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Administration

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## Winter Fuels Outlook

The U.S. Energy Information Administration (EIA) expects that average expenditures for the major home heating energy sources will decline for most households this winter compared with last winter because of warmer forecast temperatures across much of the country. Forecast changes in household heating expenditures vary significantly by both fuel and region. For the average U.S. household, EIA expects that both natural gas and electricity bills will decline by 1%, home heating oil by 4%, and propane by 15% (see [Winter Fuels Outlook table](#)).

In contrast to the national average, EIA forecasts that expenditures will increase for homes that heat with natural gas in the Midwest and South as a result of higher retail natural gas prices.

Although the lower average forecast expenditures largely reflect warmer forecast temperatures this winter compared with the winter of 2018–19, a colder-than-average winter could lead to increases in expenditures compared with last winter.

In addition, retail heating oil prices could rise above forecast levels because of ongoing uncertainties. For example, there is uncertainty regarding the effect global sulfur restrictions for marine fuels that go into effect in January will have on global distillate fuel markets. Additionally, distillate fuel inventories in the Northeast, the main residential heating fuel market, are low heading into winter.

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.

Based on the most recent forecast of heating degree days (HDD) from the National Oceanic and Atmospheric Administration (NOAA), EIA expects temperatures for the winter of 2019–20 to be warmer than last winter for most of the country. On a national-average basis, temperatures last winter were slightly colder than the most recent 10-winter (2009–10 through 2018–19) average. HDD are an approximate measure of how cold temperatures are compared with a base temperature—more HDD indicate colder temperatures. On average, EIA expects total HDD for the winter of 2019–20 across the United States to be 4% less than last winter. However, the forecast varies [among U.S. regions](#), and forecasts range from 7% fewer HDD than last winter in the Midwest region to no change in HDD from last winter in the South region.

Although NOAA forecasts temperatures this winter to be warmer 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 HDD in all regions are 10% higher (colder) or 10% lower (warmer) than forecast.

**Natural Gas.** Nearly half of all U.S. households heat primarily with natural gas. EIA expects households heating primarily with natural gas will spend about \$580 this winter, down 1% from the amount they spent last winter. EIA forecasts a 3% increase in residential natural gas prices and a 4% decline in residential natural gas consumption this winter to contribute to the slightly lower natural gas expenditures.

For the winter of 2019–20, EIA forecasts that the residential natural gas price will average \$10.03 per thousand cubic feet (Mcf), up from \$9.76/Mcf last winter. EIA's higher residential price forecast occurs amid an environment of generally declining natural gas commodity prices. EIA expects natural gas spot prices at Henry Hub to average \$2.56 per million British thermal units (MMBtu) (\$2.66/Mcf) this winter, which is 24% lower than last winter. Record growth in U.S. natural gas production put [downward pressure on natural gas spot prices](#) in 2019, despite [high levels of natural gas exports](#) and [increased consumption in the electric generation sector](#).

Decreases in natural gas spot prices generally pass through to residential customers over long periods of time. In the short term, residential prices can go up while spot prices go down. 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.

Significant regional variation exists in natural gas price changes compared with last winter. Forecast prices in the Midwest are almost 8% higher than last winter, and forecast prices in the South and West are about 5% and 3% higher than last winter, respectively. EIA forecasts residential prices in the Northeast to be 6% 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. Relatively low prices globally for liquefied natural gas (LNG), which New England relies on as a source of supply, have helped bring residential natural gas prices in the Northeast closer to the U.S. average.

EIA forecasts that total U.S. residential natural gas consumption this winter will average 22.1 billion cubic feet per day (Bcf/d), and average household consumption for the winter will total 58 Mcf. The decrease in expected winter consumption reflects less cold temperatures: a forecast for U.S. population-weighted HDD that is 4% lower this winter compared with winter 2018–19. Although NOAA is forecasting generally warmer winter temperatures for most of the

country, the biggest decline in HDD from last winter is expected in the Midwest. EIA forecasts an almost 6% decline in average natural gas consumption per household from last winter in the Midwest compared to less than 1% in the South. EIA forecasts that residential natural gas consumption this winter in the West will decline by 4% compared with last winter, and in the Northeast by 3%.

The Northeast is the only region EIA forecasts to see both lower prices and consumption in the winter of 2019–20, forecasting a 9% decline in household natural gas expenditures compared with last winter. In the West, forecast decreases in consumption offset forecast increases in prices, leading to a 2% decrease in expenditures. In the South and Midwest, EIA does not expect consumption declines to fully offset price increases, leading to expected increases in expenditures of 4% and 1%, respectively.

Under a 10%-colder-than-forecast scenario, EIA expects that average U.S. residential natural gas consumption would be 4% higher than last winter and natural gas prices would be 2% higher, resulting in 7% higher household expenditures. Under a 10% warmer-than-forecast scenario, EIA forecasts natural gas consumption would be 12% lower than last winter and prices would be 4% higher, resulting in 9% lower household expenditures.

EIA forecasts working U.S. natural gas inventories will total 3.8 trillion cubic feet (Tcf) at the end of October, or 17% more than the October 2018 end-of-month level and slightly more than the five-year (2014–18) average for the end of October. Natural gas storage has been absorbing a significant amount of the increase in U.S. production. Working natural gas inventories in the Lower 48 states began the injection season (April 1) almost 30% lower than the previous five-year average for that time of year. By the end of October, EIA expects working gas inventories in the Lower 48 states to be 2% more than the five-year end-of-October average. 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 EIA's baseline temperature scenario for winter 2019–20, where HDD are forecast to be 4% lower than last winter, EIA expects natural gas inventories to fall to 1.8 Tcf at the end of March 2020, which would be 6% higher than the previous five-year (2015–19) average level for the end of March. However, under a 10% colder-than-forecast scenario, EIA expects inventories to end March 2020 at 1.3 Tcf, which would be 25% lower than the five-year average. In a 10% warmer-than-forecast scenario, inventories would likely end March 2020 at 2.2 Tcf, which would be 28% 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 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.

Utilities and local distribution companies have a regulatory obligation to meet residential and commercial customer demands, and continued increases in U.S. natural gas production along with increased pipeline takeaway capacity will alleviate winter demand shortage concerns, even under a colder-than-forecast scenario. EIA forecasts U.S. dry natural gas production will average 93.8 billion cubic feet per day (Bcf/d) this winter, which is up 5.0 Bcf/d (6%) from last winter.

Last year's [pipeline buildouts in the Northeast](#) and this year's new capacity additions in the [south central](#) regions have further enabled natural gas exports from U.S. natural gas producing areas to demand centers.

**Heating Oil.** EIA expects retail heating oil prices to be slightly lower this winter compared with last winter. The forecast lower heating oil prices are the result of lower expected crude oil prices that partly offset by higher refining margins. However, crude oil prices have been volatile since May of this year and have recently experienced significant volatility after the recent [attacks on crude oil production facilities in Saudi Arabia](#). As a result, crude oil prices are uncertain heading into this winter heating season, and 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. Also, many heating oil users buy supplies ahead of the winter and refill as needed. When forecasting expenditures, EIA does not account for the fact that heating oil consumers purchase fuel ahead of its use. EIA assumes consumers pay the prevailing retail price at the time fuel is consumed.

EIA forecasts that the Brent crude oil price will average \$59/barrel (b) this winter, which is \$7/b lower than last winter. In October 2018, the beginning of STEO's winter heating season, Brent crude oil prices averaged \$81/b, the highest monthly average of the year, before falling to an average of \$57/b by December and \$63/b during the first quarter of 2019. EIA forecasts that Brent crude oil prices will average \$60/b this October and will fall slightly to an average of \$58/b by March 2020. The lower forecast for Brent crude oil for this winter compared with last winter primarily reflects uncertainty about global economic growth and its effect on global petroleum demand.

EIA expects lower forecast crude oil prices this winter to be offset by higher refinery margins (the price difference between wholesale heating oil and Brent crude oil). For winter 2019–20, EIA estimates that heating oil wholesale margins will average 55 cents per gallon (gal), which would be 17 cents/gal higher than last winter and 22 cents/gal higher than the previous five-winter (2014–15 through 2018–19) average. The higher forecast margins reflect the increased demand for low sulfur marine distillate fuel as a result of the upcoming International Maritime Organization regulations in 2020, which EIA expects to affect all distillate fuel prices such as heating oil.

In addition, EIA expects margins to be supported by continued [demand for U.S. distillate fuel exports](#). However, a decelerating global economic growth is putting some downward pressure on margins. The severity with which any of these factors affect the market depends on several variables. So, EIA views uncertainty in distillate fuel prices, in addition to uncertainty in the crude oil market itself, to be greater this winter than in previous recent winters.

EIA expects households whose primary space heating fuel is heating oil to spend an average of \$1,501 this winter on heating oil, \$69 (4%) less than last winter. The decline in expenditures reflects EIA's forecast that retail heating oil prices will be 5 cents per gallon (gal) (2%) lower than last winter and consumption will be 3% lower than last winter. Although total expenditure on heating oil is forecast to be slightly less than last winter, it will be the second highest since the winter of 2014–15.

In the scenario that assumes a 10% colder-than-forecast winter, forecast expenditures for heating oil are \$105 (7%) higher than last winter. In this case, EIA forecasts heating oil prices to be 2 cents/gal (1%) higher than last winter and consumption to be 6% higher. In the 10% warmer scenario, EIA forecasts expenditures to be \$222 (14%) lower than last winter, resulting from heating oil prices that are 9 cents/gal (3%) lower and consumption that is 12% lower.

Customers in the Northeast rely on heating oil more than in any other region. About 20% of households in this region use oil for space heating, down from 25% 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.

