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.

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

Actual expenditures compared with EIA’s October forecast are largely a function of weather outcomes

Percentage change in expenditures and heating degree days
March end-of-winter STEO versus October STEO

U.S. Energy Information Administration, *Winter Fuels Outlooks 2013 through 2018*
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.

<table>
<thead>
<tr>
<th>Fuel</th>
<th>Compared with previous five-winter average</th>
<th>Compared with last winter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heating oil*</td>
<td>13%</td>
<td>-4%</td>
</tr>
<tr>
<td>Natural gas</td>
<td>5%</td>
<td>-1%</td>
</tr>
<tr>
<td>Propane *</td>
<td>-6%</td>
<td>-16%</td>
</tr>
<tr>
<td>Electricity</td>
<td>4%</td>
<td>-1%</td>
</tr>
</tbody>
</table>

*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.

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

<table>
<thead>
<tr>
<th>Fuel</th>
<th>Base Case</th>
<th>If 10% warmer than forecast</th>
<th>If 10% colder than forecast</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heating oil*</td>
<td>-4%</td>
<td>-14%</td>
<td>7%</td>
</tr>
<tr>
<td>Natural gas</td>
<td>-1%</td>
<td>-9%</td>
<td>7%</td>
</tr>
<tr>
<td>Propane *</td>
<td>-16%</td>
<td>-25%</td>
<td>4%</td>
</tr>
<tr>
<td>Electricity</td>
<td>-1%</td>
<td>-7%</td>
<td>4%</td>
</tr>
</tbody>
</table>

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.

Natural Gas
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:
- West: 26%
- South: 23%
- Midwest: 30%
- Northeast: 21%

Change from last winter (forecast):

<table>
<thead>
<tr>
<th>Regional Share</th>
<th>Consumption</th>
<th>Average Price</th>
<th>Total Expenditures</th>
</tr>
</thead>
<tbody>
<tr>
<td>West</td>
<td>-4%</td>
<td>3%</td>
<td>-2%</td>
</tr>
<tr>
<td>South</td>
<td>0%</td>
<td>5%</td>
<td>4%</td>
</tr>
<tr>
<td>Midwest</td>
<td>-6%</td>
<td>8%</td>
<td>1%</td>
</tr>
<tr>
<td>Northeast</td>
<td>-3%</td>
<td>-6%</td>
<td>-9%</td>
</tr>
</tbody>
</table>

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

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.

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.
U.S. natural gas production has covered an increasing share of winter consumption in recent years.

Winter average U.S. dry natural gas production as a percentage of consumption and exports

Winter average Henry Hub spot price

dollars per million British thermal units

Source: U.S. Energy Information Administration, Short-Term Energy Outlook, October 2019
Electricity generation now accounts for about 30% of total natural gas demand during winter months.

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.

Source: U.S. Energy Information Administration, Short-Term Energy Outlook, October 2019, and Refinitiv.
Northeast distillate fuel inventories are below the five-year average and recently dipped below year-ago levels.

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.
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

<table>
<thead>
<tr>
<th>Region</th>
<th>Consumption</th>
<th>Average price</th>
<th>Total expenditures</th>
</tr>
</thead>
<tbody>
<tr>
<td>West</td>
<td>16%</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>South</td>
<td>31%</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Midwest</td>
<td>37%</td>
<td>-6%</td>
<td>-17%</td>
</tr>
<tr>
<td>Northeast</td>
<td>17%</td>
<td>-3%</td>
<td>-12%</td>
</tr>
</tbody>
</table>

**Change from last winter (forecast)**

- **Consumption**
  - West: -6%
  - South: -3%
  - Midwest: -6%
  - Northeast: -3%
- **Average price**
  - West: -12%
  - South: -10%
  - Midwest: -12%
  - Northeast: -10%
- **Total expenditures**
  - West: -17%
  - South: -12%
  - Midwest: -17%
  - Northeast: -12%

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

Propane inventories in the Midwest were at the five-year average as of September 27

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.
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

<table>
<thead>
<tr>
<th>Region</th>
<th>Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>West</td>
<td>19%</td>
</tr>
<tr>
<td>South</td>
<td>61%</td>
</tr>
<tr>
<td>Midwest</td>
<td>13%</td>
</tr>
<tr>
<td>Northeast</td>
<td>7%</td>
</tr>
</tbody>
</table>

### Change from last winter (forecast)

<table>
<thead>
<tr>
<th>Consumption</th>
<th>Average price</th>
<th>Total expenditures</th>
</tr>
</thead>
<tbody>
<tr>
<td>West</td>
<td>-3%</td>
<td>2%</td>
</tr>
<tr>
<td>South</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Midwest</td>
<td>-4%</td>
<td>2%</td>
</tr>
<tr>
<td>Northeast</td>
<td>-2%</td>
<td>-1%</td>
</tr>
</tbody>
</table>

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