Winter Fuels Outlook 2022–2023

October 13, 2022 | Washington, D.C.

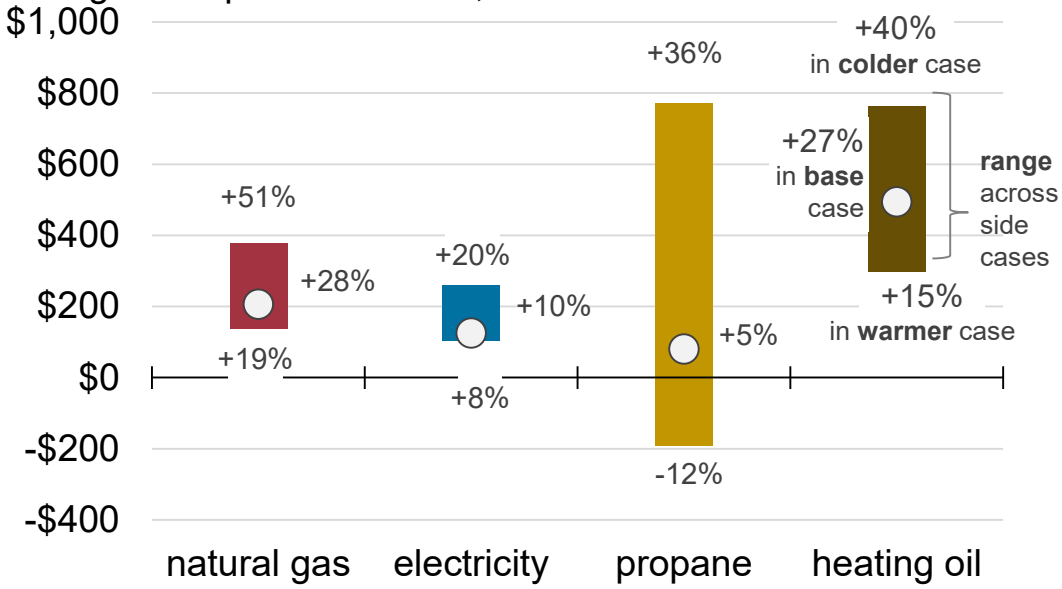
By
Joseph F. DeCarolis, Administrator

Findings

- Winter energy expenditures for most households are likely to be higher than last winter.
- Expenditures could be much higher if the weather is very cold.
- Inventories are low, which could lead to volatile commodity prices.

Average real winter household energy expenditures (winter = Oct–Mar)