Distillate fuel inventories (which include heating oil) in the Northeast totaled 28.8 million barrels on September 27, 9.9 million barrels (26%) lower than the five-year (2014–18) average for that week and 2.1 million barrels (7%) lower than at the same time last year. A number of supply options are available in the Northeast including pipelines, coast-wise compliant vessels from other U.S. ports, and imports from other countries in the actively traded Atlantic Basin. As a result, EIA does not expect significant supply disruptions or resulting price fluctuations in the Northeast.

In the winter of 2019–20, EIA expects strong distillate margins to encourage refiners to increase refinery runs and maximize distillate production. EIA forecasts total refinery inputs to average 17.1 million b/d in the 2019–20 winter, a 1% increase compared with the 2018–19 winter. In the 2019–20 winter, EIA expects total refinery and blender net production of distillate fuel to average 5.5 million b/d, an increase of about 300,000 b/d compared with the 2018–19 winter.

However, if temperatures become severely cold, the Northeast typically increases imports of distillate fuel to help meet demand. As a result, prices have the potential to rise above forecast levels. Higher prices encourage imports into the region. If a cold snap in the U.S. Northeast coincides with a cold snap in Europe, then the European cold snap could place additional upward pressure on distillate prices because Europe is the main source of U.S. imports.

**Electricity.** EIA forecasts that households heating primarily with electricity will spend an average of \$1,162 this winter on their electricity bills, 1% lower than the typical bill last winter. This decrease in forecast expenditures is a result of 1% lower forecast consumption, including both heating and non-heating uses of electricity, along with residential electricity prices that are about the same as last winter. Nearly all U.S. households use electricity, but 40% rely primarily on electric heat. Nearly two-thirds of homes in the South heat primarily with electricity compared with only 16% in the Northeast.

In the scenario that assumes a 10% colder-than-forecast winter, forecast expenditures for electricity are \$47 (4%) higher than last winter. In the 10% warmer scenario, EIA forecasts electricity expenditures to be \$77 (7%) lower than last winter.

The trends in household electricity expenditures vary between regions of the country. In the South census region, where most households heat with electricity, EIA forecasts winter electricity consumption to be about 0.2% greater than last winter as a result of similar forecast colder-than-normal weather in the region. In contrast, the weather in the Midwest region is expected to be milder than last winter, and forecast winter heating degree days in 2019–20 are about 7% lower than last winter. This milder weather contributes to EIA's forecast that winter electricity consumption will be about 4% lower than last winter.

Forecast residential electricity price changes also vary among regions. EIA's expected decline in the cost of natural gas for electric generation leads to forecast declines for residential electricity prices in the regions of the country that tend to use more of the fuel for their power supply. EIA expects the electricity price in the Northeast region this winter to average 1.1% lower than the price last winter, and the forecast winter electricity price in the South region declines 0.5%. In the Midwest region, EIA expects residential electricity prices this winter to be 1.7% higher than last winter. In the West region, EIA expects residential electricity prices to be 1.8% higher this 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 projected fuel costs and changes in available capacity. EIA forecasts the price of natural gas delivered to electric generators this winter will be 25% lower than last winter. As a result, the share of total U.S. electricity generation fueled by natural gas this winter is expected to grow from 33% to 35%. Additions of solar and wind generating capacity lead to a forecast increase in renewables share of total generation to 19% this winter from 17% last winter. Offsetting these increases is a forecast decline in coal generation from 28% to 24%.

EIA expects the winter-over-winter increase in U.S. natural gas generation to be driven by the PJM (Mid-Atlantic) region, which has the country's largest natural gas generating fleet. In PJM, natural gas's share of generation is expected to grow from 32% to 35%, and the forecast coal generation share to fall from 26% to 24%. In the ERCOT (Electric Reliability Council of Texas) region, the forecast coal generation share falls from 24% to 18%. Renewable energy, driven by

wind power, increases from 23% of total ERCOT generation last winter to 27% this winter. Natural gas's share in ERCOT rises from 41% to 42%.

**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 15% less 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 \$228 (12%) less this winter than last winter, a result of prices that are 10% lower and average household consumption that is forecast to be 3% less than last winter. EIA expects households in the Midwest to spend an average of \$236 (17%) less this winter, reflecting average prices that are about 12% lower than last winter and consumption that is 6% lower.

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

In the 10% colder-than-forecast scenario, EIA's forecast expenditures for propane are about the same as last winter in the Northeast, with prices that are 16 cents/gal (5%) lower than last winter and consumption that is 5% higher. Forecast expenditures in the cold scenario are \$108 more than last winter in the Midwest, reflecting prices that are 11 cents/gal (6%) higher than last winter and consumption that is 2% higher.

In the 10% warmer-than-forecast scenario, EIA's forecast expenditures are \$486 lower than last winter in the Northeast, reflecting prices that are 54 cents/gal (17%) lower than last winter and consumption that is 11% lower. Forecast expenditures are \$332 lower than last winter in the Midwest, reflecting prices that are 22 cents/gal (12%) lower than last winter and consumption that is 14% lower.

As of September 30, wholesale propane spot prices at the Mont Belvieu hub were almost 60% lower than at the same time in 2018. EIA expects residential propane prices to be lower this winter compared with last winter because of lower crude oil and natural gas prices that feed into lower prices for retail propane and because of more abundant propane supplies nationally. EIA's propane price forecasts reflect inventories that are above average in most regions of the United States going into the winter season and U.S. propane production growth that is expected to continue to outpace domestic and international demand growth.

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 100.6 million barrels on September 27, 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 23% higher than the five-

year average. Inventories were also well above average in all other regions, with the exception of the Midwest where inventory levels were closer to the five-year average.

EIA forecasts that U.S. propane production at natural gas plants and refineries will be 12% higher this winter than last winter, total U.S. consumption will be 1% higher than last winter, and net exports will be 32% higher than last winter. U.S. consumption and export growth depend on demand for propane as a heating fuel, as petrochemical feedstock for petrochemical plants, and as an agricultural fuel. The increases in total consumption and exports are mainly a result of expected growth in the use of propane as a feedstock for petrochemical plants and would be affected by U.S. and global industrial growth. Propane is also used as a fuel for drying agricultural crops, which may contribute to higher-than-forecast Midwest prices, if farmers have [higher than expected U.S crop-drying demand](#) during harvest season (October–November).

EIA estimates that U.S. production of propane/propylene was 125,000 b/d (6%) higher in the third quarter of 2019 relative to the third quarter of 2018, and propane net exports increased by 85,000 b/d (10%) during the same period. Expansion of the Enterprise Product Partners' Houston Ship Channel export facility in the fourth quarter of 2019 could contribute to rising exports in the coming quarters.

During this heating season, the Northeast region will have an additional source of propane supply when Blackline Midstream reactivates the [Providence, Rhode Island, import terminal](#). In the Northeast, exports leave from the Philadelphia area in the Central Atlantic region, but U.S. imports mostly come into New England.

**Wood.** EIA estimates that almost 2.0 million households (2%) will use cord wood or wood pellets as the primary residential space heating fuel for the winter 2019–20. 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 [Residential Energy Consumption Survey](#). 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 2019

