



Winter Fuels Outlook

Responses to COVID-19 and the mitigation efforts to stop its spread have significantly affected energy price and consumption patterns in 2020. Notably, the average U.S. consumer has increased residential uses of energy (such as powering electric appliances and space cooling/heating) but has decreased transportation-related uses of energy. The U.S. Energy Information Administration (EIA) expects that trend to continue into the winter of 2020–21. EIA forecasts that there will be more residential energy consumption in the United States this winter compared with last winter. More people are working and attending school from home this year, which EIA expects will increase demand for space heating at any given temperature relative to past winters. In addition, based on forecasts from the National Oceanic and Atmospheric Administration (NOAA), this forecast assumes a colder winter than last year in much of the United States.

In the United States, EIA expects homes that heat primarily with natural gas, electricity, or propane will have more demand for space heating, which contributes to higher forecast heating expenditures this winter compared with last winter. For homes that heat primarily with heating oil, EIA expects that price declines will offset the effects of higher consumption and lead to a decrease in expenditures. However, forecast expenditures vary significantly across [regions](#) and fuels for this winter (see [Winter Fuels Outlook table](#)).

For this outlook, EIA defines the winter season as October through March. The average household winter heating fuel expenditures discussed in this supplement are a broad measure for comparing recent winters. Fuel expenditures for individual households are highly dependent on the size and energy efficiency of individual homes and their heating equipment, along with thermostat settings, local weather conditions, and market size.

EIA uses its [Residential Energy Consumption Survey](#) (RECS) as a baseline for the average amount of energy that homes use for space heating and other appliances. A key assumption underpinning EIA's forecast expenditures reported in this outlook is that this winter, homes will use 5% more fuel for space heating for every heating degree day (HDD) than reported in RECS to reflect COVID-19-related changes in energy consumption patterns. EIA also assumes that homes will use 5% more electricity and 1% more propane and natural gas for other uses, such as appliances, compared with RECS. EIA applied these assumptions across all regions and fuels.

These assumptions are highly uncertain. A complete dataset does not yet exist to determine the effect on household energy consumption patterns with more people working and attending school at home. EIA based these assumptions mostly on observed residential electricity use

from the second quarter of 2020 and compared that use with how models would have predicted the level of residential electricity consumption. Actual behavioral patterns regarding daily work and school routines, thermostat settings, and other factors affecting energy use vary widely among households. Moreover, homes where residents are not working or attending school from home would likely not see an increase in energy use per HDD compared with the baseline. However, it is important to note that this winter's fuel consumption forecasts are more uncertain than in most years.

Even with assumptions of more baseline energy use, like in other winters, observed weather will still be a key contributor to home heating fuel consumption. Based on NOAA's most recent HDD forecast, EIA assumes temperatures for the winter of 2020–21 will be colder than last winter but similar to the previous 10-winter average for most of the country. On average, HDDs for the winter of 2020–21 across the United States are expected to be 5% higher than last winter. HDDs are an approximate measure of how cold temperatures are compared with a base temperature—more HDDs indicate colder temperatures. However, the forecast varies among regions, ranging from 10% more HDDs than last winter in the South to 1% fewer HDDs than last winter in the West.

Although NOAA's forecast for this winter indicates temperatures could be colder than last year, recent winters provide a reminder that weather can be unpredictable. The winters of 2013–14 and 2014–15 were generally colder than normal, but the winters of 2015–16 and 2016–17 were much warmer than normal. Recognizing this potential variability, the *Winter Fuels Outlook* includes scenarios where HDDs in all regions are 10% higher (colder) or 10% lower (warmer) than forecast.

Finally, fuel prices also affect forecast consumer expenditures. On a U.S. average basis, EIA expects prices for natural gas and electricity to be relatively unchanged from last winter, although the forecast varies by region of the country. Changes in commodity prices for natural gas and electricity tend to affect residential prices over relatively long periods. Residential energy prices also reflect other factors such as delivery charges. Thus, low commodity prices in 2020 have not yet significantly affected residential prices. However, commodity prices for petroleum products tend to affect retail prices quickly. As a result, EIA expects retail heating oil prices to be 19% lower than last winter based on lower crude oil prices. However, EIA expects residential propane prices to be higher this heating season largely because of higher prices at the Mont Belvieu propane hub.

Natural Gas. Nearly half of all U.S. households heat primarily with natural gas. EIA expects households that use natural gas as their primary space heating fuel will spend \$572 this winter, up 6% from the amount they spent last winter. EIA forecasts that a 2% decrease in residential natural gas prices will partly offset an 8% increase in residential natural gas consumption this winter, resulting in higher natural gas expenditures.

EIA expects more residential consumption of natural gas this winter than last winter because of both colder forecast temperatures and higher demand for space heating because more people

are at home. EIA forecasts U.S. residential natural gas consumption this winter to average 21.0 billion cubic feet per day (Bcf/d). For households that use natural gas as their primary space heating fuel, EIA expects average household consumption for the winter to total almost 60 thousand cubic feet (Mcf), up 8% from last winter. The increase in expected winter residential consumption reflects a forecast for U.S. population-weighted HDD that is 5% higher this winter compared with the 2019–20 winter. EIA expects widespread virtual schooling and work-from-home policies related to COVID-19 mitigation efforts to contribute to higher residential natural gas consumption. Because more people will be at home during more hours of the day, EIA assumes 5% more natural gas use for space heating for each HDD than if school and work patterns were unchanged.

NOAA is forecasting generally colder temperatures for most of the country this winter. Based on NOAA's forecast, EIA assumes 5% more HDDs on average across the United States than last winter and similar to the average of the previous ten winters. The largest expected increase in HDDs from last winter is in the South. EIA forecasts an 11% increase in average natural gas consumption per household in the South and increases of almost 11% and more than 8% in the Northeast and Midwest, respectively. Residential natural gas consumption this winter compared with last winter in the West is expected to rise by 2%. A forecast slightly warmer winter compared with last year in that area will be offset by increased consumption because people will be at home more often.

For the winter of 2020–21, EIA forecasts the residential natural gas price for homes that heat primarily with natural gas to average \$9.55/Mcf, down from an average of \$9.73/Mcf last winter. EIA's slightly lower residential price forecast is the result of low commodity prices for natural gas in much of 2020. Changes in natural gas spot prices generally pass through to residential customers over long periods of time. Some state utility commissions set the rates that utilities can charge for natural gas deliveries a year or more in advance of billing to reflect the cost of wholesale natural gas that utilities purchased over many months. In addition, residential prices include charges to cover utility operating costs and the cost to transport and distribute natural gas, which are not directly linked to spot market prices.

EIA expects natural gas spot prices at Henry Hub to average \$3.00 per million British thermal units (MMBtu) this winter, a 39% increase from last winter, which had [historically low natural gas prices](#). After [reaching record lows](#) during the first half of 2020, EIA expects declining natural gas production and rising liquefied natural gas (LNG) exports to put upward pressure on natural gas spot prices this winter. Henry Hub spot prices rise in this forecast from a monthly average of \$2.08/MMBtu in October to a winter peak of \$3.38/MMBtu in January.

Significant regional variation exists in residential natural gas price changes compared with last winter. EIA expects prices in the West will be 4% higher than last winter. In the Midwest, EIA expects prices to be mostly unchanged from last winter. Forecast prices in the South are 4% lower than last winter, and forecast residential prices in the Northeast are 8% lower than last winter. Prices in the Northeast, particularly New England, have been among the highest in the country in recent years as a result of pipeline capacity constraints that limited delivery of natural

gas into the region. However, [increased pipeline connectivity](#) along with relatively [low prices globally for LNG](#), which is an additional source of supply in New England, have helped bring residential natural gas prices in the Northeast closer to the U.S. average.

Under a 10% colder-than-forecast scenario, EIA expects 17% more U.S. residential natural gas consumption on average than last winter, 2% lower natural gas prices, and 15% higher resulting household expenditures. Under a 10% warmer-than-forecast scenario, EIA forecasts natural gas consumption and prices would both be 1% lower than last winter, and resulting household expenditures would be 2% lower.

EIA forecasts that working natural gas inventories will reach more than 4.0 trillion cubic feet (Tcf) at the end of October, which would be a record high for that time. Natural gas in storage ended the 2019–20 winter [above its five-year average](#) following the relatively warm winter and strong production early in 2020, and injections this summer close to the five-year average have led to a natural gas storage surplus heading into this winter. Working natural gas inventories in the Lower 48 states began the injection season (April 1) 18% higher than the five-year average level for that time of year. Although the end of October is typically considered the end of the storage injection season, injections commonly occur in early November, depending on temperatures and other market conditions.

Under the baseline temperature scenario for winter 2020–21, where HDDs are forecast to be 5% higher than last winter, EIA expects natural gas inventories to be 1.7 Tcf at the end of March 2021, which would be 6% lower than the five-year (2016–20) average for the end of March. In addition to colder temperatures, EIA forecasts lower natural gas production to increase natural gas storage draws this winter. EIA forecasts dry natural gas production will average 87.7 billion cubic feet per day (Bcf/d) this winter, which is a decrease of 7.8 Bcf/d (8%) from last winter.

Under a 10% colder-than-forecast scenario, EIA expects inventories to end March 2021 at 1.2 Tcf, which is 35% lower than the five-year average. In a 10% warmer-than-forecast scenario, inventories would likely end March 2021 at 2.1 Tcf, which is 14% more than the five-year average.

EIA expects natural gas supplies to be adequate to meet winter demand. However, wholesale price volatility and localized wholesale price spikes could occur during severely cold temperatures, particularly during a prolonged cold snap. Although a spike in wholesale natural gas prices would not be immediately reflected in retail prices, the additional cost of natural gas for utilities is typically passed on as smaller increases in retail prices spread across many months. Price spikes resulting from constrained natural gas supplies can also have ripple effects through energy distribution systems. Higher wholesale prices or curtailments to electric power generators can cause electric generators to turn to other fuels during cold periods.

Heating Oil. EIA expects U.S. households that use heating oil as their primary space heating fuel will spend \$1,221 on average this winter, down 10% from the amount they spent last winter. The lower forecast heating oil expenditures primarily reflect lower retail heating oil prices driven

by lower crude oil prices than last winter and abundant fuel supplies. The forecast expenditures are lower despite the increase in forecast HDDs and consumption.

Customers in the Northeast rely on heating oil more than in any other region. About 19% of households in this region use oil for space heating, down from 24% seven years ago. An increasing number of homes in the Northeast have switched to natural gas and electricity for space heating. Nationwide, 4% of households use heating oil for space heating.

EIA expects retail heating oil prices to be 54 cents per gallon (gal) less than heating oil prices last winter. EIA forecasts that the Brent crude oil price, which is the most relevant crude oil price in determining U.S. petroleum product prices, will average \$43/barrel (b) this winter. This forecast is \$14/b lower than last winter. Heading into the winter heating season last year, the average price of Brent in September 2019 was \$63/b, but the price of Brent fell to \$32/b in March 2020 as the economic impacts of efforts to mitigate the spread of COVID-19 limited travel and reduced demand for petroleum products. In September 2020, the average price of Brent was \$41/b, and EIA expects it to rise to \$45/b in March 2021. The lower forecast Brent crude oil price relative to last winter primarily reflects the global response to the COVID-19 pandemic, which has resulted in decreased demand for crude oil and petroleum products, driving the price of crude oil down to multiyear lows.