change from previous winter, dollars

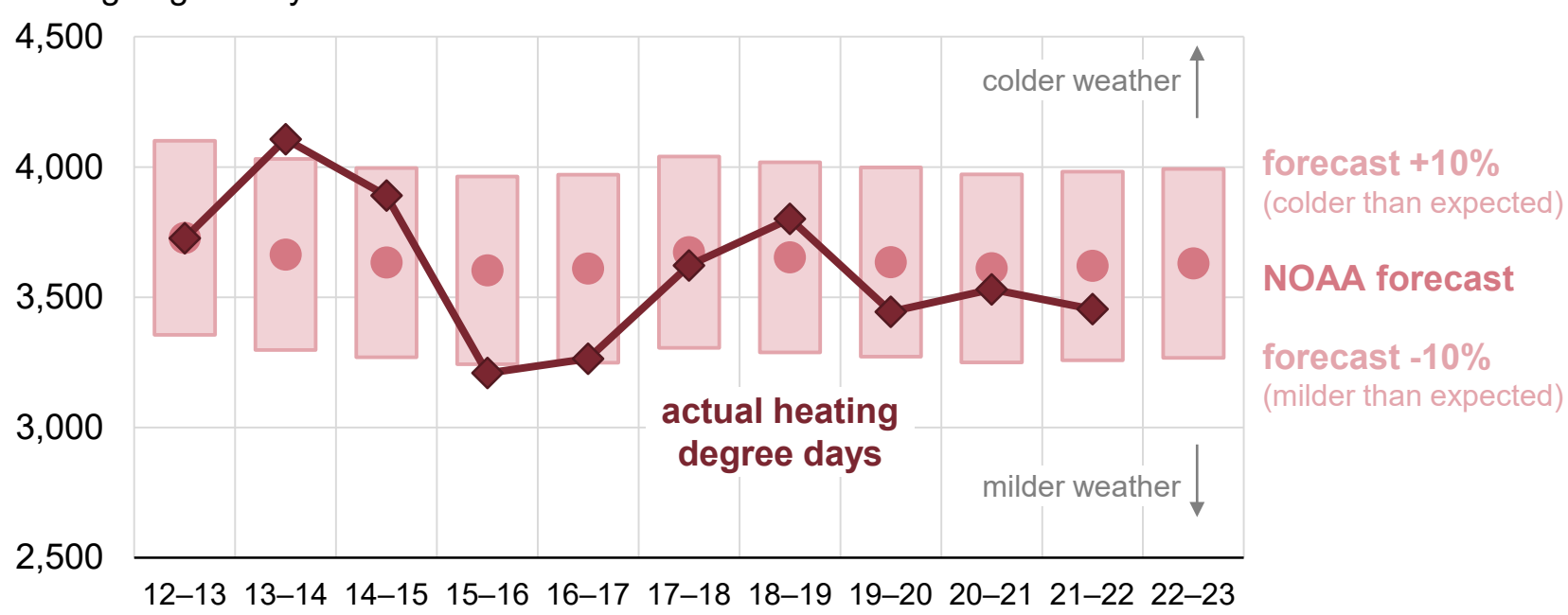


Key notes and definitions

- Winter season: October – March.
- Forecast expenditures for households grouped by their primary space heating fuel.
- The reported expenditures represent the total bill for the primary heating fuel, not just for heating
- We use the *Residential Energy Consumption Survey* (RECS) as a baseline for the average amount of energy that homes use for space heating and other appliances.
- Fuel expenditures for individual homes depend on their size, energy efficiency, and heating equipment, along with thermostat settings and local weather conditions.
- Each fuel also has its own market structure, physical infrastructure, regulations, and limitations that can affect the connection between wholesale and retail market events.
- To produce this outlook, we use the Short-Term Integrated Forecasting System, which mostly comprises a system of linear regressions with several exogenous inputs including forecasts for weather and macroeconomic variables.

Actual heating degree days tend to be within 10% of the forecast

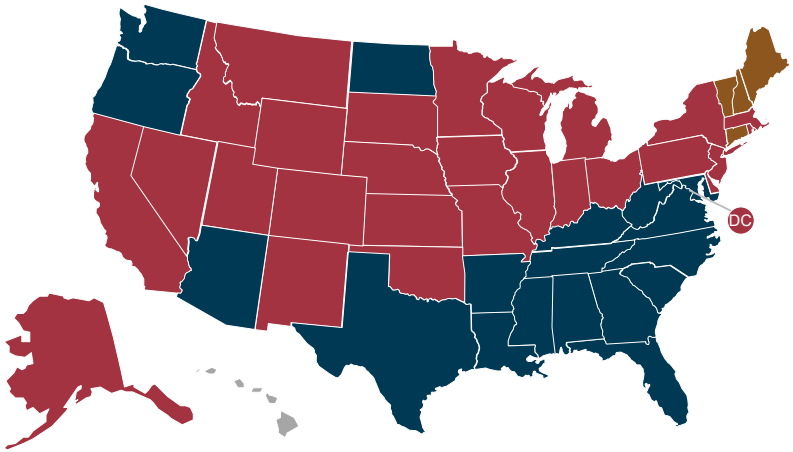
U.S. population-weighted winter heating degree days (winter = Oct–Mar, 2011–2022)



Data source: National Oceanic and Atmospheric Administration (NOAA)

Almost 90% of U.S. homes are primarily heated by natural gas or electricity; heating oil and propane are regionally concentrated