| Fuel / Region         | Winter of |        |        |       |       |        |        | Forecast |          |
|-----------------------|-----------|--------|--------|-------|-------|--------|--------|----------|----------|
|                       | 12-13     | 13-14  | 14-15  | 15-16 | 16-17 | 17-18  | 18-19  | 19-20    | % Change |
| <b>Natural Gas</b>    |           |        |        |       |       |        |        |          |          |
| <b>Northeast</b>      |           |        |        |       |       |        |        |          |          |
| Consumption (Mcf**)   | 64.7      | 71.7   | 72.3   | 57.4  | 61.5  | 65.2   | 66.8   | 65.0     | -2.6     |
| Price (\$/mcf)        | 11.71     | 11.52  | 10.80  | 10.18 | 10.70 | 11.37  | 11.70  | 10.95    | -6.4     |
| Expenditures (\$)     | 757       | 826    | 780    | 584   | 659   | 742    | 781    | 712      | -8.8     |
| <b>Midwest</b>        |           |        |        |       |       |        |        |          |          |
| Consumption (Mcf)     | 73.5      | 84.2   | 79.1   | 63.6  | 64.8  | 73.9   | 77.0   | 72.6     | -5.6     |
| Price (\$/mcf)        | 8.34      | 8.68   | 8.54   | 7.55  | 8.28  | 7.84   | 7.83   | 8.42     | 7.5      |
| Expenditures (\$)     | 614       | 731    | 676    | 480   | 536   | 579    | 603    | 611      | 1.5      |
| <b>South</b>          |           |        |        |       |       |        |        |          |          |
| Consumption (Mcf)     | 46.6      | 52.7   | 50.9   | 40.3  | 37.9  | 45.6   | 46.0   | 45.8     | -0.5     |
| Price (\$/mcf)        | 10.67     | 10.71  | 10.75  | 10.72 | 12.04 | 11.27  | 10.69  | 11.20    | 4.8      |
| Expenditures (\$)     | 497       | 564    | 547    | 432   | 457   | 513    | 492    | 513      | 4.3      |
| <b>West</b>           |           |        |        |       |       |        |        |          |          |
| Consumption (Mcf)     | 47.5      | 45.2   | 40.1   | 44.7  | 45.6  | 43.8   | 48.8   | 46.6     | -4.4     |
| Price (\$/mcf)        | 9.13      | 9.96   | 10.71  | 9.92  | 10.68 | 10.24  | 10.26  | 10.56    | 2.9      |
| Expenditures (\$)     | 433       | 450    | 430    | 443   | 487   | 448    | 501    | 492      | -1.7     |
| <b>U.S. Average</b>   |           |        |        |       |       |        |        |          |          |
| Consumption (Mcf)     | 58.4      | 63.9   | 60.7   | 51.8  | 52.9  | 57.6   | 60.2   | 57.8     | -3.9     |
| Price (\$/mcf)        | 9.71      | 9.95   | 9.89   | 9.28  | 10.06 | 9.82   | 9.76   | 10.03    | 2.8      |
| Expenditures (\$)     | 567       | 636    | 600    | 481   | 533   | 565    | 588    | 580      | -1.3     |
| <b>Heating Oil</b>    |           |        |        |       |       |        |        |          |          |
| <b>U.S. Average</b>   |           |        |        |       |       |        |        |          |          |
| Consumption (gallons) | 493.0     | 547.5  | 548.2  | 436.6 | 468.2 | 495.4  | 512.0  | 497.8    | -2.8     |
| Price (\$/gallon)     | 3.87      | 3.87   | 3.04   | 2.06  | 2.41  | 2.78   | 3.07   | 3.02     | -1.7     |
| Expenditures (\$)     | 1,910     | 2,121  | 1,668  | 900   | 1,128 | 1,376  | 1,570  | 1,501    | -4.4     |
| <b>Electricity</b>    |           |        |        |       |       |        |        |          |          |
| <b>Northeast</b>      |           |        |        |       |       |        |        |          |          |
| Consumption (kWh***)  | 8,299     | 8,879  | 8,927  | 7,705 | 8,050 | 8,344  | 8,480  | 8,333    | -1.7     |
| Price (\$/kwh)        | 0.152     | 0.163  | 0.168  | 0.164 | 0.165 | 0.169  | 0.169  | 0.167    | -1.1     |
| Expenditures (\$)     | 1,264     | 1,448  | 1,501  | 1,263 | 1,324 | 1,406  | 1,431  | 1,391    | -2.8     |
| <b>Midwest</b>        |           |        |        |       |       |        |        |          |          |
| Consumption (kWh)     | 10,344    | 11,363 | 10,816 | 9,365 | 9,479 | 10,381 | 10,716 | 10,253   | -4.3     |
| Price (\$/kwh)        | 0.111     | 0.112  | 0.118  | 0.122 | 0.124 | 0.124  | 0.123  | 0.125    | 1.7      |
| Expenditures (\$)     | 1,152     | 1,275  | 1,274  | 1,138 | 1,172 | 1,286  | 1,316  | 1,281    | -2.7     |
| <b>South</b>          |           |        |        |       |       |        |        |          |          |
| Consumption (kWh)     | 9,731     | 10,488 | 10,301 | 8,782 | 8,511 | 9,549  | 9,538  | 9,559    | 0.2      |
| Price (\$/kwh)        | 0.107     | 0.109  | 0.111  | 0.110 | 0.111 | 0.112  | 0.113  | 0.112    | -0.5     |
| Expenditures (\$)     | 1,037     | 1,141  | 1,141  | 967   | 948   | 1,069  | 1,077  | 1,075    | -0.2     |
| <b>West</b>           |           |        |        |       |       |        |        |          |          |
| Consumption (kWh)     | 8,778     | 8,487  | 7,831  | 8,441 | 8,560 | 8,326  | 8,984  | 8,699    | -3.2     |
| Price (\$/kwh)        | 0.119     | 0.123  | 0.127  | 0.130 | 0.132 | 0.136  | 0.136  | 0.139    | 1.8      |
| Expenditures (\$)     | 1,041     | 1,045  | 993    | 1,095 | 1,128 | 1,129  | 1,225  | 1,207    | -1.4     |
| <b>U.S. Average</b>   |           |        |        |       |       |        |        |          |          |
| Consumption (kWh)     | 9,193     | 9,729  | 9,418  | 8,456 | 8,424 | 9,048  | 9,273  | 9,139    | -1.4     |
| Price (\$/kwh)        | 0.117     | 0.120  | 0.123  | 0.124 | 0.125 | 0.126  | 0.127  | 0.127    | 0.2      |
| Expenditures (\$)     | 1,071     | 1,163  | 1,158  | 1,044 | 1,055 | 1,143  | 1,177  | 1,162    | -1.2     |

**Table WF01. Average Consumer Prices and Expenditures for Heating Fuels During the Winter**  
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| Fuel / Region   | Winter of |        |        |        |        |        |        | Forecast |          |
|---|-----------|--------|--------|--------|--------|--------|--------|----------|----------|
|   | 12-13     | 13-14  | 14-15  | 15-16  | 16-17  | 17-18  | 18-19  | 19-20    | % Change |
| <b>Propane</b>  |           |        |        |        |        |        |        |          |          |
| <b>Northeast</b>  |           |        |        |        |        |        |        |          |          |
| Consumption (gallons)   | 564.7     | 624.5  | 629.7  | 505.7  | 542.6  | 569.1  | 585.7  | 569.9    | -2.7     |
| Price* (\$/gallon)  | 3.00      | 3.56   | 3.00   | 2.71   | 3.06   | 3.26   | 3.22   | 2.91     | -9.6     |
| Expenditures (\$)   | 1,697     | 2,223  | 1,889  | 1,371  | 1,660  | 1,855  | 1,886  | 1,658    | -12.1    |
| <b>Midwest</b>  |           |        |        |        |        |        |        |          |          |
| Consumption (gallons)   | 711.7     | 808.5  | 755.9  | 618.2  | 628.9  | 715.1  | 746.9  | 702.3    | -6.0     |
| Price* (\$/gallon)  | 1.74      | 2.61   | 1.91   | 1.47   | 1.73   | 1.95   | 1.83   | 1.61     | -12.0    |
| Expenditures (\$)   | 1,238     | 2,110  | 1,444  | 909    | 1,088  | 1,394  | 1,367  | 1,131    | -17.3    |
| <b>Number of households by primary space heating fuel (thousands)</b> |           |        |        |        |        |        |        |          |          |
| <b>Northeast</b>  |           |        |        |        |        |        |        |          |          |
| Natural gas   | 11,356    | 11,529 | 11,705 | 11,802 | 11,918 | 12,070 | 12,270 | 12,488   | 1.8      |
| Heating oil   | 5,464     | 5,244  | 5,097  | 4,923  | 4,774  | 4,724  | 4,635  | 4,483    | -3.3     |
| Propane   | 814       | 846    | 856    | 884    | 933    | 982    | 988    | 997      | 0.9      |
| Electricity   | 3,014     | 3,038  | 3,093  | 3,253  | 3,326  | 3,386  | 3,526  | 3,646    | 3.4      |
| Wood  | 583       | 585    | 569    | 511    | 471    | 477    | 402    | 303      | -24.7    |
| Other/None  | 377       | 436    | 437    | 433    | 433    | 438    | 470    | 504      | 7.3      |
| <b>Midwest</b>  |           |        |        |        |        |        |        |          |          |
| Natural gas   | 18,072    | 18,083 | 18,206 | 18,241 | 18,236 | 18,327 | 18,297 | 18,232   | -0.4     |
| Heating oil   | 360       | 336    | 319    | 301    | 286    | 280    | 265    | 244      | -8.0     |
| Propane   | 2,065     | 2,089  | 2,085  | 2,077  | 2,057  | 2,116  | 2,174  | 2,177    | 0.2      |
| Electricity   | 5,338     | 5,425  | 5,514  | 5,747  | 5,871  | 5,954  | 6,188  | 6,474    | 4.6      |
| Wood  | 641       | 632    | 617    | 587    | 552    | 527    | 511    | 482      | -5.7     |
| Other/None  | 319       | 353    | 351    | 354    | 359    | 358    | 374    | 398      | 6.4      |
| <b>South</b>  |           |        |        |        |        |        |        |          |          |
| Natural gas   | 13,694    | 13,802 | 13,919 | 13,948 | 13,913 | 13,962 | 14,132 | 14,250   | 0.8      |
| Heating oil   | 739       | 699    | 681    | 653    | 619    | 608    | 593    | 564      | -4.8     |
| Propane   | 1,983     | 1,944  | 1,925  | 1,899  | 1,858  | 1,853  | 1,867  | 1,853    | -0.7     |
| Electricity   | 27,884    | 28,247 | 28,843 | 29,509 | 29,873 | 30,322 | 30,806 | 31,345   | 1.8      |
| Wood  | 613       | 616    | 593    | 552    | 509    | 484    | 479    | 480      | 0.2      |
| Other/None  | 367       | 419    | 407    | 413    | 426    | 436    | 447    | 466      | 4.3      |
| <b>West</b>   |           |        |        |        |        |        |        |          |          |
| Natural gas   | 15,023    | 15,068 | 15,227 | 15,312 | 15,427 | 15,588 | 15,655 | 15,711   | 0.4      |
| Heating oil   | 247       | 235    | 225    | 219    | 214    | 216    | 208    | 193      | -7.2     |
| Propane   | 910       | 930    | 915    | 923    | 936    | 968    | 963    | 935      | -2.9     |
| Electricity   | 8,680     | 8,759  | 8,927  | 9,228  | 9,351  | 9,487  | 9,751  | 10,027   | 2.8      |
| Wood  | 729       | 744    | 749    | 719    | 700    | 688    | 689    | 692      | 0.5      |
| Other/None  | 903       | 1,016  | 1,075  | 1,087  | 1,058  | 1,082  | 1,154  | 1,220    | 5.7      |
| <b>U.S. Totals</b>  |           |        |        |        |        |        |        |          |          |
| Natural gas   | 58,145    | 58,481 | 59,057 | 59,303 | 59,494 | 59,949 | 60,354 | 60,682   | 0.5      |
| Heating oil   | 6,810     | 6,513  | 6,322  | 6,095  | 5,892  | 5,828  | 5,701  | 5,483    | -3.8     |
| Propane   | 5,772     | 5,810  | 5,781  | 5,783  | 5,784  | 5,919  | 5,991  | 5,962    | -0.5     |
| Electricity   | 44,916    | 45,470 | 46,377 | 47,737 | 48,421 | 49,148 | 50,271 | 51,492   | 2.4      |
| Wood  | 2,565     | 2,578  | 2,528  | 2,369  | 2,232  | 2,176  | 2,081  | 1,957    | -6.0     |
| Other/None  | 1,967     | 2,223  | 2,271  | 2,287  | 2,277  | 2,313  | 2,444  | 2,588    | 5.9      |
| <b>Heating degree days</b>  |           |        |        |        |        |        |        |          |          |
| <b>Northeast</b>  | 4,966     | 5,597  | 5,648  | 4,322  | 4,700  | 5,013  | 5,166  | 5,004    | -3.1     |
| <b>Midwest</b>  | 5,545     | 6,452  | 6,002  | 4,688  | 4,792  | 5,577  | 5,849  | 5,467    | -6.5     |
| <b>South</b>  | 2,428     | 2,784  | 2,689  | 2,013  | 1,880  | 2,351  | 2,359  | 2,359    | 0.0      |
| <b>West</b>   | 3,183     | 2,992  | 2,569  | 2,956  | 3,040  | 2,885  | 3,296  | 3,119    | -5.4     |
| <b>U.S. Average</b>   | 3,722     | 4,110  | 3,881  | 3,202  | 3,254  | 3,610  | 3,789  | 3,635    | -4.1     |

