024. "Delivery to plants" = production + imports + waste coal + primary stock draw + secondary stock draw. There is a small discrepancy term not shown here.

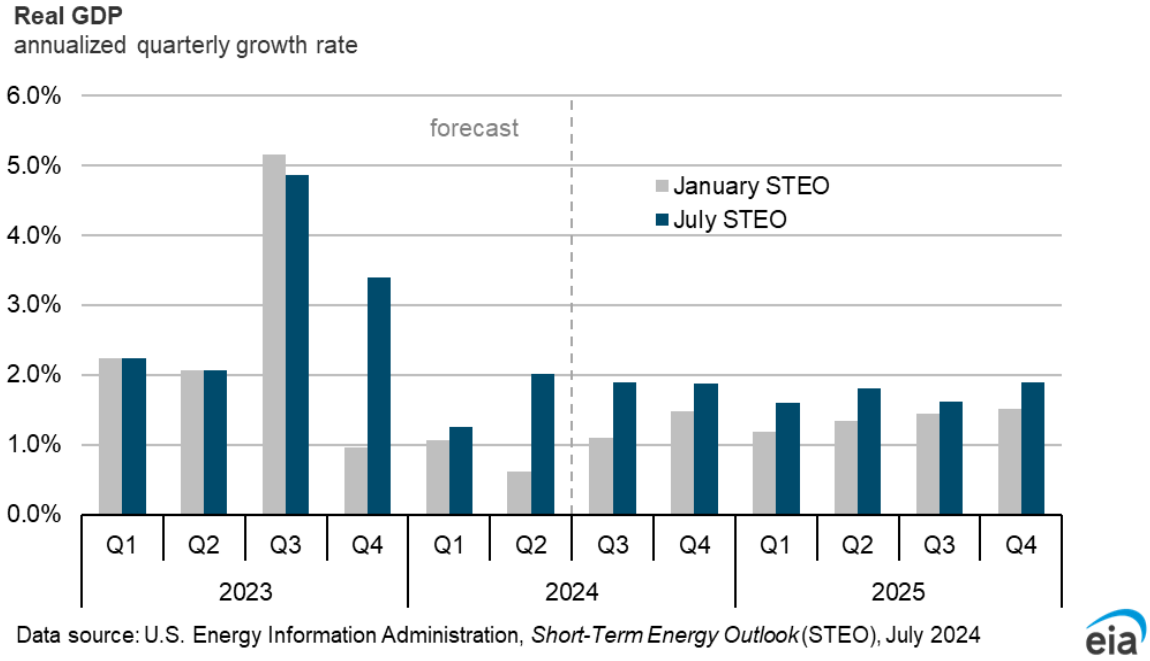
Economy, Weather, and CO_2

U.S. macroeconomics

Our forecast for July 2024 assumes real GDP will grow by 2.4% in 2024. The U.S. economy has grown faster than we assumed it would at the start of the year. Both consumer spending and private fixed investment contributed to the strength in the first half of 2024.