Any deviation in crude oil prices from forecast levels would cause a similar deviation in retail heating oil prices and consumer expenditures. Changes in crude oil and wholesale heating oil prices pass through to retail heating oil prices much more quickly than changes in wholesale natural gas prices pass through to customers' rates. In addition, many heating oil users buy supplies ahead of the winter and refill as needed. When forecasting expenditures, EIA does not account for heating oil that consumers purchase ahead of its use. EIA assumes consumers pay the prevailing retail price at the time the heating oil is consumed.

Distillate fuel inventories (which include heating oil) in the Northeast totaled 48.5 million barrels on September 25, which is 9.9 million barrels (26%) more than the recent five-year (2015–19) average for that week and 19.7 million barrels (68%) more than at the same time last year. The high inventory levels are likely to limit upward pressure on heating oil prices unless stronger demand allows inventory levels to return to levels closer to the five-year average. In addition, a number of supply options are available in the Northeast, including pipelines, coast-wise shipments from other U.S. ports, and imports from international markets in the actively traded Atlantic Basin. As a result, EIA does not expect significant supply disruptions or price fluctuations in the Northeast. However, if temperatures become severely cold, increasing inventory draws and heating oil prices, the Northeast would typically import more distillate fuel to help meet supply needs. If this occurs, prices could rise higher than forecast levels. EIA expects the high inventory levels heading into this winter season, however, to provide some buffer before more costly imports are needed.

EIA expects elevated inventory levels will result in lower refinery margins for distillate fuel (the price difference between wholesale distillate fuel oil and Brent crude oil). For winter 2020–21,

EIA estimates that distillate wholesale margins will average 29 cents/gal, which would be 14 cents/gal lower than last winter and 10 cents/gal lower than the previous five-winter (2015–16 through 2019–20) average.

In the winter of 2020–21, EIA expects the reduced petroleum product demand resulting from low refinery margins related to COVID-19 will encourage refiners to limit refinery runs and reduce distillate production compared with last winter. EIA forecasts gross refinery inputs to average 15.2 million b/d in the 2020–21 winter, a 9% decrease compared with the 2019–20 winter. In the 2020–21 winter, EIA expects total refinery and blender production of distillate fuel to average 4.5 million b/d, a decrease of almost 0.5 million b/d compared with the 2019–20 winter.

EIA expects average household heating oil consumption will increase 11% compared with last winter. The increased consumption compared with last winter is driven by more forecast HDDs and higher consumption per HDD. EIA assumes the national average number of HDDs will be 5% more this winter than last winter. In the Northeast, where home heating by oil is concentrated, EIA assumes HDDs will be 8% more than last year. In addition to a higher forecast number of HDDs, EIA expects heating oil consumption per HDDs to rise because more people are working and attending school from home.

In the scenario that assumes a 10% colder-than-forecast winter, forecast expenditures for heating oil are \$20 (1%) higher than last winter. In this case, EIA forecasts heating oil prices to be 47 cents/gal (16%) less than last winter and consumption to be 21% more. In the 10% warmer scenario, EIA forecasts expenditures to be \$260 (19%) lower than last winter, resulting from heating oil prices that are 58 cents/gal (20%) lower and consumption that is 1% higher.

Electricity. EIA forecasts that households heating primarily with electricity will spend an average of \$1,209 this winter on their electricity bills, which is 7% higher than the typical bill last winter. This increase in forecast expenditures is a result of 8% more forecast consumption, including both heating and non-heating uses of electricity and residential electricity prices that are slightly lower than last winter. Nearly all U.S. households use electricity in some form, but 40% also heat their homes primarily using electric heat pumps or electric heaters with resistant elements. Nearly two-thirds of homes in the South heat primarily with electricity compared with only 17% in the Northeast.

EIA's forecast for increased residential electricity consumption this winter is driven both by colder expected temperatures and by a shift in consumption patterns resulting from efforts to stop the spread of COVID-19. Social distancing guidelines have led people to spend more time at home, including increased work from home and virtual schooling in many parts of the country. These shifts in behavior increase household usage of electronic equipment such as computers and televisions. Other uses of electricity, such as for cooking and for heating water, may also rise. Based on our analysis of data for electricity consumption during the second quarter (April–June), EIA estimates that residential electricity usage during these months was 6% to 12% higher than would be expected given historical consumption patterns.

The effect that changing consumption patterns will have on electric heating in the coming months is uncertain. But because many people have traditionally turned down their home thermostat while at work, electricity consumption for heating purposes will also likely be higher this winter than in past years because more people are staying home during the day.

The trends in household electricity expenditures vary between regions of the country. In the South, where most households heat with electricity, EIA forecasts winter electricity consumption will be almost 10% higher than last winter as a result of forecast colder-than-normal weather in the region. In the West, EIA expects the weather to be somewhat milder than last winter, with projected winter heating degree days 1% lower than last year. However, EIA forecasts that average residential electricity use in the West will be 3% higher than last winter because more people are staying home because of social distancing guidelines.

Forecast changes in winter residential electricity price also vary among regions. Although EIA forecasts higher natural gas costs for electricity generation this winter, most of these cost increases won't be passed through to retail electricity prices until 2021. EIA expects the electricity price in the South this winter to average 2% less than the price last winter and the forecast winter electricity price in the West to be 3% higher than last winter. In the Midwest and Northeast, EIA expects residential electricity prices this winter to be relatively similar to last winter.

The mix of energy sources used to generate electricity in the electric power sector this winter is different from last year as a result of changes in expected fuel costs and changes in available generating capacity. EIA forecasts the price of natural gas delivered to electric generators this winter will be 33% higher than last winter. As a result, the share of total U.S. electricity generation fueled by natural gas this winter is expected to decline from 38% to 34%. Additions of solar- and wind-generating capacity lead to a forecast increase in renewables' share of total generation to 22% this winter from 19% last winter. Offsetting these increases is a forecast increase in coal generation from 21% to 23%.

Propane. About 5% of all U.S. households use propane as their primary space heating fuel, and many of these households are in the Midwest and Northeast. EIA expects these households to spend 14% more on average for heating this winter compared with last winter, but forecast changes in expenditures vary by region. EIA expects that households heating with propane in the Northeast will spend an average of \$249 (18%) more this winter than last winter, a result of forecast propane prices that are 7% higher and average household consumption that is forecast to be 10% higher than last winter. EIA expects households in the Midwest to spend an average of \$126 (12%) more this winter, reflecting average propane prices that are 4% higher than last winter and consumption that is 7% higher.

Similar to heating oil, changes in wholesale propane prices pass through relatively quickly to retail propane prices, and many propane users buy supplies ahead of the winter and refill as needed. When forecasting expenditures, EIA does not account for propane that consumers

purchase ahead of its use. EIA assumes consumers pay the prevailing retail price at the time the fuel is consumed.

In the 10% colder-than-forecast scenario, EIA's forecast expenditures for propane are \$683 (49%) higher than last winter in the Northeast, reflecting propane prices that are 64 cents/gal (25%) higher than last winter and consumption that is 19% more. Forecast expenditures in the cold scenario are \$384 (36%) higher than last winter in the Midwest, reflecting propane prices that are 26 cents/gal (17%) higher than last winter and consumption that is 17% higher.

In the 10% warmer-than-forecast scenario, EIA's forecast expenditures are \$13 (1%) higher than last winter in the Northeast, reflecting propane prices that are similar to last winter and consumption that is 1% more. Forecast expenditures are \$96 (9%) lower than last winter in the Midwest, reflecting propane prices that are 12 cents/gal (7%) lower than last winter and consumption that is 2% lower.

As of October 1, wholesale propane spot prices at the Mont Belvieu hub were 12% higher than at the same time in 2019. However, EIA expects the seasonal increase in propane prices to be more muted than usual this winter because the market is well supplied. EIA expects residential propane prices to be higher this winter compared with last winter but lower than the three previous winters. EIA's propane price forecasts reflect inventories that are higher than average in most regions of the United States going in to the winter season and U.S. propane production levels that are expected to remain sufficient to satisfy domestic and international demand.

Propane inventories typically build between April and October and begin drawing down in late-September or October when agricultural use of propane rises and temperatures begin to drop. U.S. propane (including propylene) inventories were 102.0 million barrels on September 25, which was 15% higher than the five-year average for that time of year. The high U.S. inventories are primarily the result of inventories in the U.S. Gulf Coast that were more than 19% higher than the five-year average. Inventories were also well above average in all other regions, except in the Midwest, where inventory levels were near the five-year average.

EIA forecasts that total U.S. propane production at natural gas plants and refineries will be 7% lower this winter than last winter, total U.S. consumption will be 5% higher, and net exports will be 15% lower. U.S. consumption and export growth depend on demand for propane as a heating fuel, as petrochemical feedstock for petrochemical plants, and to a lesser extent as an agricultural fuel. The increase in total U.S. consumption is the result of higher demand for propane as a heating fuel because of relatively colder weather and because more people will be working and attending school at home this winter. EIA expects more heating demand will more than offset reduced demand for propane as a petrochemical feedstock. Propane is also used as a fuel for drying agricultural crops early in the heating season. EIA expects grain drying demand to fall below last year's level because corn crop maturity is on track with the five-year average, and harvested grain moisture content will be lower than last year, requiring less drying in commercial grain dryers.

EIA forecasts fewer U.S. propane exports this winter mainly because of lower global demand for propane as a petrochemical feedstock and a lower price premium for propane in international markets relative to U.S. wholesale prices. Current propane inventory levels in Western Canada, which are above the five-year average, may allow for higher imports into the Midwest as heating demand rises. Development of a second marine export terminal from Canada's Pacific coast has been delayed, resulting in higher-than-expected levels of supply becoming available for export to the United States by rail this winter.

Wood. EIA estimates that almost 1.8 million households (1.4%) will use cord wood or wood pellets as their primary residential space heating fuel for the winter of 2020–21. EIA estimates another 8% of households use wood as a secondary source of heat, making wood second to electricity as a supplemental heating fuel.

In 2015, one in four rural households used wood for primary or secondary space heating, compared with 6% of urban households, according to EIA's [RECS](#). Wood use was most common in New England, where 21% of households used wood.