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

\*\*\* kilowatthour

# EIA 2019–20 Winter Fuels Outlook



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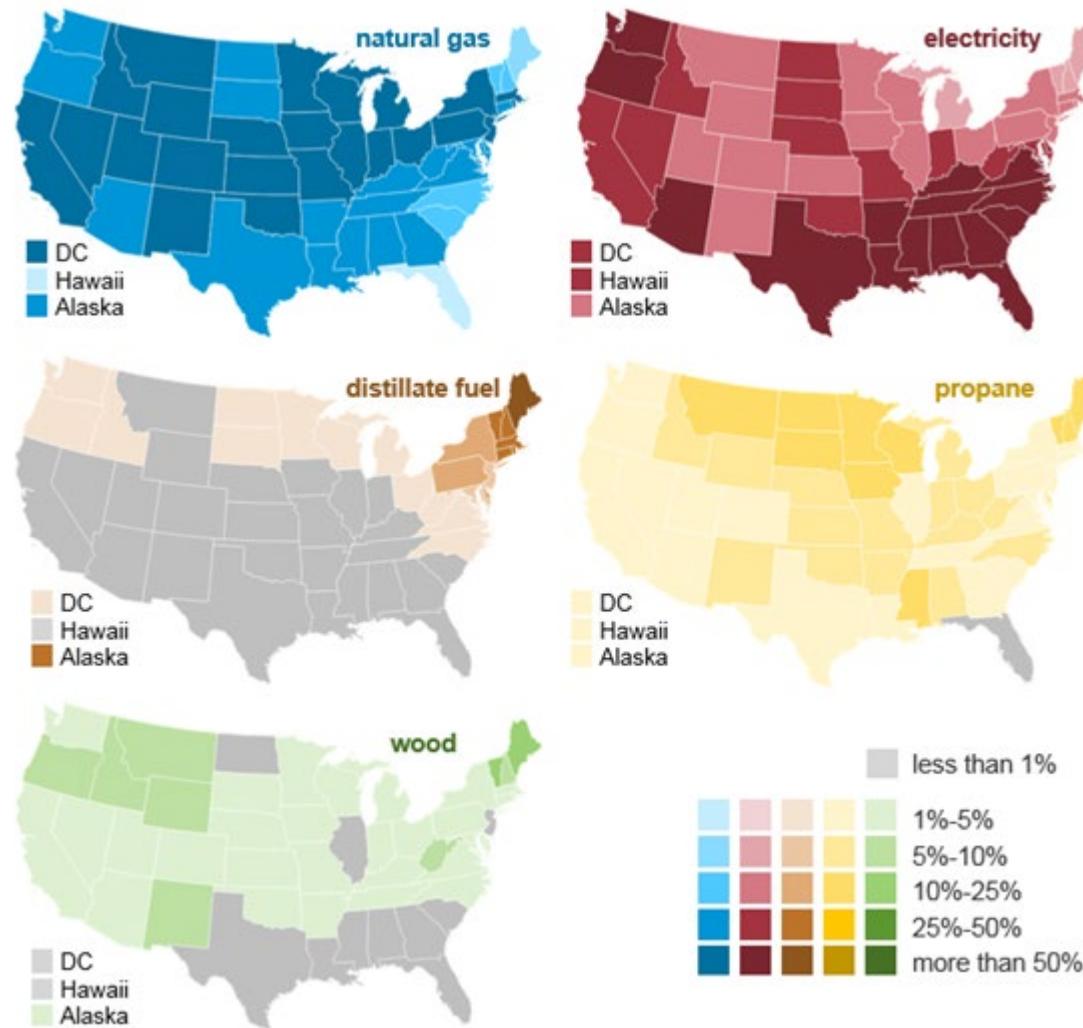
*October 8, 2019*

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

- The latest winter weather outlook from the National Oceanic and Atmospheric Administration (NOAA) indicates temperatures will be warmer than normal and warmer than last winter, with heating degree days forecast to be 1% below the 10-year (2009-2018) average and 4% below last winter.
- EIA's price forecast is mixed this year, with propane and heating oil retail prices expected to be lower than last winter, natural gas retail prices higher than last winter, and electricity prices similar to last winter.
- The effect of warmer forecast temperatures contributes to lower expected fuel bills in most regions, with the exception of natural gas customers in the South and Midwest.
- Temperature outcomes tend to vary more than retail fuel prices during the winter, as changes in retail prices for electricity and natural gas tend to happen over longer periods of time.

# Heating fuel market shares vary across U.S. regions

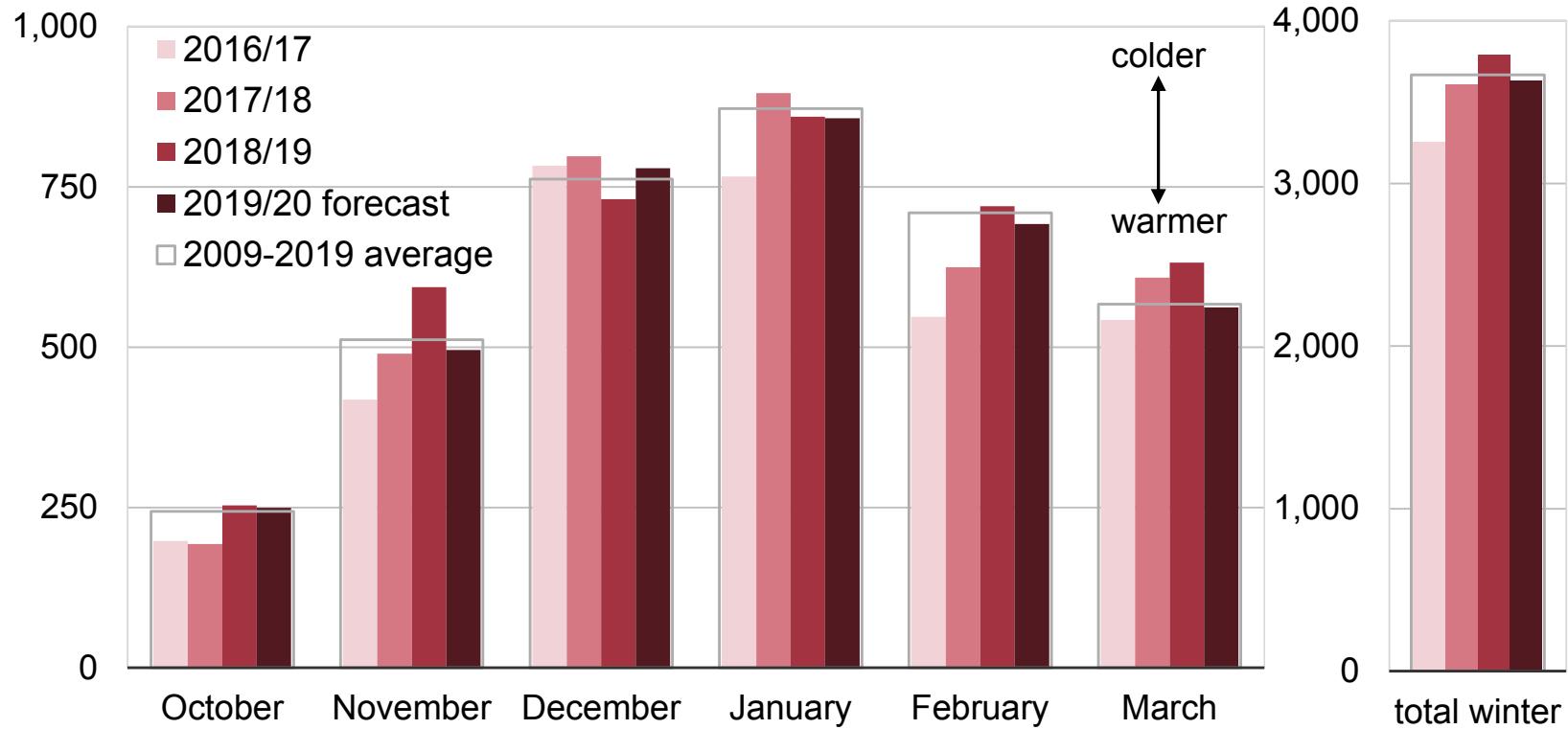
Primary home heating fuel by state, 2017



Source: U.S. Energy Information Administration based on 2017 American Community Survey

# NOAA forecasts U.S. heating degree days this winter to be 4% lower than last winter and 1% lower than the 10-year average