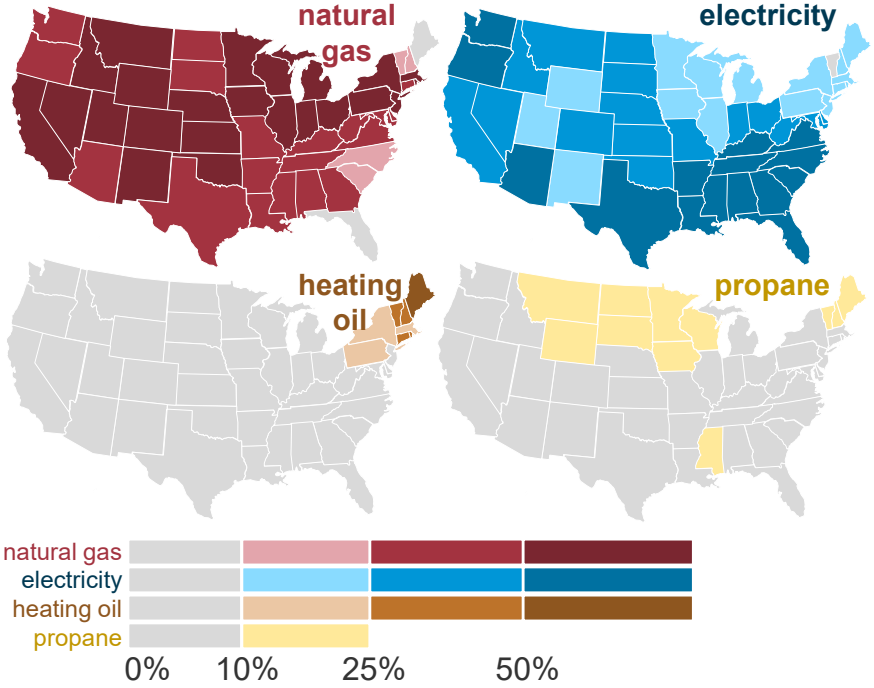
Most prevalent home heating fuel by state (2021)



share of U.S. households from 2021 ACS

- **natural gas (46%)**
- **electricity (41%)**
- **propane (5%)**
- **heating oil (4%)**
- **other / none (3%)**

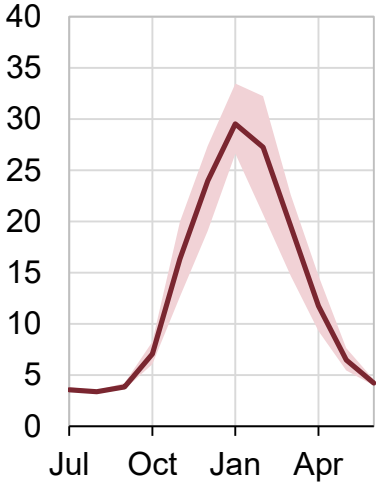
Primary home heating fuel by state (2021)



Data source: U.S. Census Bureau, American Community Survey (ACS) 2021

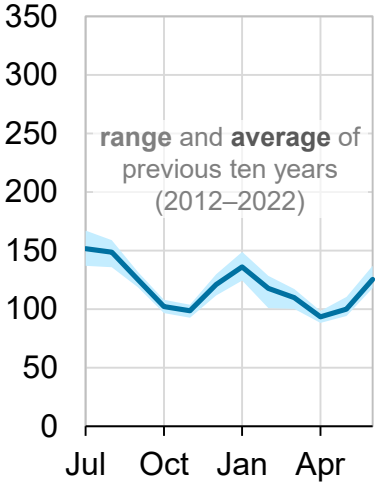
For most fuels, residential consumption is concentrated in winter

Natural gas
billion cubic feet per day



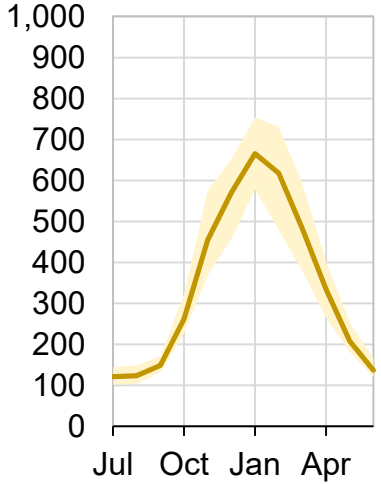
The winter months of October through March account for **79%** of annual residential **natural gas** consumption…