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Table WF01. Average Consumer Prices and Expenditures for Heating Fuels During the Winter

U.S. Energy Information Administration | Short-Term Energy Outlook - October 2020

| Fuel / Region | Winter of | | | | | | | Forecast | |
|-----------------------|-----------|--------|-------|-------|--------|--------|--------|----------|----------|
| | 13-14 | 14-15 | 15-16 | 16-17 | 17-18 | 18-19 | 19-20 | 20-21 | % Change |
| Natural Gas | | | | | | | | | |
| Northeast | | | | | | | | | |
| Consumption (Mcf**) | 71.7 | 72.3 | 57.4 | 61.5 | 65.3 | 66.8 | 61.1 | 67.7 | 10.8 |
| Price (\$/mcf) | 11.52 | 10.80 | 10.18 | 10.70 | 11.37 | 11.67 | 11.69 | 10.78 | -7.7 |
| Expenditures (\$) | 826 | 780 | 584 | 659 | 742 | 780 | 715 | 730 | 2.2 |
| Midwest | | | | | | | | | |
| Consumption (Mcf) | 84.2 | 79.1 | 63.6 | 64.8 | 73.9 | 76.9 | 69.7 | 75.6 | 8.5 |
| Price (\$/mcf) | 8.68 | 8.54 | 7.55 | 8.28 | 7.83 | 7.82 | 7.39 | 7.35 | -0.6 |
| Expenditures (\$) | 731 | 676 | 480 | 536 | 578 | 601 | 515 | 556 | 7.8 |
| South | | | | | | | | | |
| Consumption (Mcf) | 52.7 | 50.9 | 40.3 | 37.9 | 45.5 | 46.0 | 41.5 | 46.1 | 11.1 |
| Price (\$/mcf) | 10.71 | 10.75 | 10.72 | 12.04 | 11.23 | 10.61 | 11.10 | 10.67 | -3.9 |
| Expenditures (\$) | 564 | 547 | 432 | 457 | 512 | 488 | 460 | 492 | 6.8 |
| West | | | | | | | | | |
| Consumption (Mcf) | 45.2 | 40.1 | 44.7 | 45.6 | 43.8 | 48.8 | 47.4 | 48.4 | 2.1 |
| Price (\$/mcf) | 9.96 | 10.71 | 9.92 | 10.68 | 10.25 | 10.15 | 10.56 | 11.01 | 4.3 |
| Expenditures (\$) | 450 | 430 | 443 | 487 | 449 | 495 | 501 | 533 | 6.5 |
| U.S. Average | | | | | | | | | |
| Consumption (Mcf) | 63.9 | 60.7 | 51.8 | 52.9 | 57.6 | 60.2 | 55.5 | 59.9 | 7.9 |
| Price (\$/mcf) | 9.95 | 9.89 | 9.28 | 10.06 | 9.82 | 9.72 | 9.73 | 9.55 | -1.8 |
| Expenditures (\$) | 636 | 600 | 481 | 533 | 565 | 586 | 540 | 572 | 5.9 |
| Heating Oil | | | | | | | | | |
| U.S. Average | | | | | | | | | |
| Consumption (gallons) | 547.5 | 548.2 | 436.6 | 468.2 | 495.6 | 512.0 | 467.8 | 519.2 | 11.0 |
| Price (\$/gallon) | 3.87 | 3.04 | 2.06 | 2.41 | 2.78 | 3.07 | 2.89 | 2.35 | -18.7 |
| Expenditures (\$) | 2,121 | 1,668 | 900 | 1,128 | 1,376 | 1,570 | 1,353 | 1,221 | -9.7 |
| Electricity | | | | | | | | | |
| Northeast | | | | | | | | | |
| Consumption (kWh***) | 8,879 | 8,927 | 7,705 | 8,050 | 8,346 | 8,482 | 8,017 | 8,667 | 8.1 |
| Price (\$/kwh) | 0.163 | 0.168 | 0.164 | 0.165 | 0.169 | 0.169 | 0.171 | 0.170 | -0.7 |
| Expenditures (\$) | 1,448 | 1,501 | 1,263 | 1,324 | 1,407 | 1,436 | 1,374 | 1,475 | 7.3 |
| Midwest | | | | | | | | | |
| Consumption (kWh) | 11,362 | 10,816 | 9,365 | 9,479 | 10,381 | 10,707 | 10,002 | 10,665 | 6.6 |
| Price (\$/kwh) | 0.112 | 0.118 | 0.122 | 0.124 | 0.124 | 0.123 | 0.124 | 0.125 | 0.5 |
| Expenditures (\$) | 1,275 | 1,274 | 1,138 | 1,172 | 1,289 | 1,317 | 1,241 | 1,330 | 7.2 |
| South | | | | | | | | | |
| Consumption (kWh) | 10,488 | 10,302 | 8,782 | 8,511 | 9,544 | 9,538 | 8,896 | 9,755 | 9.7 |
| Price (\$/kwh) | 0.109 | 0.111 | 0.110 | 0.111 | 0.112 | 0.113 | 0.115 | 0.112 | -2.2 |
| Expenditures (\$) | 1,141 | 1,141 | 968 | 948 | 1,065 | 1,075 | 1,022 | 1,096 | 7.2 |
| West | | | | | | | | | |
| Consumption (kWh) | 8,487 | 7,830 | 8,441 | 8,560 | 8,329 | 8,987 | 8,811 | 9,050 | 2.7 |
| Price (\$/kwh) | 0.123 | 0.127 | 0.130 | 0.132 | 0.136 | 0.136 | 0.138 | 0.142 | 2.7 |
| Expenditures (\$) | 1,045 | 993 | 1,095 | 1,128 | 1,130 | 1,224 | 1,217 | 1,283 | 5.5 |
| U.S. Average | | | | | | | | | |
| Consumption (kWh) | 9,729 | 9,418 | 8,456 | 8,424 | 9,049 | 9,256 | 8,764 | 9,431 | 7.6 |
| Price (\$/kwh) | 0.120 | 0.123 | 0.124 | 0.125 | 0.126 | 0.127 | 0.129 | 0.128 | -0.5 |
| Expenditures (\$) | 1,163 | 1,158 | 1,044 | 1,055 | 1,142 | 1,174 | 1,128 | 1,209 | 7.1 |

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|---|-----------|--------|--------|--------|--------|--------|--------|----------|----------|
| | 13-14 | 14-15 | 15-16 | 16-17 | 17-18 | 18-19 | 19-20 | 20-21 | % Change |
| Propane | | | | | | | | | |
| Northeast | | | | | | | | | |
| Consumption (gallons) | 624.5 | 629.7 | 505.7 | 542.6 | 569.3 | 585.8 | 538.5 | 593.0 | 10.1 |
| Price* (\$/gallon) | 3.56 | 3.00 | 2.71 | 3.06 | 3.26 | 3.22 | 2.61 | 2.79 | 6.9 |
| Expenditures (\$) | 2,223 | 1,889 | 1,371 | 1,660 | 1,856 | 1,886 | 1,406 | 1,655 | 17.7 |
| Midwest | | | | | | | | | |
| Consumption (gallons) | 808.4 | 755.9 | 618.2 | 628.9 | 715.1 | 746.7 | 679.1 | 729.5 | 7.4 |
| Price* (\$/gallon) | 2.61 | 1.91 | 1.47 | 1.73 | 1.95 | 1.83 | 1.58 | 1.64 | 4.1 |
| Expenditures (\$) | 2,110 | 1,444 | 909 | 1,088 | 1,394 | 1,366 | 1,070 | 1,196 | 11.8 |
| Number of households by primary space heating fuel (thousands) | | | | | | | | | |
| Northeast | | | | | | | | | |
| Natural gas | 11,529 | 11,705 | 11,802 | 11,918 | 12,063 | 12,167 | 12,389 | 12,516 | 1.0 |
| Heating oil | 5,244 | 5,097 | 4,923 | 4,774 | 4,724 | 4,604 | 4,464 | 4,306 | -3.5 |
| Propane | 846 | 856 | 884 | 933 | 977 | 1,018 | 1,042 | 1,042 | 0.0 |
| Electricity | 3,038 | 3,093 | 3,253 | 3,326 | 3,387 | 3,478 | 3,597 | 3,713 | 3.2 |
| Wood | 585 | 569 | 511 | 471 | 469 | 461 | 352 | 218 | -37.9 |
| Other/None | 436 | 437 | 433 | 433 | 441 | 446 | 470 | 508 | 8.0 |
| Midwest | | | | | | | | | |
| Natural gas | 18,083 | 18,206 | 18,241 | 18,236 | 18,319 | 18,405 | 18,371 | 18,164 | -1.1 |
| Heating oil | 336 | 319 | 301 | 286 | 278 | 273 | 264 | 249 | -5.7 |
| Propane | 2,089 | 2,085 | 2,077 | 2,057 | 2,115 | 2,187 | 2,237 | 2,261 | 1.1 |
| Electricity | 5,425 | 5,514 | 5,747 | 5,871 | 5,978 | 6,036 | 6,273 | 6,545 | 4.3 |
| Wood | 632 | 617 | 587 | 552 | 527 | 508 | 476 | 429 | -9.7 |
| Other/None | 353 | 351 | 354 | 359 | 361 | 349 | 366 | 397 | 8.7 |
| South | | | | | | | | | |
| Natural gas | 13,802 | 13,919 | 13,948 | 13,913 | 13,970 | 14,026 | 14,207 | 14,280 | 0.5 |
| Heating oil | 699 | 681 | 653 | 619 | 609 | 583 | 556 | 534 | -4.0 |
| Propane | 1,944 | 1,925 | 1,899 | 1,858 | 1,852 | 1,861 | 1,899 | 1,903 | 0.2 |
| Electricity | 28,247 | 28,843 | 29,509 | 29,873 | 30,326 | 30,694 | 31,090 | 31,296 | 0.7 |
| Wood | 616 | 593 | 552 | 509 | 484 | 474 | 466 | 451 | -3.2 |
| Other/None | 419 | 407 | 413 | 426 | 434 | 454 | 485 | 506 | 4.2 |
| West | | | | | | | | | |
| Natural gas | 15,068 | 15,227 | 15,312 | 15,427 | 15,570 | 15,653 | 15,738 | 15,636 | -0.6 |
| Heating oil | 235 | 225 | 219 | 214 | 214 | 217 | 205 | 187 | -8.6 |
| Propane | 930 | 915 | 923 | 935 | 963 | 988 | 973 | 944 | -3.0 |
| Electricity | 8,759 | 8,927 | 9,228 | 9,351 | 9,490 | 9,648 | 9,905 | 10,118 | 2.1 |
| Wood | 744 | 749 | 719 | 700 | 689 | 677 | 670 | 667 | -0.6 |
| Other/None | 1,016 | 1,075 | 1,087 | 1,058 | 1,089 | 1,091 | 1,128 | 1,226 | 8.6 |
| U.S. Totals | | | | | | | | | |
| Natural gas | 58,481 | 59,057 | 59,303 | 59,494 | 59,922 | 60,250 | 60,705 | 60,597 | -0.2 |
| Heating oil | 6,513 | 6,322 | 6,095 | 5,893 | 5,825 | 5,678 | 5,489 | 5,276 | -3.9 |
| Propane | 5,810 | 5,781 | 5,783 | 5,784 | 5,906 | 6,054 | 6,151 | 6,150 | 0.0 |
| Electricity | 45,470 | 46,377 | 47,737 | 48,420 | 49,180 | 49,857 | 50,865 | 51,672 | 1.6 |
| Wood | 2,578 | 2,528 | 2,369 | 2,232 | 2,170 | 2,122 | 1,964 | 1,765 | -10.1 |
| Other/None | 2,223 | 2,271 | 2,287 | 2,277 | 2,326 | 2,340 | 2,449 | 2,637 | 7.6 |
| Heating degree days | | | | | | | | | |
| Northeast | 5,597 | 5,648 | 4,322 | 4,700 | 5,015 | 5,167 | 4,660 | 5,018 | 7.7 |
| Midwest | 6,451 | 6,002 | 4,688 | 4,792 | 5,577 | 5,843 | 5,226 | 5,472 | 4.7 |
| South | 2,784 | 2,689 | 2,013 | 1,881 | 2,349 | 2,358 | 2,071 | 2,283 | 10.2 |
| West | 2,992 | 2,569 | 2,957 | 3,041 | 2,887 | 3,296 | 3,184 | 3,137 | -1.5 |
| U.S. Average | 4,111 | 3,882 | 3,202 | 3,255 | 3,610 | 3,788 | 3,433 | 3,611 | 5.2 |

Note: Winter covers the period October 1 through March 31. Fuel prices are nominal prices. Fuel consumption per household is based only on households that use that fuel as the primary space-heating fuel. Included in fuel consumption is consumption for water heating, appliances, electronics, and lighting (electricity). Per-household consumption based on EIA's 2015 Residential Energy Consumption Surveys corrected for actual and projected heating degree days. Number of households using heating oil includes kerosene.