U.S. current population-weighted  
heating degree days

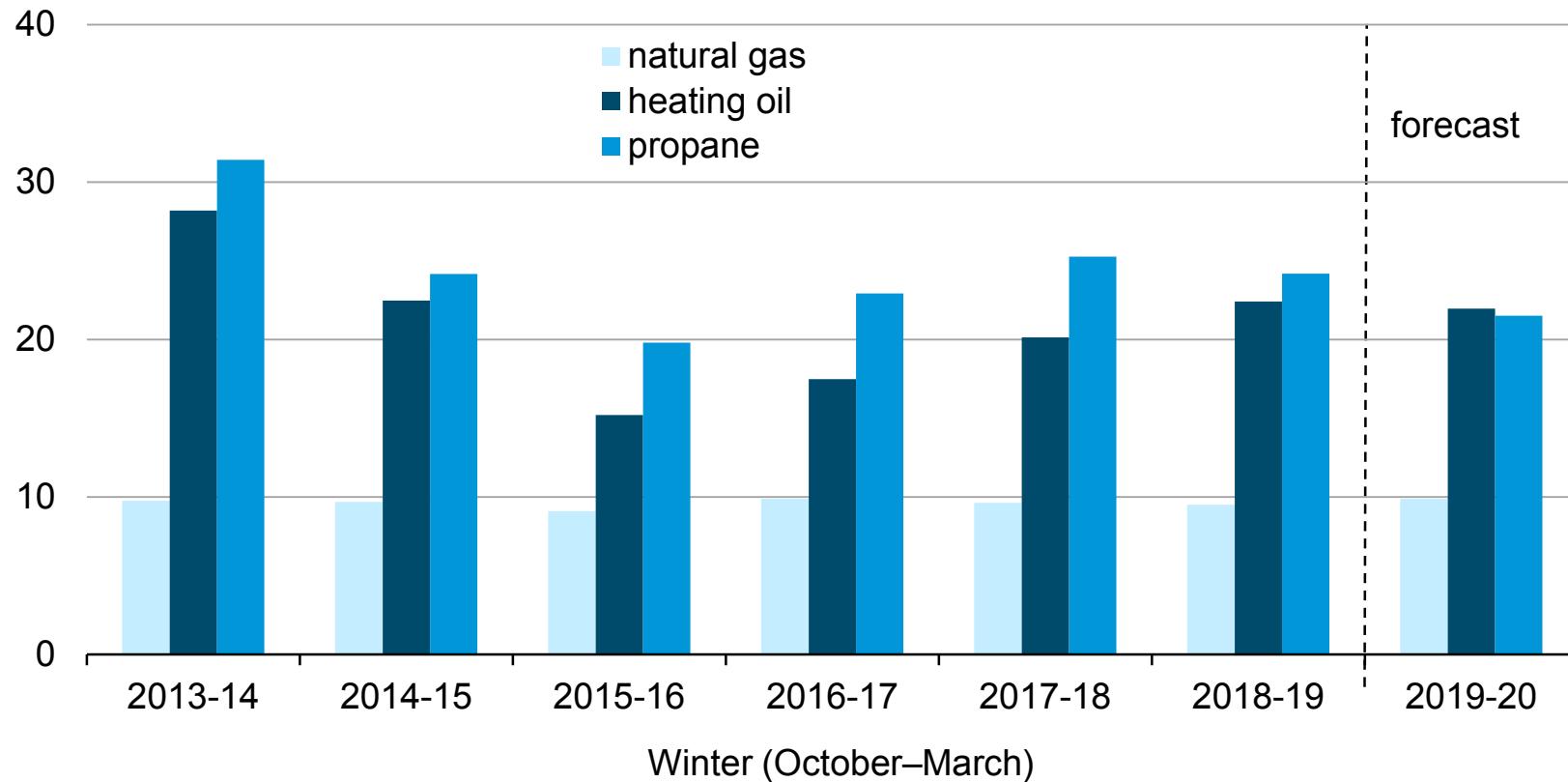


Note: EIA calculations based on National Oceanic and Atmospheric Administration (NOAA) data. The gray box represents the 10-year average for October 2009–March 2019. Projections reflect NOAA's 14–16 month outlook.

Source: U.S. Energy Information Administration, *Short-Term Energy Outlook*, October 2019.

# EIA forecasts propane prices to drop below heating oil prices this winter on a heat-content basis

U.S. average residential winter heating fuel prices  
dollars per million Btu



Source: U.S. Energy Information Administration, *Short-Term Energy Outlook*, October 2019.

Fuel expenditures are generally expected to be lower this winter (October 1–March 31) compared with last winter, but propane is the only fuel below the five-year average

| Change in base case forecast fuel expenditures |  |                           |
|--|--|---------------------------|
| Fuel   | Compared with previous five-winter average | Compared with last winter |
| Heating oil*                                   | 13%  | -4%                       |
| Natural gas                                    | 5%   | -1%                       |
| Propane *                                      | -6%  | -16%                      |
| Electricity                                    | 4%   | -1%                       |

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 2019.

Colder or warmer (+/- 10% HDD) than forecast winters can swing expected expenditures by as much as 25% compared with last winter

| Change in forecast fuel expenditures from last winter |           |                             |                             |
|---|-----------|-----------------------------|-----------------------------|
| Fuel  | Base Case | If 10% warmer than forecast | If 10% colder than forecast |
| Heating oil*  | -4%       | -14%                        | 7%                          |
| Natural gas   | -1%       | -9%                         | 7%                          |
| Propane *   | -16%      | -25%                        | 4%                          |
| Electricity   | -1%       | -7%                         | 4%                          |

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 2019.

# Natural Gas

## Winter 2019–20 takeaways – Natural gas

- As of September 27, inventories of natural gas in working storage were 16% higher than year-ago levels and close to the five-year average.
- Inventories are expected to end October at almost 3.8 trillion cubic feet, which would be 2% higher than the five-year average for this time of year.
- Dry natural gas production this winter is forecast to average close to 94 billion cubic feet/day, a 5% increase compared with last winter and up 31% from three winters ago.
- Henry Hub spot prices are forecast to average \$2.56/million British thermal units this winter, a 24% decrease from last winter because of higher inventory levels.
- 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 the South and Midwest and decline in the West and Northeast based on the current forecast, but temperatures will be a key variable

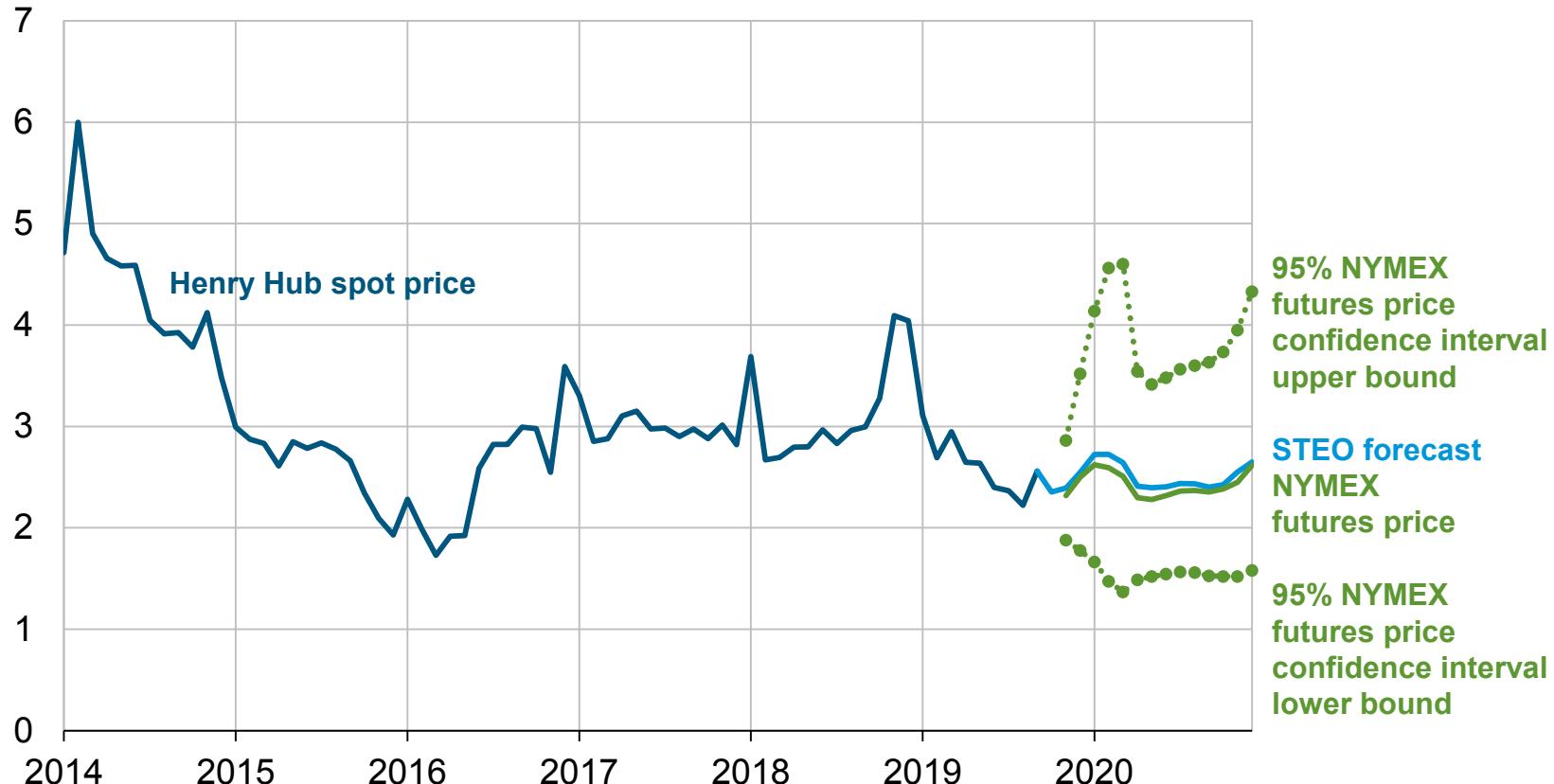
Regional share of all U.S.  
households that use natural gas as  
their primary space heating fuel

|           |     | Change from last winter (forecast) |               |                    |
|-----------|-----|------------------------------------|---------------|--------------------|
|           |     | Consumption                        | Average price | Total expenditures |
| West      | 26% | -4%                                | 3%            | -2%                |
| South     | 23% | 0%                                 | 5%            | 4%                 |
| Midwest   | 30% | -6%                                | 8%            | 1%                 |
| Northeast | 21% | -3%                                | -6%           | -9%                |

Source: U.S. Energy Information Administration, *Short-Term Energy Outlook*, October 2019.