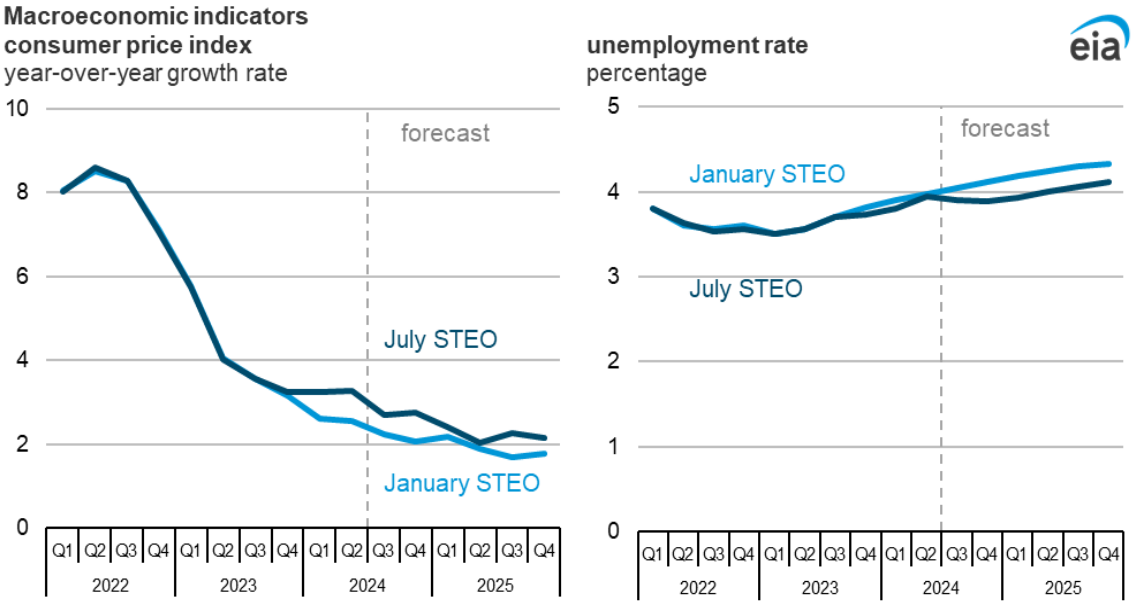
Accompanying the faster-than-expected GDP growth, consumer price index (CPI) inflation declined less over the first half of the year than we assumed in January. The most recent CPI report from the Bureau of Labor Statistics (BLS), however, showed no growth in the all-item CPI in May.

In the first half of this year, the U.S. economy has added an average of 222,000 jobs per month. According to BLS, the unemployment rate now stands at 4.1%, compared with a post-pandemic low of 3.4% in April 2023. Given the strength in other macroeconomic indicators, we now assume the unemployment rate will remain at 4.1% through the fourth quarter of 2025 (4Q25), lower than the 4.3% in our January forecast.



Our macroeconomic forecasts are based on S&P Global's macroeconomic model. We incorporate energy price forecasts from the *Short-Term Energy Outlook* into the model to obtain the final macroeconomic assumptions.

The economic data released since January have implications for future monetary policy and the macroeconomic assumptions that underlie our forecast for the second half of 2024 and 2025. In January, our forecast assumed that the U.S. Federal Reserve would reduce the federal funds rate by 0.25 percentage points in March 2024 and implement three additional quarter point cuts over the course of 2024. However, considering the slower-than-expected decline in inflation, along with faster GDP growth and a resilient labor market, S&P Global now anticipates that the target for the federal funds rate will remain at its current level until December.



Data source: U.S. Energy Information Administration, *Short-Term Energy Outlook* (STEO), May 2024

Emissions

We expect U.S. energy-related carbon dioxide (CO_2) emissions to increase by almost 1% between 2023 and 2025. CO_2 emissions from petroleum products, notably from increased consumption of jet fuel and diesel, are the largest driver of emissions increases over that period. We expect petroleum-related emissions will increase by 18 million metric tons (1%) between 2023 and 2025 and coal-related emissions increase by 10 million metric tons (1%). Coal emissions rise based on our assumption of a warmer summer, with cooling degree days (CDDs) increasing by 6% in 2024 and remaining unchanged in 2025, increasing electricity demand. We expect U.S. electricity generation to increase by 4% in 2024 and by 1% in 2025. We expect natural gas-related emissions to remain relatively unchanged over the forecast period.

Weather

Heat waves across the United States at the end of June increased the number of cooling degree days (CDDs) in 2Q24 more than we had previously expected. The warmer June weather increased CDDs by about 60 in 2Q24 compared with our June STEO, resulting in 33% more CDDs in 2Q24 than in 2Q23. We now expect the United States to average 1,570 CDDs in 2024, 6% more than in 2023, and for CDDs to remain unchanged in 2025. We expect a slightly cooler heating season this winter (November–March), with 5% more heating degree days compared with last winter.