* Prices exclude taxes

** thousand cubic feet

*** kilowatt-hour

EIA 2020–21 Winter Fuels Outlook



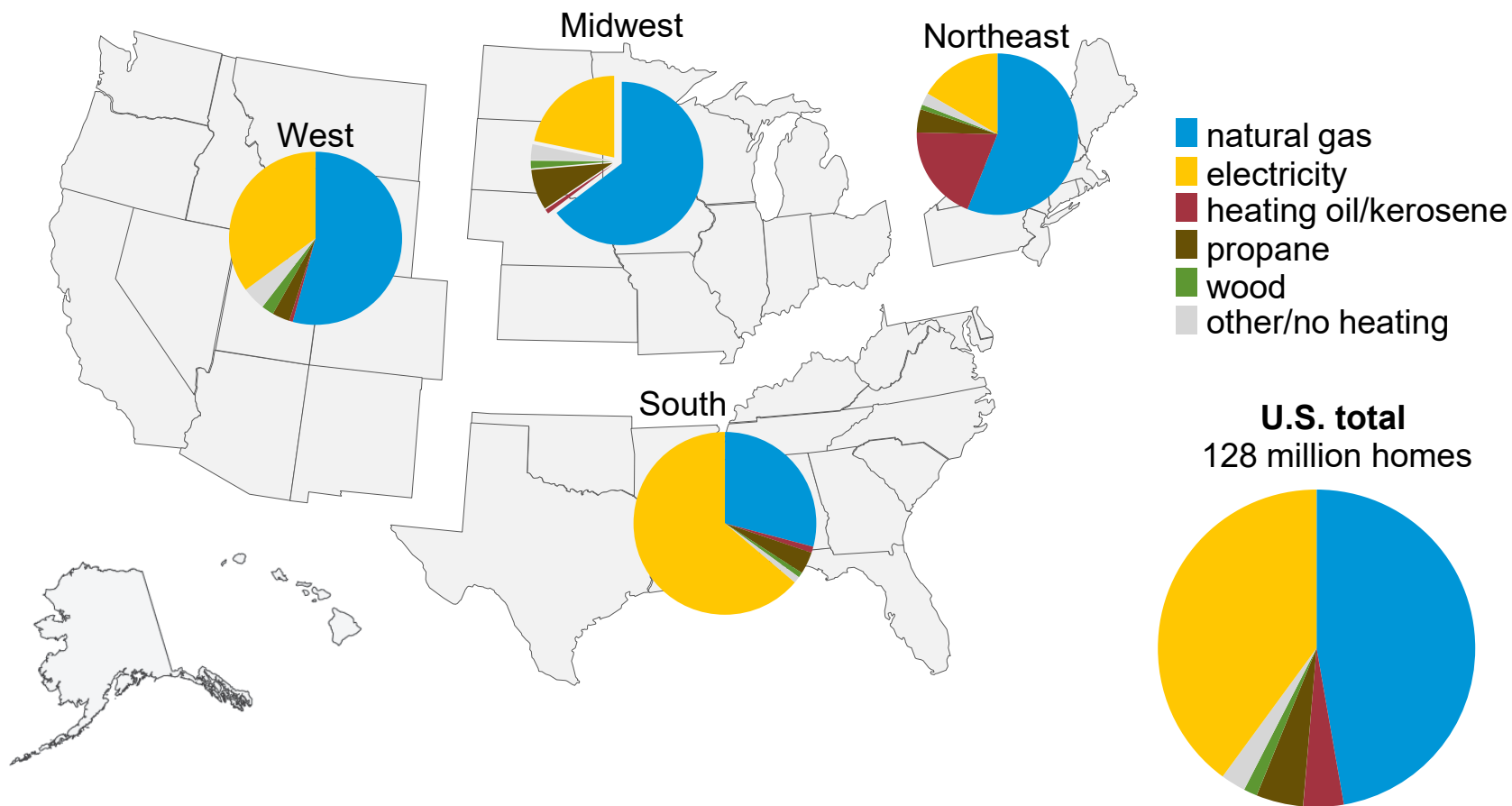
October 6, 2020

The main determinants of winter heating fuels expenditures are temperatures and prices

- For the United States, on average, EIA expects winter heating expenditures to be higher this winter than last winter.
- The latest winter weather outlook from the National Oceanic and Atmospheric Administration (NOAA) indicates temperatures will be close to normal but colder than last winter, with heating degree days forecast to be 5% more than last winter.
- EIA expects more space heating demand this winter for each heating degree days (HDD) because more people are working and attending school from home.
- EIA's price forecast is mixed this year, with heating oil retail prices expected to be lower than last winter, natural gas and electricity retail prices similar to last winter and propane prices higher than last winter.

Heating fuel market shares vary across U.S. regions

Share of homes by primary space-heating fuel and Census Region

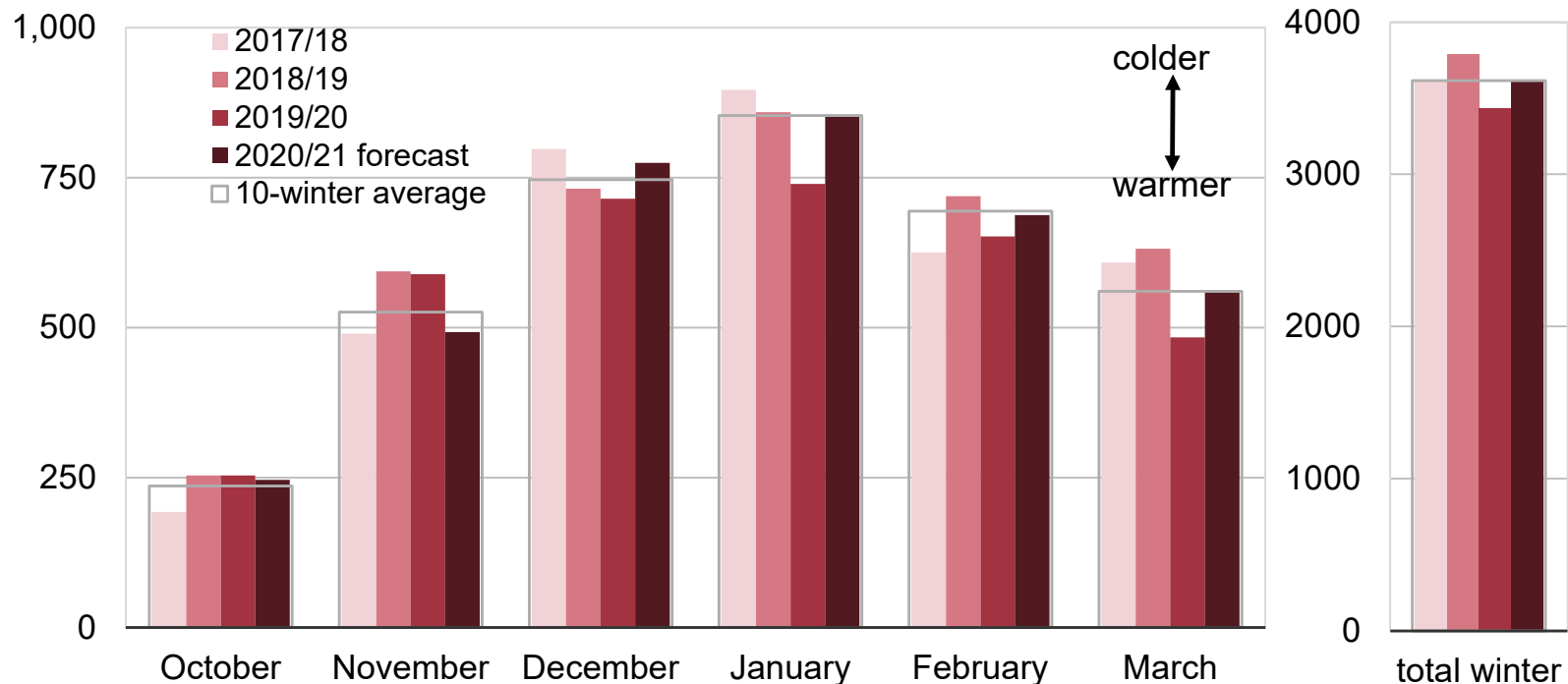


Source: U.S. Energy Information Administration based on 2019 American Community Survey

NOAA forecasts U.S. heating degree days this winter to be 5% higher than last winter and equal to the 10-year average

Winter weather

U.S. current population-weighted heating degree days

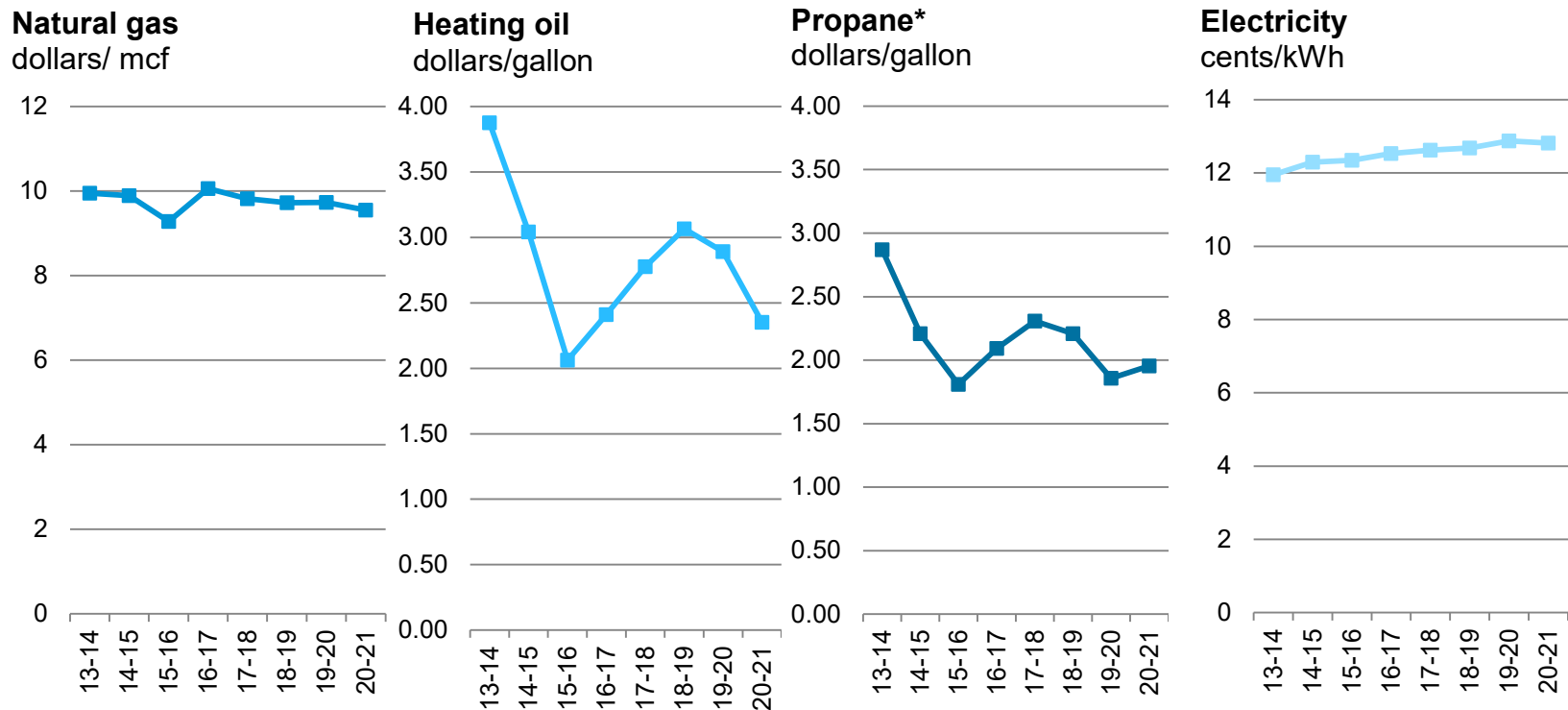


Note: EIA calculations based on National Oceanic and Atmospheric Administration (NOAA) data. The gray box represents the 10-year average for October 2009–March 2019. Projections reflect NOAA's 14–16 month outlook.