# EIA forecasts Henry Hub spot prices to average \$2.56/MMBtu this winter

Henry Hub natural gas price  
dollars per million Btu

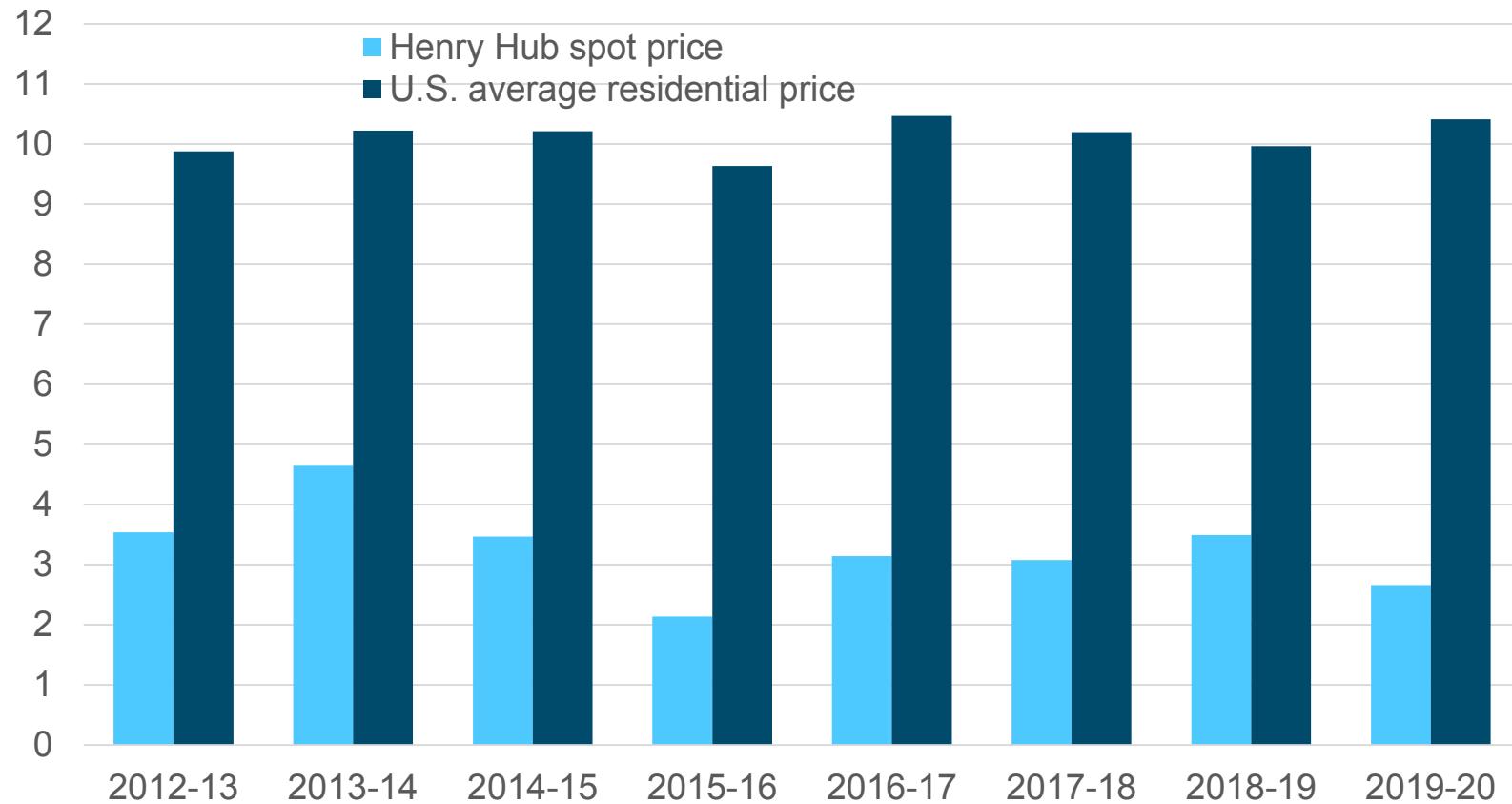


Note: Confidence interval and futures prices derived from market information for the five trading days ending October 3, 2019. Intervals not calculated for months with sparse trading in near-the-money options contracts.

Source: U.S. Energy Information Administration, *Short-Term Energy Outlook*, October 2019.

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

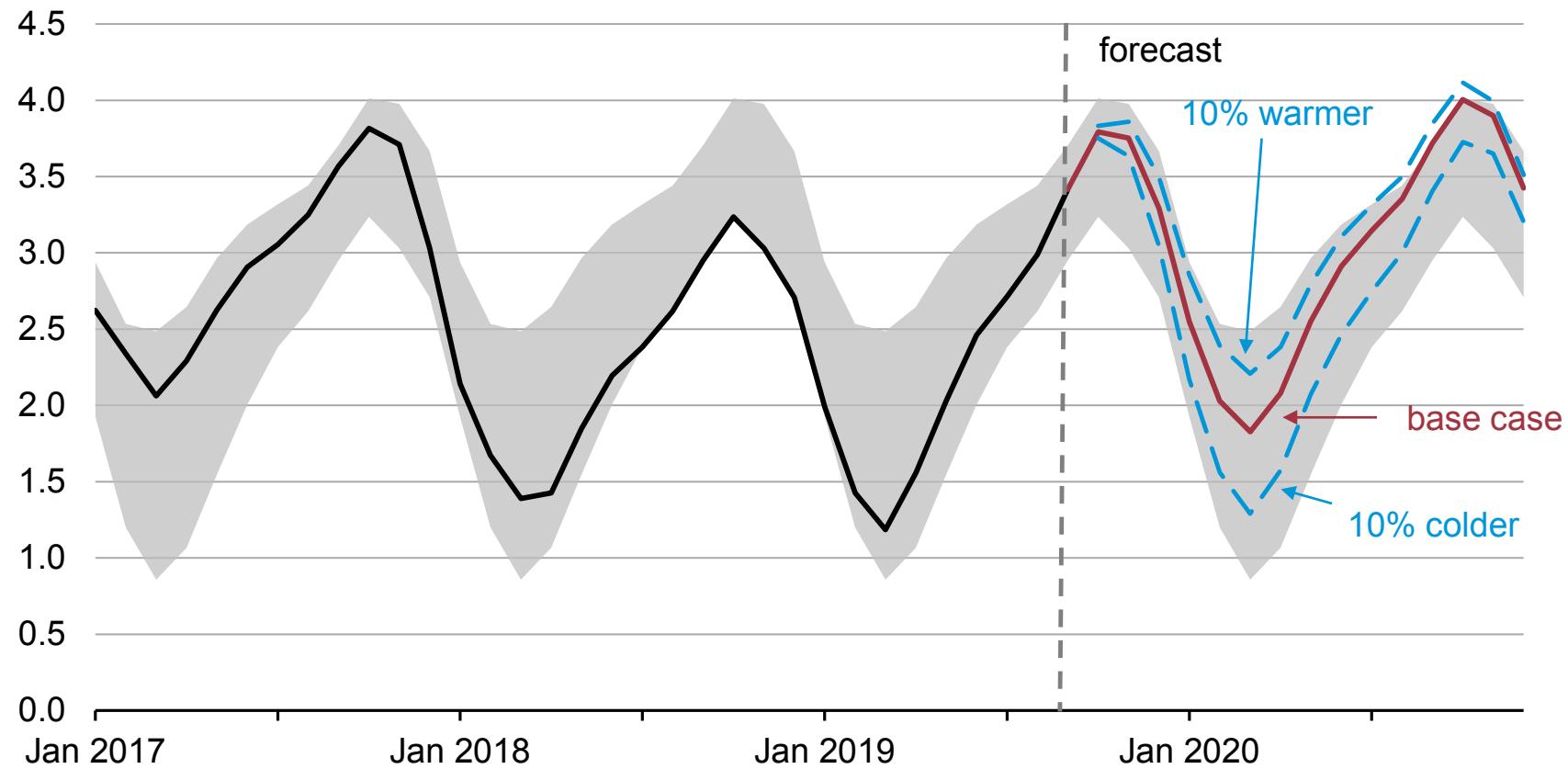
winter average natural gas prices  
dollars per thousand cubic feet (Mcf)



Source: U.S. Energy Information Administration, *Short-Term Energy Outlook*, October 2019, and Refinitiv.

# In a 10% colder-than-forecast scenario, EIA expects natural gas inventories to end the winter within 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 2014 to 2018.

Source: U.S. Energy Information Administration, *Short-Term Energy Outlook*, October 2019.

