Winter Fuels Outlook 2023–2024

A supplement to the Short-Term Energy Outlook

Joseph F. DeCarolis, Administrator
October 16, 2023 | Washington, DC
What is the *Winter Fuels Outlook*?

EIA’s forecasts for upcoming winter residential energy expenditures

Energy market conditions for heating fuels
We expect the majority of households will **spend less** on energy this winter.

### Residential Energy Expenditures

**Nominal Dollars**

**Source:** Winter Fuels Outlook Webinar

<table>
<thead>
<tr>
<th>Fuel Type</th>
<th>Last Winter</th>
<th>This Winter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural Gas</td>
<td>$760</td>
<td>$650</td>
</tr>
<tr>
<td>Electricity</td>
<td>$1,080</td>
<td>$1,110</td>
</tr>
<tr>
<td>Propane</td>
<td>$1,380</td>
<td>$1,340</td>
</tr>
<tr>
<td>Heating Oil</td>
<td>$1,850</td>
<td>$1,850</td>
</tr>
</tbody>
</table>

**Case Scenarios:**

- **Colder Case:** $650
- **Base Case:** $600
- **Warmer Case:** $570

**2023-2024 Winter Fuels Outlook Webinar**

October 16, 2023
Natural gas and propane inventories are relatively high; distillate inventories are relatively low.

U.S. natural gas inventory
billion cubic feet

U.S. propane inventory
million barrels

U.S. distillate fuel oil inventory
million barrels

Source: Winter Fuels Outlook

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Energy Expenditures
97% of U.S. homes are primarily heated with one of four fuels

Data source: U.S. Census Bureau American Community Survey (ACS)

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October 16, 2023
Our Winter Fuels Outlook has **regional detail** for three fuels:

<table>
<thead>
<tr>
<th>Primary Heating Fuel</th>
<th>West 22% of U.S. Households</th>
<th>South 39%</th>
<th>Midwest 22%</th>
<th>Northeast 17%</th>
<th>Winter Fuels Outlook Regional Detail</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Heating Oil</strong> (4%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>U.S. Average Only</td>
</tr>
<tr>
<td><strong>Propane</strong> (5%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3 Regions</td>
</tr>
<tr>
<td><strong>Natural Gas</strong> (46%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4 Regions</td>
</tr>
<tr>
<td><strong>Electricity</strong> (41%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4 Regions</td>
</tr>
<tr>
<td><strong>Other / None</strong> (3%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Not Included</td>
</tr>
</tbody>
</table>

- **Natural Gas**: 15 regions, 15 regions, 18 regions, 12 regions
- **Electricity**: 11 regions, 34 million households, 7 regions, 4 regions
- **Heating Oil**: 2 regions, 2 regions, 2 regions, 1 region
- **Propane**: 4 regions, 2 regions, 2 regions, 1 region

*Data source: Short-Term Energy Outlook*
Estimates for expenditures include all end uses for that fuel, not just heating.

U.S. average energy expenditures (2020)

dollars

$3,000
$2,500
$2,000
$1,500
$1,000
$500
$0

natural gas
electricity
propane
fuel oil or kerosene

homes heating with electricity have relatively few non-electric end uses

household energy expenditures on other fuels

main heating fuel non-heating expenditures (water heating, cooking, etc.)
main heating fuel heating expenditures

Winter Fuels Outlook scope of expenditures

Source: Residential Energy Consumption Survey, 2020, Table CE4.16
We’ve changed our definition of the **winter season**

**U.S. population-weighted heating degree days**

previous ten-year average

Source: Short-Term Energy Outlook

- October usually has warmer temperatures and less heating demand than April.
- New definition has about 6% less heating demand for the *winter season*.
- We’ve recalculated previous winter estimates to exclude October.

Source: Short-Term Energy Outlook

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Temperatures are a key source of uncertainty in our forecasts

U.S. population-weighted heating degree days

degree days

Source: Short-Term Energy Outlook
Long-term price and expenditure comparisons can differ if measured in **real dollar terms**

Retail natural gas prices

- Dollars per thousand cubic feet

Retail electricity prices

- Cents per kilowatthour

Retail heating oil prices

- Dollars per gallon

Source: Short-Term Energy Outlook Real Prices Viewer
Changes in wholesale prices ultimately affect retail prices, but the timing of these changes varies by market.
Weather affects energy expenditures in **two ways**

Residential energy expenditures
nominal dollars

Source: Winter Fuels Outlook

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**natural gas**
- Last winter: $650
- This winter: $760
- Colder case: $600
- Base case: $570
- Warmer case: $570

**electricity**
- Last winter: $1,110
- This winter: $1,080
- Warmer case: $1,060
- Baseline: $1,020

**propane**
- Last winter: $1,110
- This winter: $1,080
- Warmer case: $1,060
- Baseline: $1,020

**heating oil**
- Last winter: $1,340
- This winter: $1,210
- Warmer case: $1,170
- Baseline: $1,150

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Source: Winter Fuels Outlook
Natural gas expenditures forecast to be **21% lower** this winter

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**Monthly natural gas expenditures**

nominal dollars

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**U.S. average**

- **$600**
  - **-21%**

**Midwest**

- **$580**
  - **-21%**

**Northeast**

- **$760**
  - **-18%**

**West**

- **$590**
  - **-30%**

**South**

- **$490**
  - **-15%**

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**change from last winter**

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**last winter**

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**colder base**

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**warmer**

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**Data source:** Winter Fuels Outlook
Natural gas production has continued to increase

Natural gas supply
billion cubic feet per day

Natural gas disposition
billion cubic feet per day

Data source: Short-Term Energy Outlook
Natural gas inventories are above average across the country