Source: U.S. Energy Information Administration, *Short-Term Energy Outlook*, October 2020.

EIA forecasts heating oil prices will be lower than last winter and propane prices will be higher while natural gas and electricity prices change little

U.S. average residential winter heating fuel prices

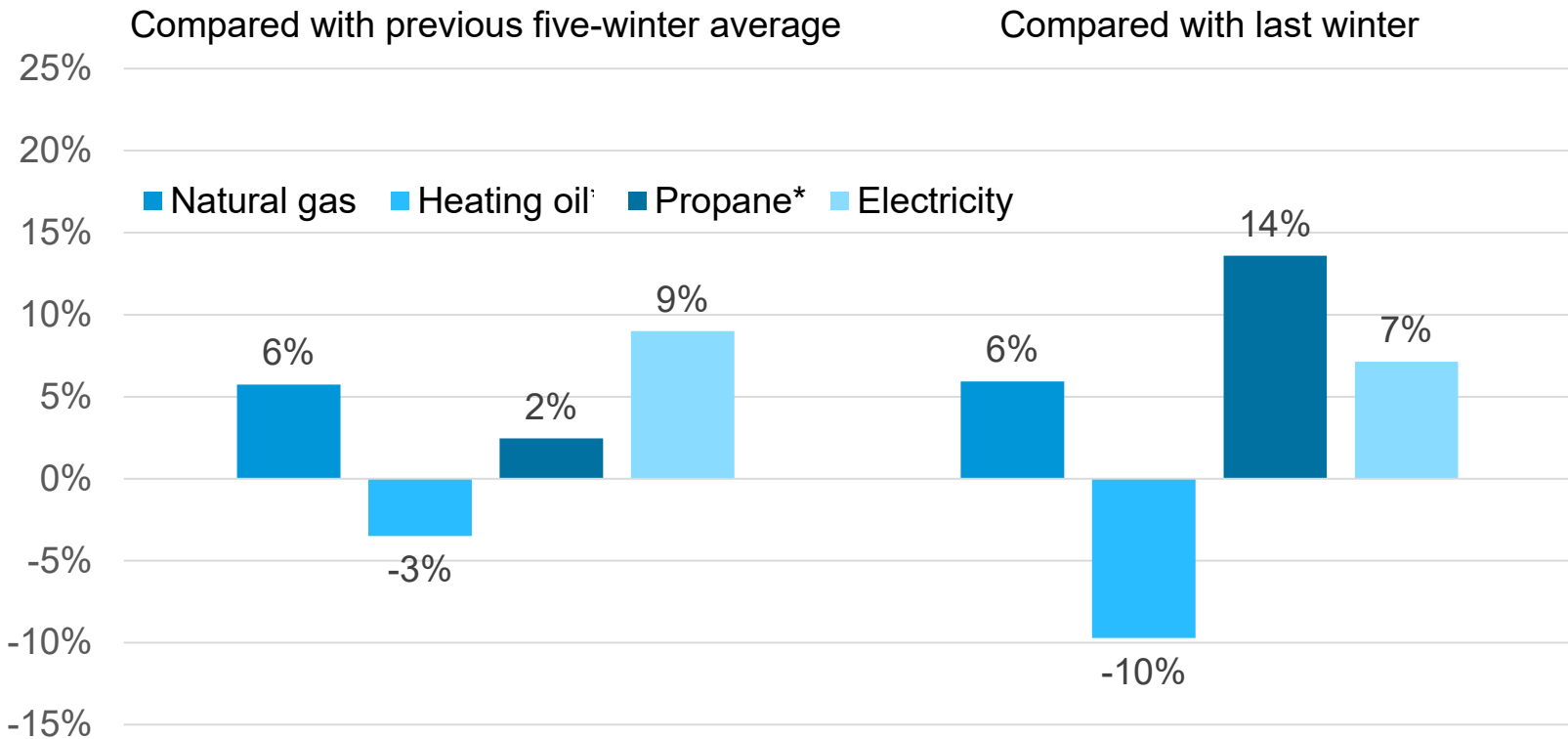


Note: * Propane prices are a volume-weighted average of the Northeast and Midwest regions. All other fuels are U.S. volume-weighted averages. Propane and heating oil prices do not reflect prices locked in before the winter heating season starts.

Source: U.S. Energy Information Administration, *Short-Term Energy Outlook*, October 2020.

Fuel expenditures are generally expected to be higher this winter (October 1–March 31) compared with last winter because of higher forecast space heating use

Forecast percentage change in base case fuel expenditures

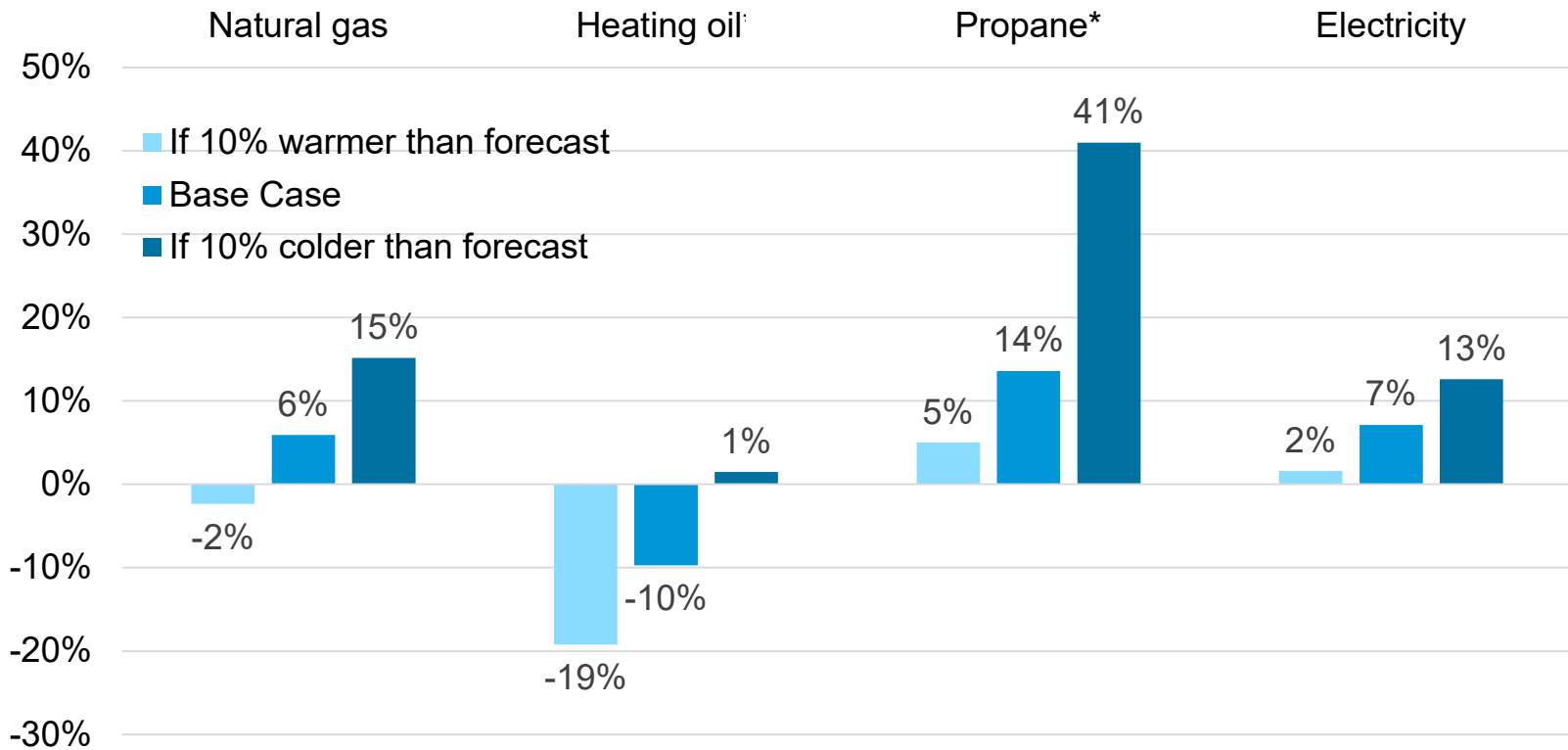


Note: * Propane expenditures are a volume-weighted average of the Northeast and Midwest regions. All other fuels are U.S. volume-weighted averages. Propane and heating oil prices do not reflect prices locked in before the winter heating season starts.

Source: U.S. Energy Information Administration, Short-Term Energy Outlook, October 2020.

Colder or warmer (+/- 10% HDD) winter scenarios can swing expected expenditures significantly

U.S. average winter fuel expenditures percent change (compared with last winter)



Note: * Propane expenditures are a volume-weighted average of the Northeast and Midwest regions. All other fuels are U.S. volume-weighted averages. Propane and heating oil prices do not reflect prices locked in before the winter heating season starts.

Source: U.S. Energy Information Administration, *Short-Term Energy Outlook*, October 2020.

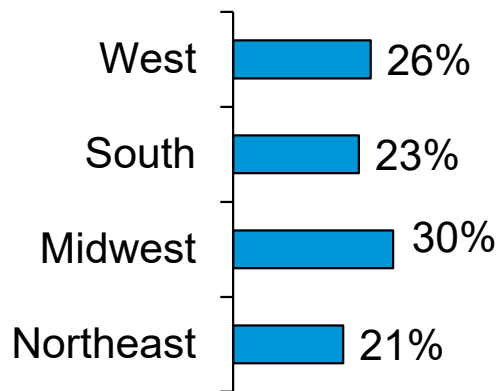
Natural Gas

Winter 2020–21 takeaways – Natural gas

- As of September 25, inventories of natural gas in working storage were 14% higher than year-ago levels and 12% higher than the five-year average. EIA expects natural gas inventories to end October above 4.0 trillion cubic feet, which would be an end-of-October record.
- Higher demand for space heating this winter compared with last winter amid lower natural gas production contributes to EIA's forecast of a larger-than-normal inventory draw during the upcoming heating season.
- Henry Hub spot prices are forecast to average \$3.00/million British thermal units this winter, an 84-cent increase compared with last winter.
- Very cold temperatures will likely contribute to spikes in spot prices; however, price spikes do not tend to be reflected immediately in retail prices, and record levels of natural gas production and high inventory levels might be reducing the need for inventory holding at the margin.