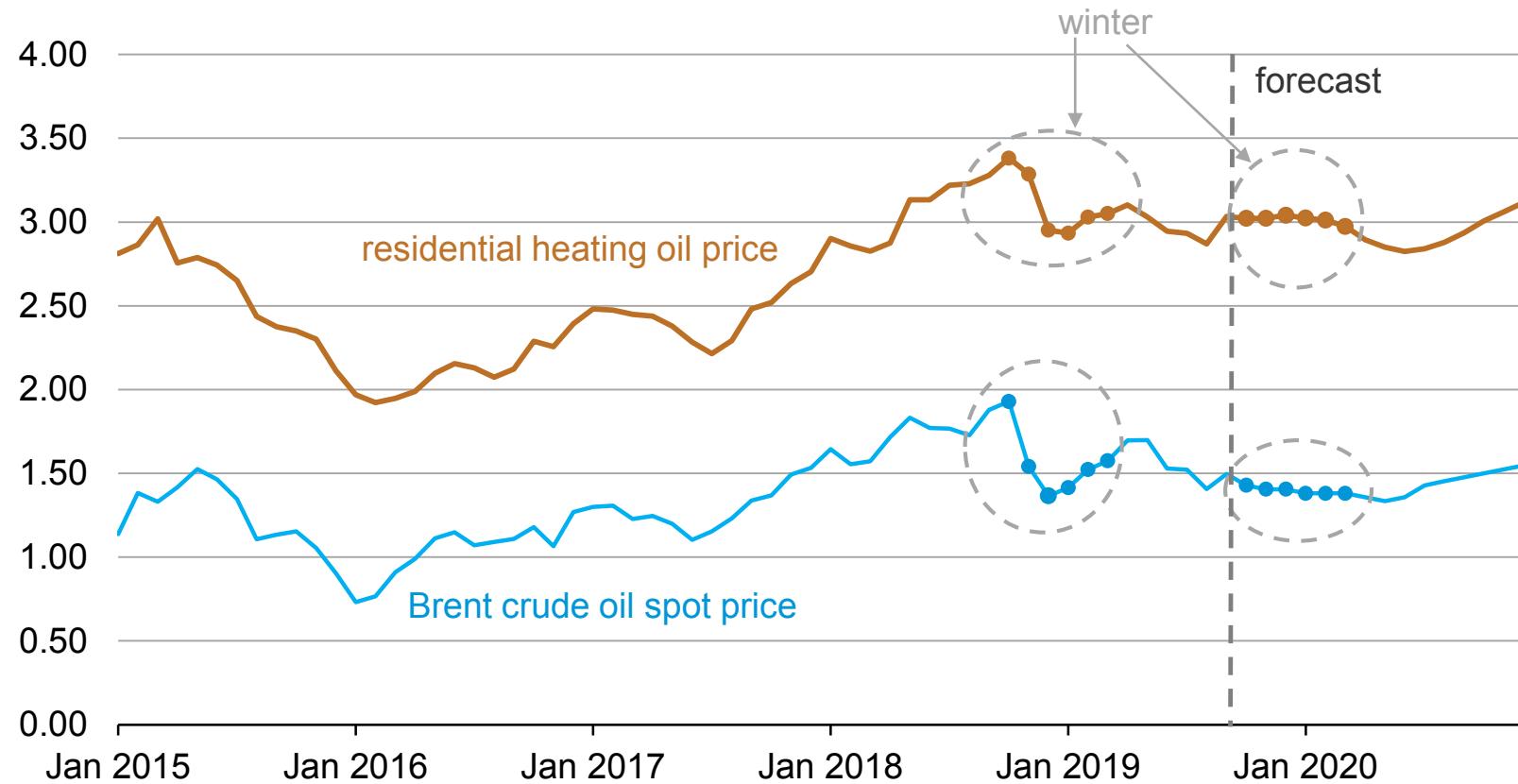
# Heating Oil

## Winter 2019–20 takeaways – Heating oil

- EIA expects Brent crude oil spot prices to average \$59 per barrel (b) this winter, \$7/b (17 cents/gal) less than last winter; however, the outlook for crude oil supply disruptions and economic growth add uncertainty to the forecast for the winter.
- EIA expects International Maritime Organization 2020 regulations that reduce the amount of sulfur allowable in global bunker fuel to increase refining margins for distillate fuels, including heating oil, this winter.
- Lower forecast crude oil prices offset higher refining margins and contribute to lower expected retail heating oil prices this winter.
- Distillate stocks in the Northeast totaled 28.8 million barrels on September 27, 2.1 million barrels (7%) lower than the same time last year and 26% lower than the previous five-year average.
- EIA expects ample distillate supplies to be available to meet demand, but localized supply issues are possible if severely cold temperatures in the Northeast coincide with severely cold temperatures in Europe.

# EIA expects average residential heating oil prices to be 2% lower than prices last winter, averaging \$3.02 per gallon

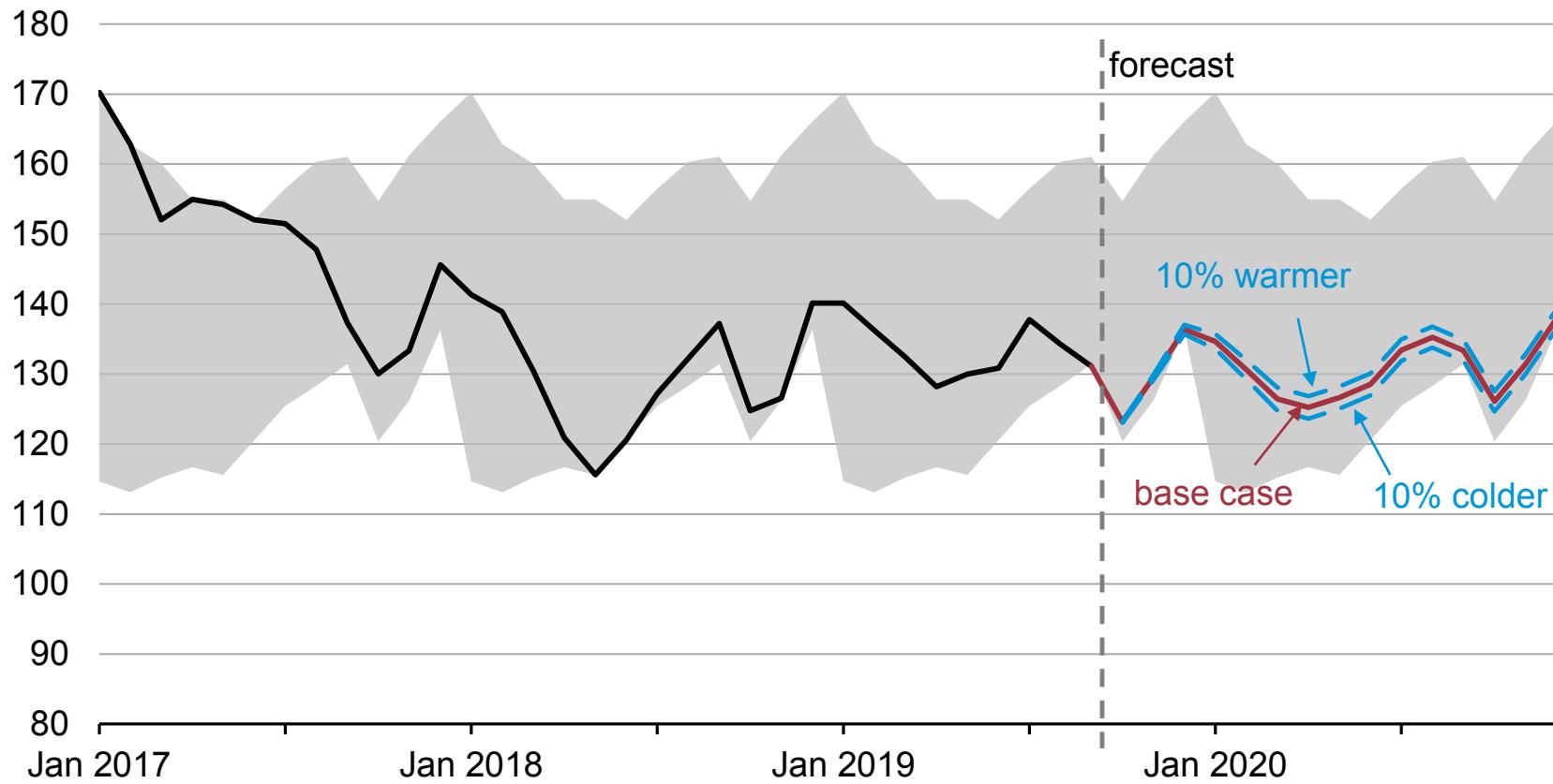
monthly average heating oil and Brent crude oil prices  
dollars per gallon



Source: U.S. Energy Information Administration, *Short-Term Energy Outlook*, October 2019, and Refinitiv.

# Distillate inventories are near the lowest level in the past five years, but seasonality has become more muted in recent years

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



Note: Gray band represents the range between the minimum and maximum from 2014 to 2018.

Source: U.S. Energy Information Administration, *Short-Term Energy Outlook*, October 2019.

# Propane

## Winter 2019–20 takeaways – Propane

- U.S. propane/propylene inventories as of September 27 were 100.6 million barrels, which was 15% higher than the previous five-year average for that time of year and 26% 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 5-year range. In the Midwest inventories as of September 27, were about the same as last year and the five-year average.
- Rising propane supply combined with lower consumption during much of 2019 has contributed to rising inventories and falling prices.
- EIA forecasts propane production to be 12% higher this winter compared with last winter, while total propane consumption is expected to be up 2% from last winter, and net exports are forecast to rise by 32%, supported by rising production and high inventory levels.
- EIA expects propane retail prices in the Northeast and Midwest to be 10% and 12% lower, respectively.