Regional natural gas inventories
billion cubic feet

Data source: Short-Term Energy Outlook
Propane
Propane expenditures forecast to be **slightly lower** this winter

**Monthly propane expenditures**
nominal dollars

- **U.S. average**
  - $1,340 (-4%)
  - winter base case expenditures change from last winter

- **Midwest**
  - $1,300 (-10%)

- **Northeast**
  - $1,700 (+2%)

- **South**
  - $1,180 (+5%)

**Data source:** Winter Fuels Outlook

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We now publish a propane spot price forecast

- In the September STEO, we added a forecast of the wholesale price of propane at the hub in Mont Belvieu, Texas

- STEO Between the Lines
  - How propane is produced
  - How propane is priced
  - What factors affect wholesale propane prices

Read the article
Increases in propane consumption can be met with withdrawals from inventory; exports remain relatively high.
Propane inventories are **above average**, especially in the Gulf Coast region.

**Regional propane inventories**

million barrels

<table>
<thead>
<tr>
<th>Region</th>
<th>Forecast</th>
<th>Rolling previous five-year average</th>
</tr>
</thead>
<tbody>
<tr>
<td>West Coast and Rocky Mountain</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gulf Coast</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Midwest</td>
<td></td>
<td></td>
</tr>
<tr>
<td>East Coast</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Data source: Short-Term Energy Outlook*
Heating Oil
Heating oil expenditures forecast to be higher than last winter

Monthly heating oil expenditures
nominal dollars

U.S. average

Data source: Winter Fuels Outlook
The **diesel crack spread** is lower than it was last year, but still high and encouraging refinery production.

- Crack spreads are the price difference between crude oil and refined petroleum products and can indicate refineries’ short-term profits.

- Higher crack spreads provide more incentive to produce that fuel.

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**Wholesale spot prices**

<table>
<thead>
<tr>
<th>Year</th>
<th>Diesel Fuel</th>
<th>Brent Crude Oil</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018</td>
<td>$2.00</td>
<td>$1.00</td>
</tr>
<tr>
<td>2020</td>
<td>$1.50</td>
<td>$0.75</td>
</tr>
<tr>
<td>2022</td>
<td>$1.00</td>
<td>$0.50</td>
</tr>
<tr>
<td>2024</td>
<td>$0.50</td>
<td>$0.25</td>
</tr>
</tbody>
</table>

**Crack spread**

<table>
<thead>
<tr>
<th>Year</th>
<th>Crack Spread</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018</td>
<td>$0.00</td>
</tr>
<tr>
<td>2020</td>
<td>$0.25</td>
</tr>
<tr>
<td>2022</td>
<td>$0.50</td>
</tr>
<tr>
<td>2024</td>
<td>$0.75</td>
</tr>
</tbody>
</table>

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**Data source:** Short-Term Energy Outlook
Distillate balances are relatively steady as production rises.

**Distillate fuel oil supply**

- **million barrels per day**
- **winter**
- **net storage withdrawals**
- **refinery production**

**Distillate fuel oil disposition**

- **million barrels per day**
- **winter**
- **net storage injections**
- **net exports**
- **consumption**

**Data source:** Short-Term Energy Outlook

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Heating oil inventories are **below average** in the Gulf Coast and East Coast regions.

Regional distillate fuel oil inventories

million barrels

Data source: Short-Term Energy Outlook
Electricity expenditures forecast to be similar to last winter

Monthly electricity expenditures
nominal dollars

U.S. average

winter base case expenditures change from last winter

last winter colder base warmer

Monthly electricity expenditures
nominal dollars

Midwest

Northeast

South

U.S. average

Midwest

Northeast

South

Data source: Winter Fuels Outlook

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Electricity has **more equipment options** and is the most common secondary heating fuel.

**Main heating fuel and equipment (2020)**

- Natural gas: 55 million households
- Propane or fuel oil: 4 million households
- Electricity: 2 million households
- Some other equipment: 30 million households

**Secondary heating fuel and equipment (2020)**

- Natural gas: 30 million households
- Electricity: 30 million households
- Ductless heat pump (mini-split): 25 million households
- Portable heater: 10 million households
- Built-in heater: 5 million households
- Some other equipment: 5 million households
- Central furnace: 4 million households
- Steam or hot water system: 3 million households
- Heat pump: 1 million households
- Central furnace: 1 million households
- Built-in heater: 1 million households
- Some other equipment: 1 million households

**Source:** Residential Energy Consumption Survey, 2020, Tables HC 6.7 and 6.8
EIA resources
**Winter Fuels Outlook** updates and other EIA resources

- We plan to update household consumption, price, and expenditure estimates with each edition of the *Short-Term Energy Outlook* through March 2024

- EIA data sources
  - Heating Oil and Propane Update
    - Winter Propane Market Update
  - Weekly Petroleum Status Report
  - Weekly Natural Gas Storage Report
  - Hourly Electric Grid Monitor
  - Residential Energy Consumption Survey
Question and Answer session

Moderator: Hannah Breul, Team Lead, Short-Term Integrated Products

Short-Term Energy Outlook analysts

• Tim Hess, STEO Product Manager
• Josh Eiermann, Economist, Petroleum & Liquid Fuels Markets
• Matt French, Senior Analyst, Petroleum & Liquid Fuels Markets
• Tyler Hodge, Senior Economist, Electricity, Coal, Nuclear, and Renewables Markets
• Corrina Ricker, Senior Natural Gas Modeler, Natural Gas Markets

You can submit questions at any time during the presentation using the chat function in the WebEx control panel. Please direct your questions to “All panelists.”