Natural gas heating expenditures are expected to increase in all regions because of higher forecast consumption

Regional share of all U.S. households that use natural gas as their primary space heating fuel

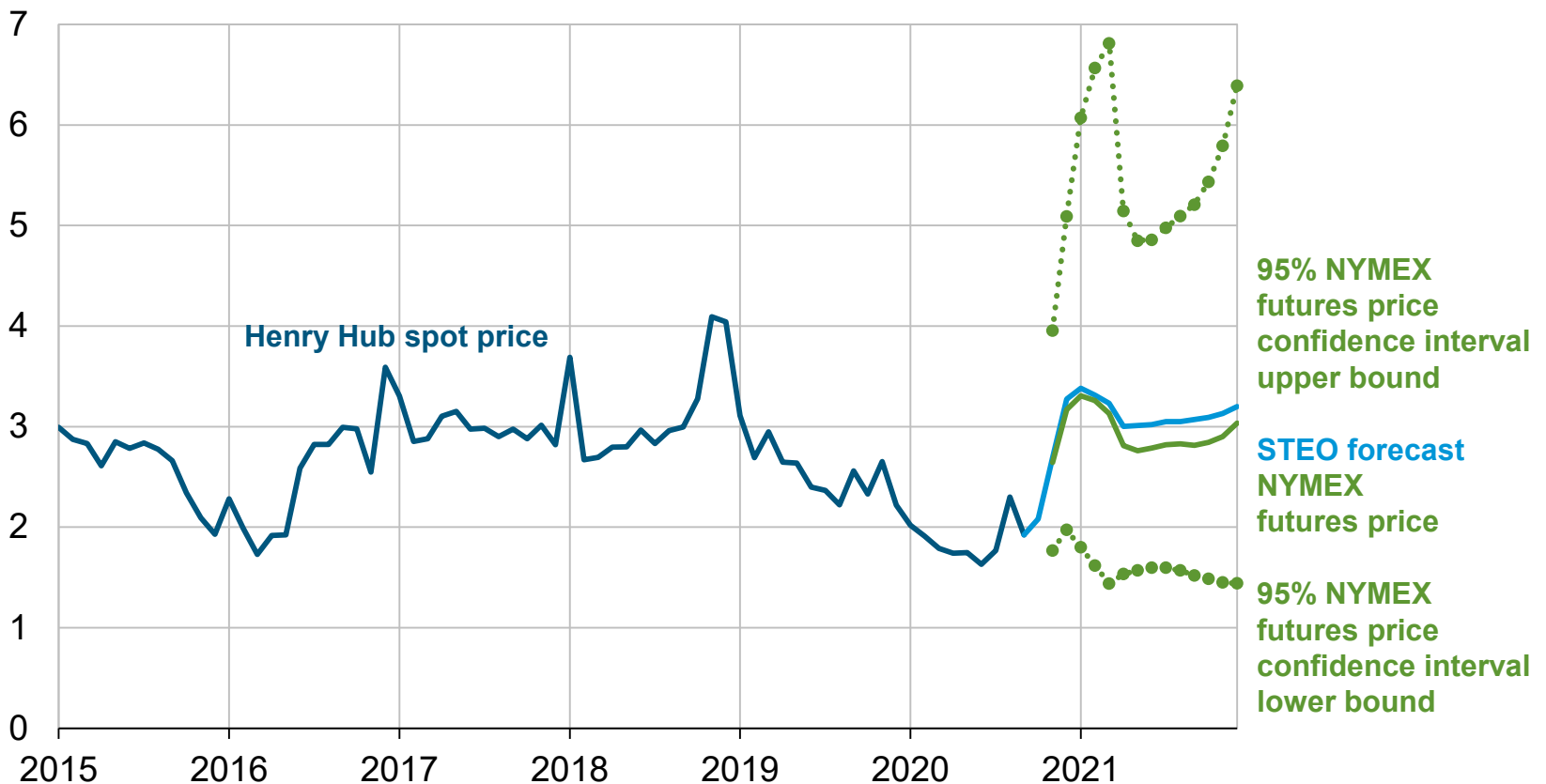


| | Change from last winter (forecast) | | |
|-----------|------------------------------------|---------------|--------------------|
| | Consumption | Average price | Total expenditures |
| West | 2% | 4% | 6% |
| South | 11% | -4% | 7% |
| Midwest | 8% | -1% | 8% |
| Northeast | 11% | -8% | 2% |

Source: U.S. Energy Information Administration, *Short-Term Energy Outlook*, October 2020.

EIA forecasts Henry Hub spot prices to average \$3.00/MMBtu this winter

Henry Hub natural gas price dollars per million Btu



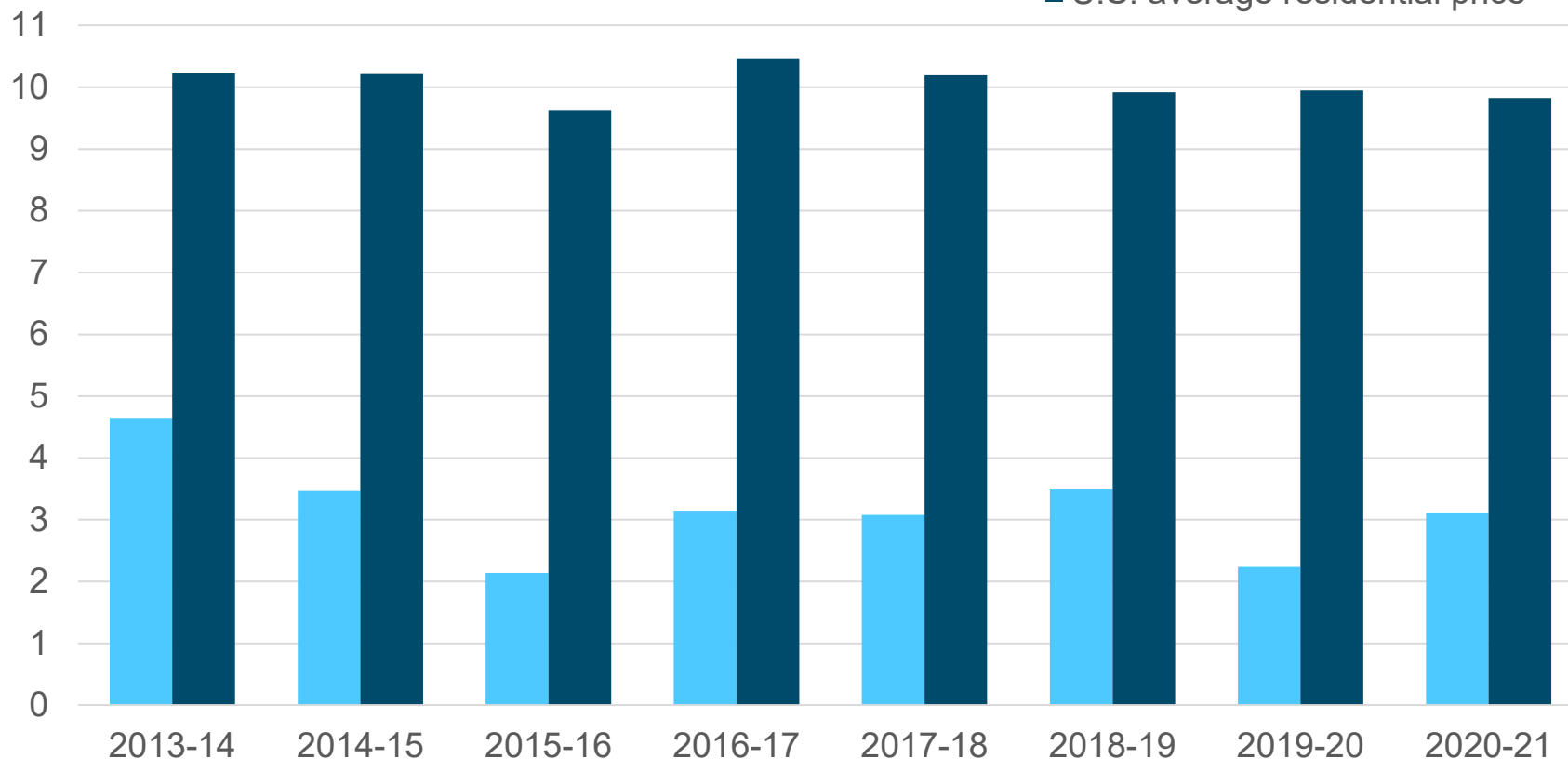
Note: Confidence interval and futures prices derived from market information for the five trading days ending October 1, 2020. Intervals not calculated for months with sparse trading in near-the-money options contracts.

Source: U.S. Energy Information Administration, *Short-Term Energy Outlook*, October 2020.

EIA expects average residential natural gas prices to be slightly lower than prices last winter

Winter average natural gas prices
dollars per thousand cubic feet (Mcf)

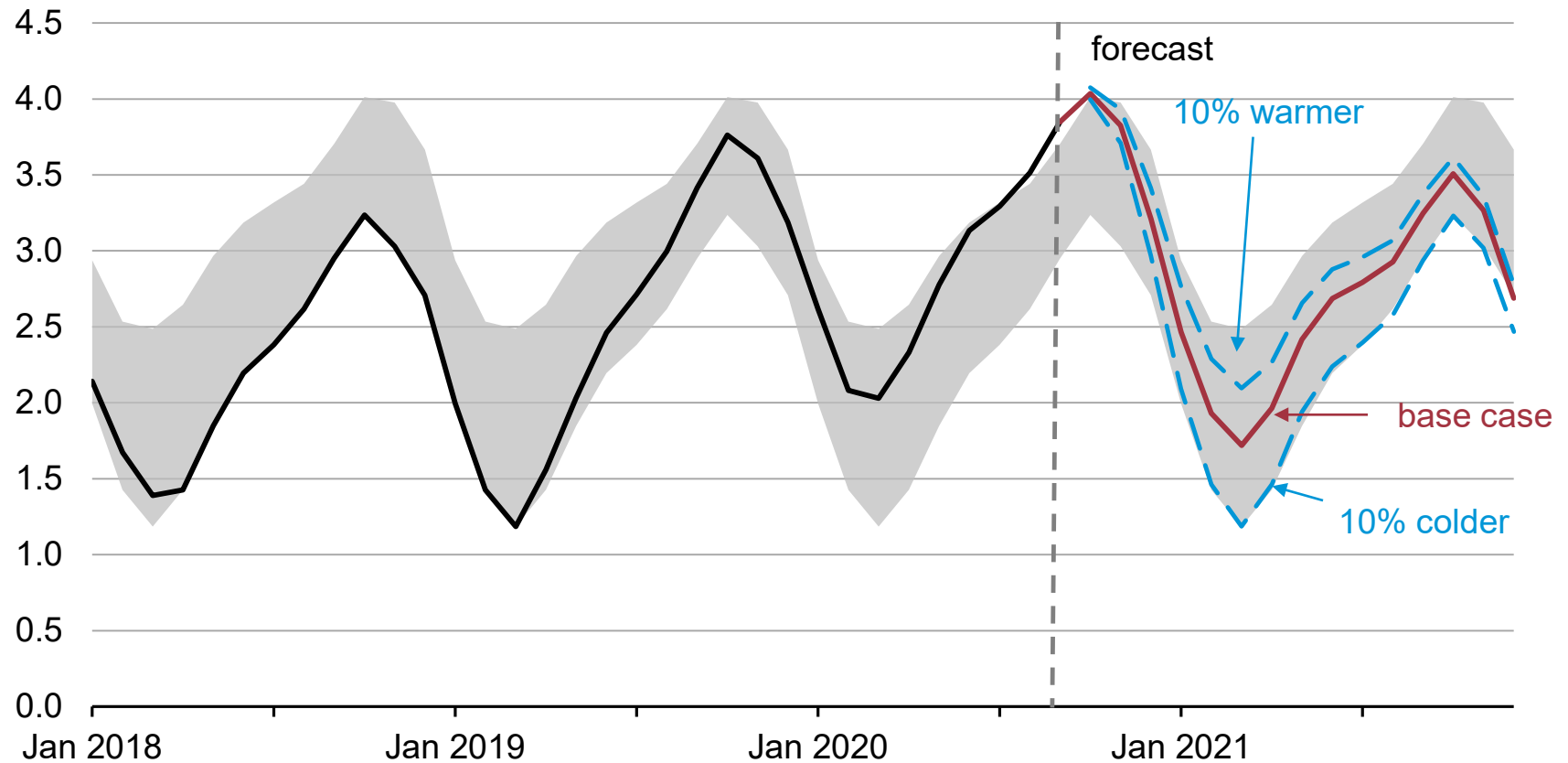
■ Henry Hub spot price
■ U.S. average residential price