# EIA forecasts propane expenditures to down from last year's levels because of lower consumption and prices

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

A horizontal bar chart showing the regional share of all U.S. households that use propane as primary space heating fuel. The y-axis lists four regions: West, South, Midwest, and Northeast. The x-axis represents the percentage share. The bars are blue.

| Region    | Share (%) |
|-----------|-----------|
| West      | 16%       |
| South     | 31%       |
| Midwest   | 37%       |
| Northeast | 17%       |

South 31%

Midwest 37%

Northeast 17%

Change from last winter (forecast)

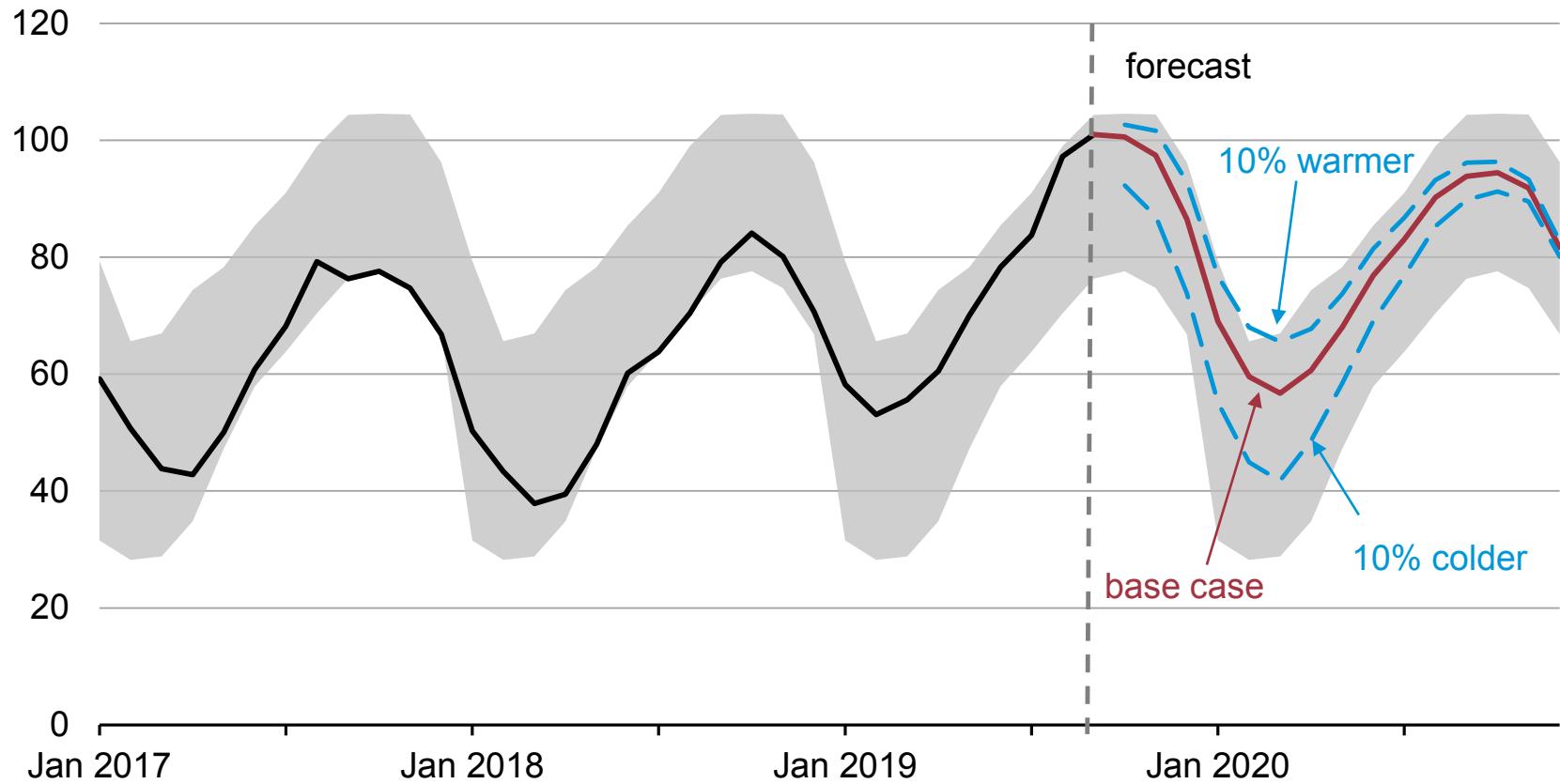
|           | Consumption | Average price | Total expenditures |
|-----------|-------------|---------------|--------------------|
| West      | n/a         | n/a           | n/a                |
| South     | n/a         | n/a           | n/a                |
| Midwest   | -6%         | -12%          | -17%               |
| Northeast | -3%         | -10%          | -12%               |

Note: n/a = not available because of insufficient underlying data to create forecast

Source: U.S. Energy Information Administration, *Short-Term Energy Outlook*, October 2019.

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

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



Note: Propane inventories include refinery propylene. Gray band represents the range between the minimum and maximum from 2014 to 2018.

Source: U.S. Energy Information Administration, *Short-Term Energy Outlook*, October 2019.

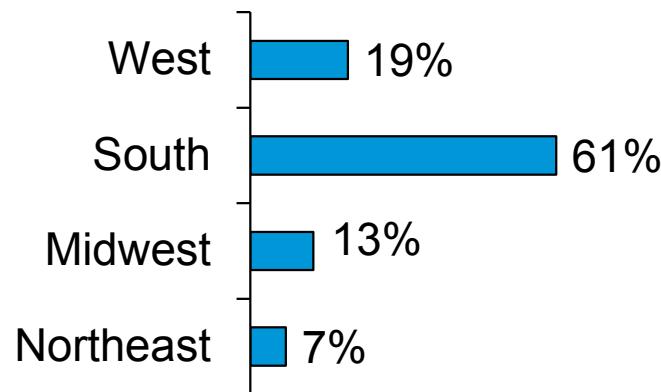
# Electricity

## Winter 2019–20 takeaways – Electricity

- Because wholesale electricity prices are slow to pass through to consumers, yearly increases in expenditure deviations are driven more by temperatures.
- Electricity consumption is expected to be 1% lower this winter compared with last winter because of a forecast of warmer temperatures than last winter.
- EIA expects residential electricity prices to be the same this winter compared with last winter.
- In the case of very cold temperatures, Northeast electricity markets could see constrained natural gas supplies into the region causing electricity generation to be supplied by more expensive fuels, such as petroleum, which could contribute to higher wholesale electricity prices.

# Winter electricity bills are expected to be higher compared with last winter, but temperatures will be a key variable

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%         | 2%            | -1%                |
| South     | 0%          | 0%            | 0%                 |
| Midwest   | -4%         | 2%            | -3%                |
| Northeast | -2%         | -1%           | -3%                |

Source: U.S. Energy Information Administration, *Short-Term Energy Outlook*, October 2019.

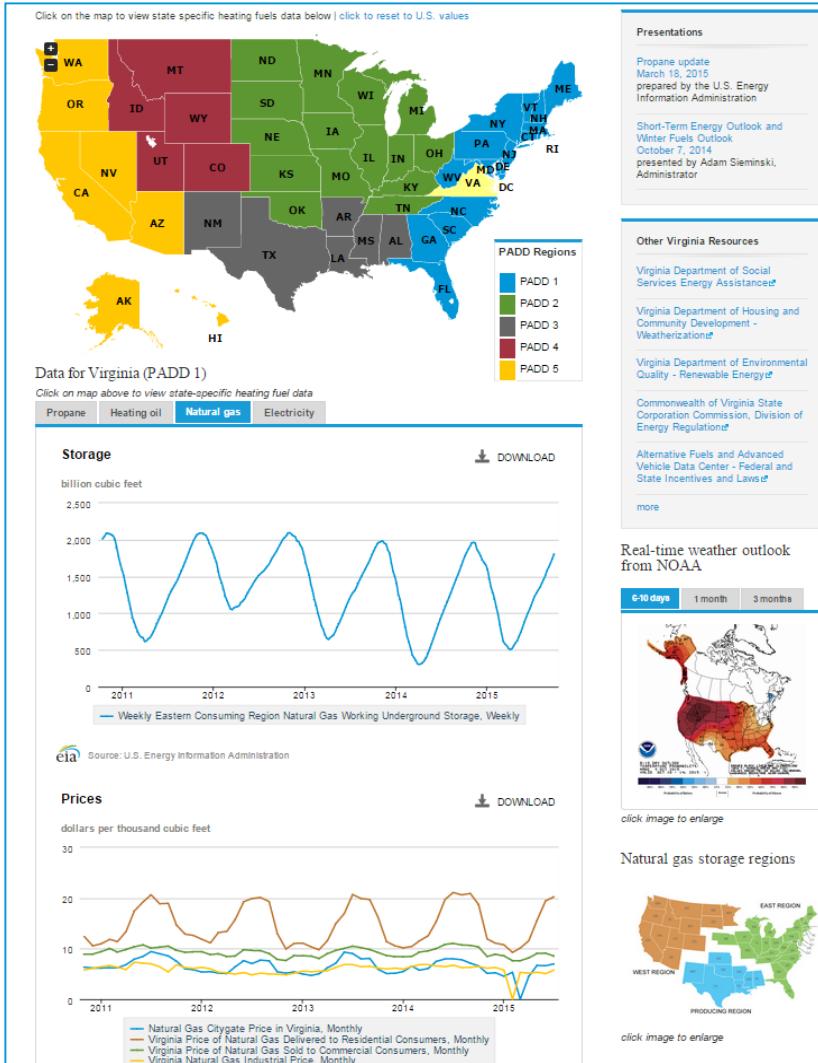
# Annual growth in residential electricity prices averaged 1.2% over the past five winters

U.S. winter average residential electricity price  
cents per kilowatthour



Source: U.S. Energy Information Administration, *Short-Term Energy Outlook*, October 2019.

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



[www.eia.gov/special/heatingfuels](http://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