Source: U.S. Energy Information Administration, *Short-Term Energy Outlook*, October 2020, and *Refinitiv*.

In a 10% colder-than-forecast scenario, EIA expects natural gas inventories to end the winter near the bottom of the five-year range

U.S. total end-of-month working natural gas inventories
trillion cubic feet



Note: Gray band represents the range between the minimum and maximum from 2015 to 2019.

Source: U.S. Energy Information Administration, *Short-Term Energy Outlook*, October 2020.

Heating Oil

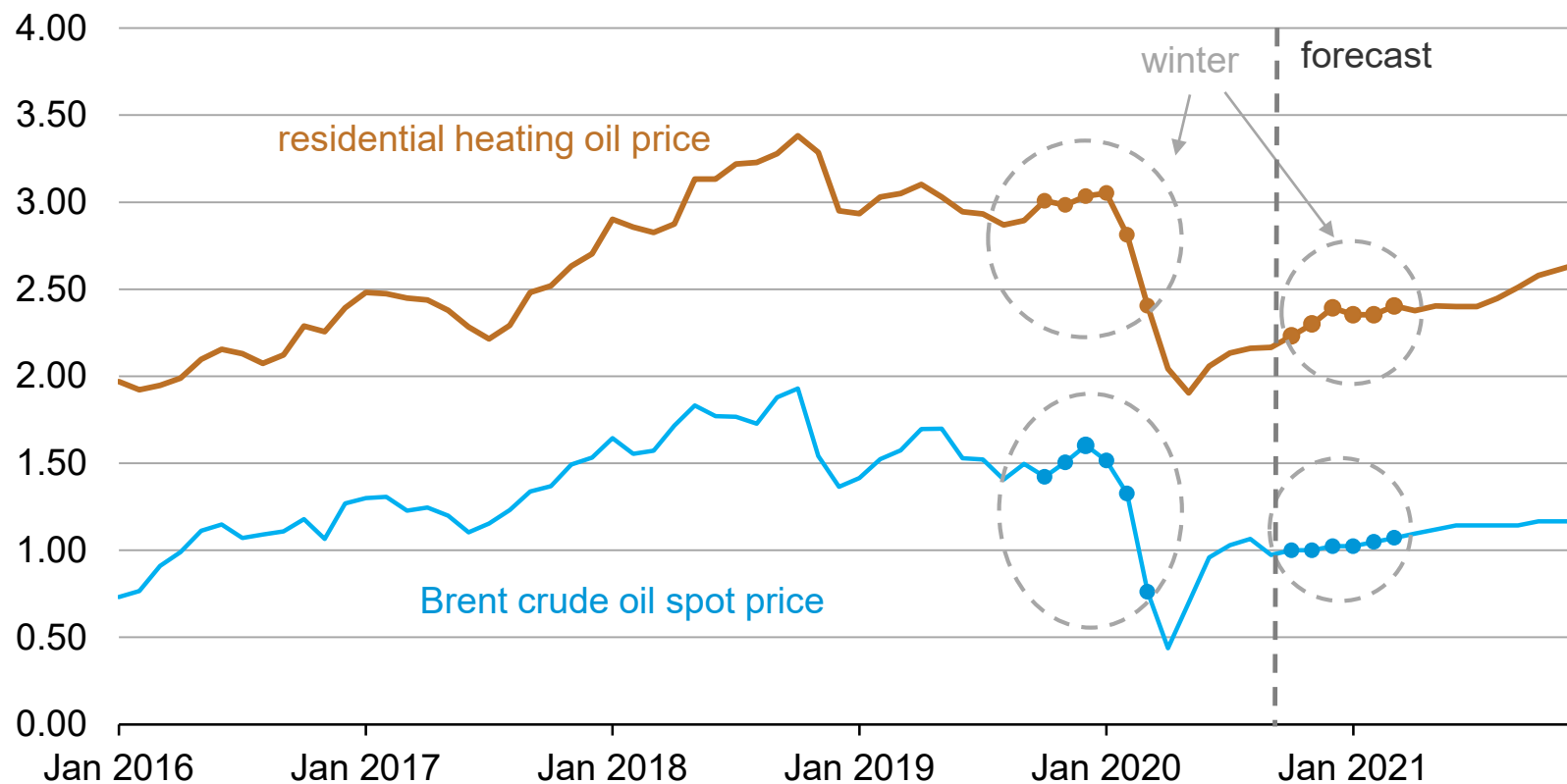
Winter 2020–21 takeaways – Heating oil

- EIA expects Brent crude oil spot prices to average \$43 per barrel (b) this winter, \$14/b (33 cents/gal) less than last winter.
- High distillate fuel and global oil inventory levels in EIA's forecast largely limit expected upward oil price pressures this winter.
- Distillate stocks in the Northeast totaled 48.5 million barrels on September 25, 19.7 million barrels (68%) higher than the same time last year and 26% higher than the previous five-year average.
- EIA expects distillate stocks to fall by more than normal this winter as overall distillate fuel consumption recovers and refiners shift yields toward gasoline production because of low distillate fuel refining margins.
- EIA forecasts average home heating oil expenditures to fall this winter compared with last winter as lower forecast prices offset higher expected consumption

EIA expects average residential heating oil prices to be 19% lower than prices last winter, averaging \$2.35 per gallon

monthly average heating oil and Brent crude oil prices

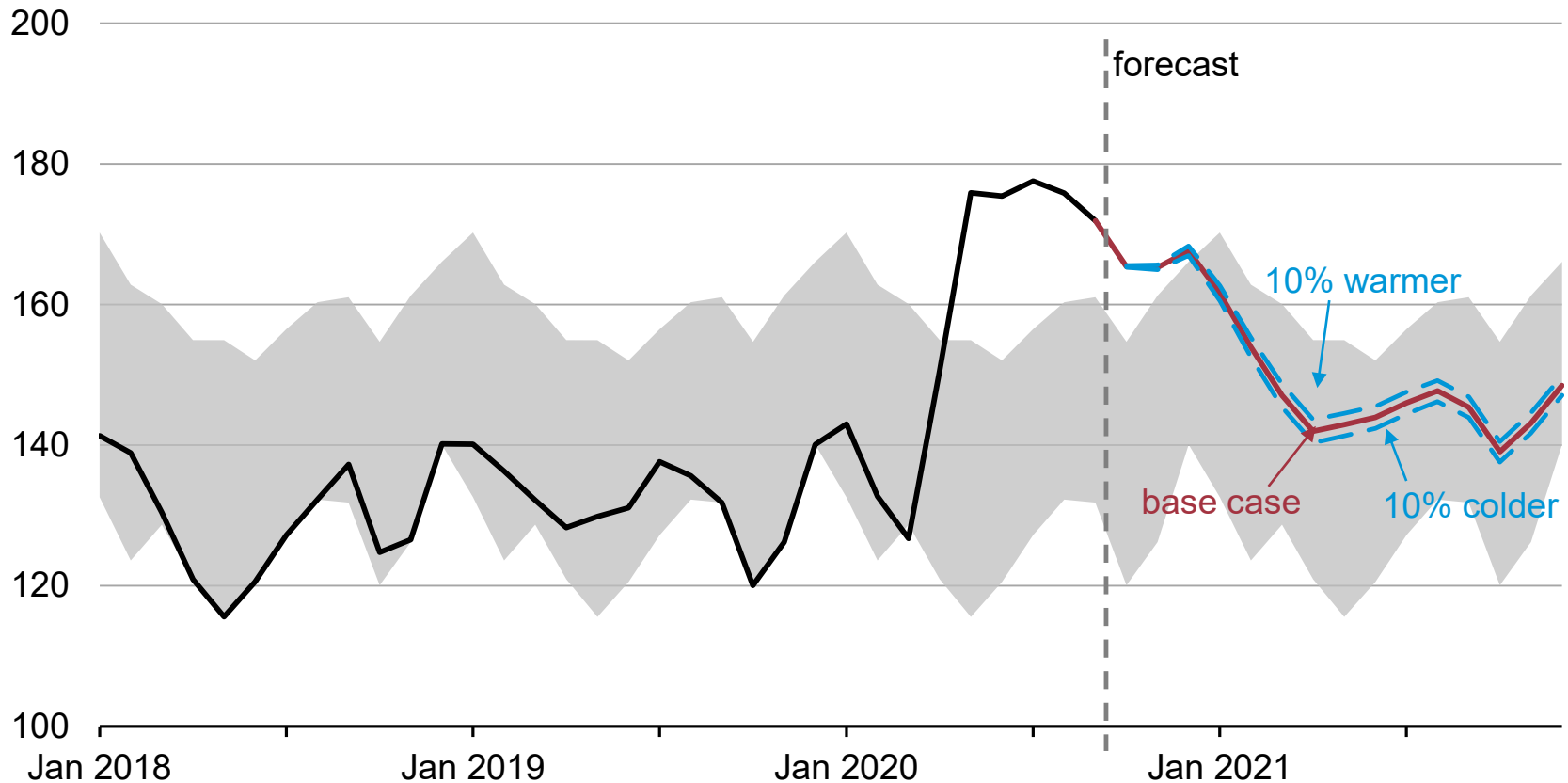
dollars per gallon



Source: U.S. Energy Information Administration, *Short-Term Energy Outlook*, October 2020, and *Refinitiv*.

Distillate inventories are near the highest level in the past five years, but EIA expects inventories to fall during the winter

U.S. total end-of-month distillate inventories million barrels



Note: Gray band represents the range between the minimum and maximum from 2015 to 2019.

Source: U.S. Energy Information Administration, *Short-Term Energy Outlook*, October 2020.

Propane

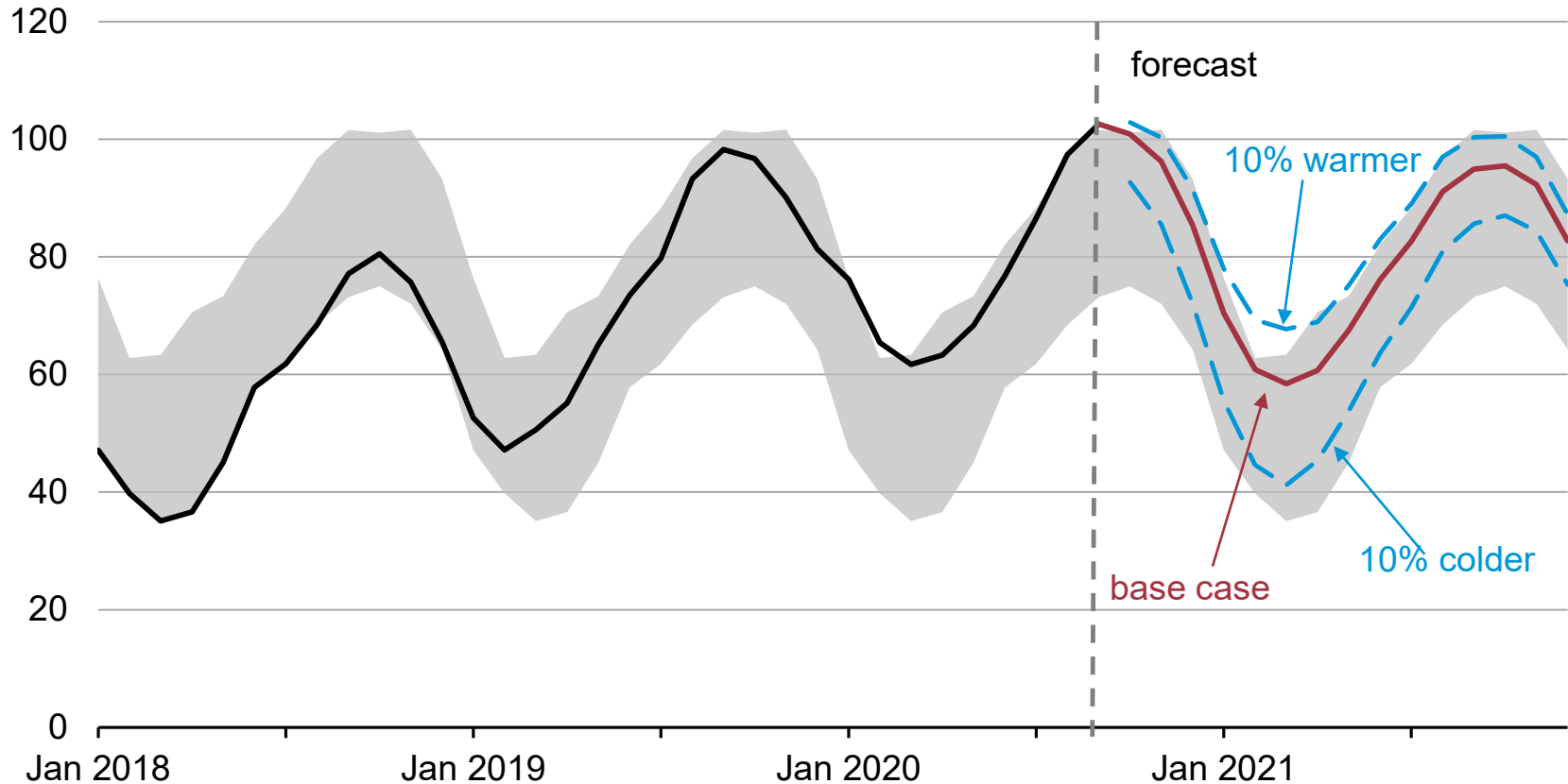
Winter 2020–21 takeaways – Propane

- U.S. propane inventories (including propylene stored at refineries) were 102.0 million barrels on September 25, which was 15% higher than the five-year average for that time of year and 6% above year-ago levels.
- In all regions except for the Midwest, which is the region most reliant on propane for heating, inventories are going into the winter on the high side of the five-year range. In the Midwest inventories as of September 25, were about the same as last year and the five-year average.
- EIA forecasts a 4% increase in total U.S. propane consumption this winter, which reflects higher space heating demand that more than offsets lower industrial demand. EIA expects households to use more propane this winter because of relatively colder weather and more people staying at home.
- Wholesale propane prices are starting the heating season higher than year ago levels. EIA expects retail prices to be higher than last winter but lower than the three prior winters.

U.S. propane inventories are starting the winter at the top of the five-year range

U.S. total end-of-month propane inventories

million barrels



Note: Propane inventories include propylene stored at refineries. Gray band represents the range between the minimum and maximum from 2015 to 2019.

Source: U.S. Energy Information Administration, *Short-Term Energy Outlook*, October 2020.

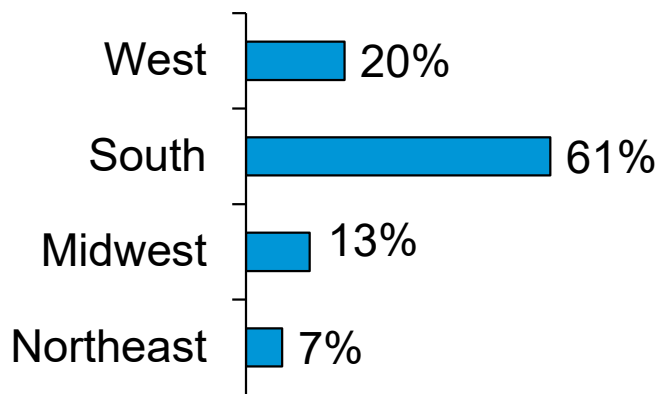
Electricity

Winter 2020–21 takeaways – Electricity

- Because wholesale electricity prices are slow to pass through to consumers, yearly changes in expenditure deviations are driven more by temperatures.
- Electricity consumption is expected to be 8% higher this winter compared with last winter because of a forecast of colder winter temperatures and more people working and attending school from home, which affects electricity more than other fuels because, in addition to space heating, electricity is used to power a wide range of home appliances.
- EIA expects residential electricity prices to be about the same this winter compared with last winter.

Winter electricity bills are expected to be higher compared with last winter because of higher forecast consumption

Regional share of all U.S. households that use electricity as primary space heating fuel



Change from last winter (forecast)

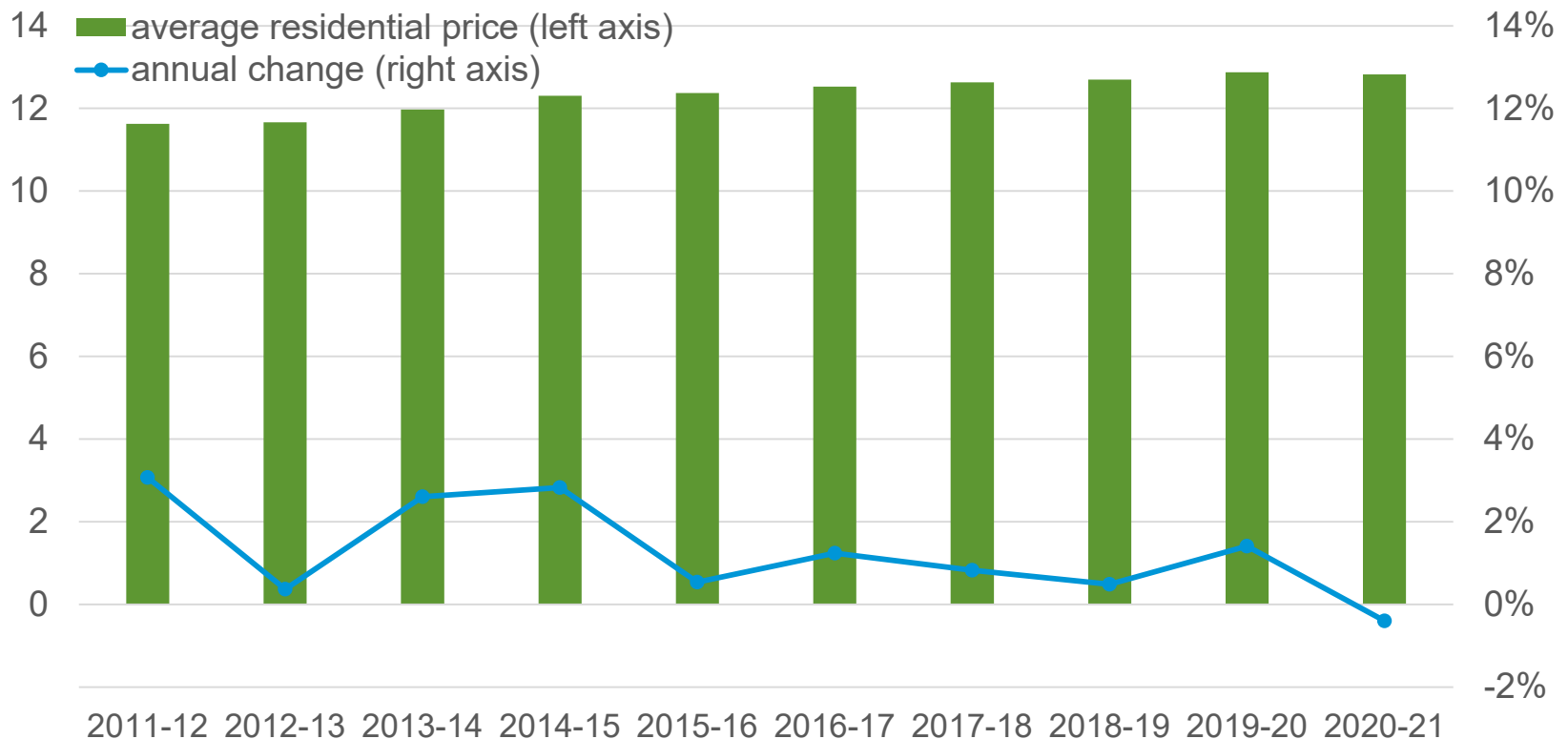
| | Consumption | Average price | Total expenditures |
|-----------|-------------|---------------|--------------------|
| West | 3% | 3% | 5% |
| South | 10% | -2% | 7% |
| Midwest | 7% | 0% | 7% |
| Northeast | 8% | -1% | 7% |

Source: U.S. Energy Information Administration, *Short-Term Energy Outlook*, October 2020.

Annual growth in residential electricity prices averaged about 1% over the past five winters

U.S. winter average residential electricity price

cents per kilowatthour



Source: U.S. Energy Information Administration, *Short-Term Energy Outlook*, October 2020.

EIA's winter Heating Fuels Webpage provides more detailed information on winter fuel supply and prices

www.eia.gov/special/heatingfuels

- Availability and pricing for the four principals heating fuels
 - Propane
 - Heating oil
 - Natural gas
 - Electricity
- Data for each state are available on the clickable map
- Links to resources for each state
- Current week and three-month weather forecasts from NOAA
- Downloadable graphs as an image or as a spreadsheet