Electricity
billion kilowatthours



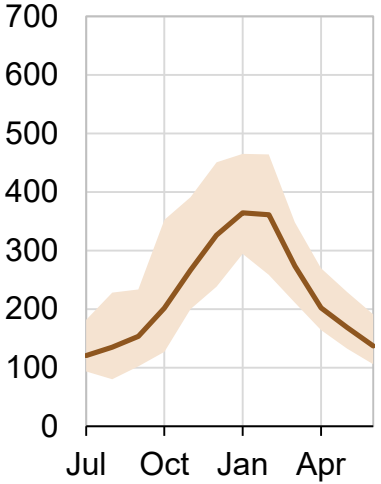
…**48%** of annual residential **electricity** consumption…

Propane
thousand barrels per day



…**74%** of annual residential **propane** consumption…

Distillate fuel oil
thousand barrels per day



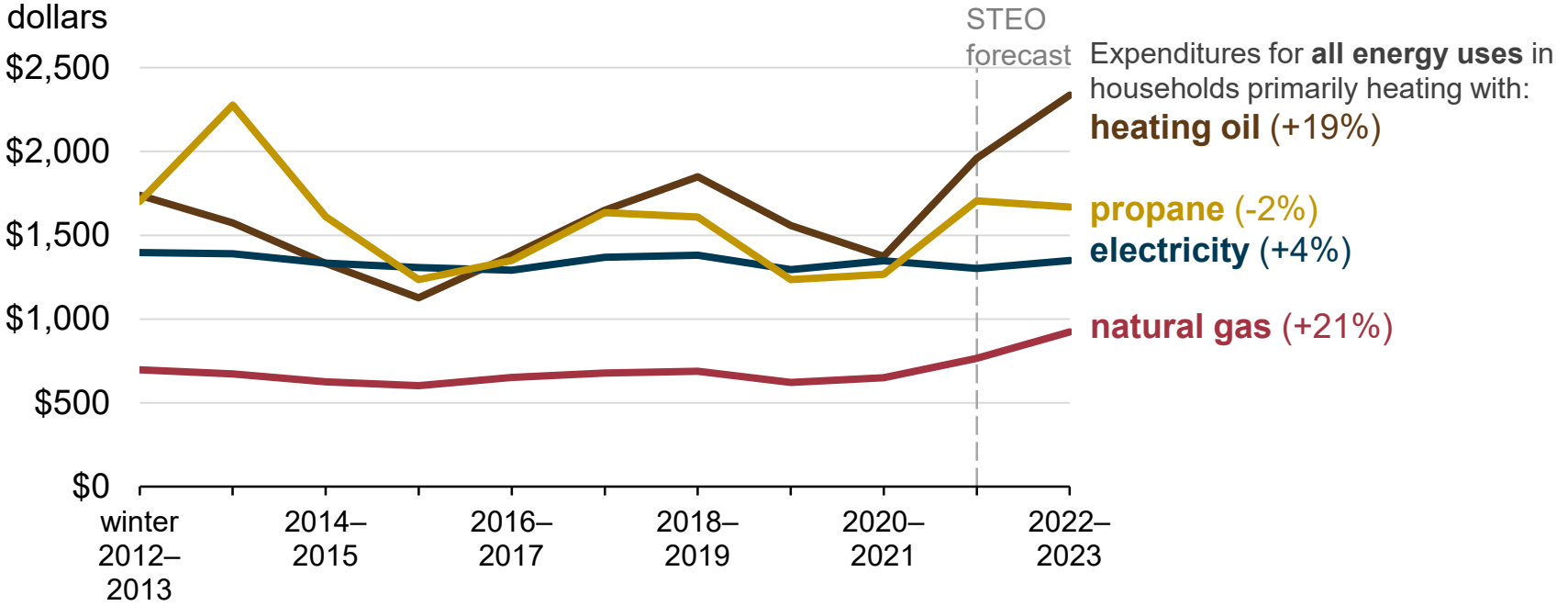
…and **66%** of annual residential **distillate fuel oil** consumption.

Note: Reflects consumption in all households for all uses, not just those using the fuel for primary space heating.

Data source: U.S. Energy Information Administration, Monthly Energy Review

We expect real energy expenditures to increase for heating fuels, excluding propane, primarily driven by higher prices

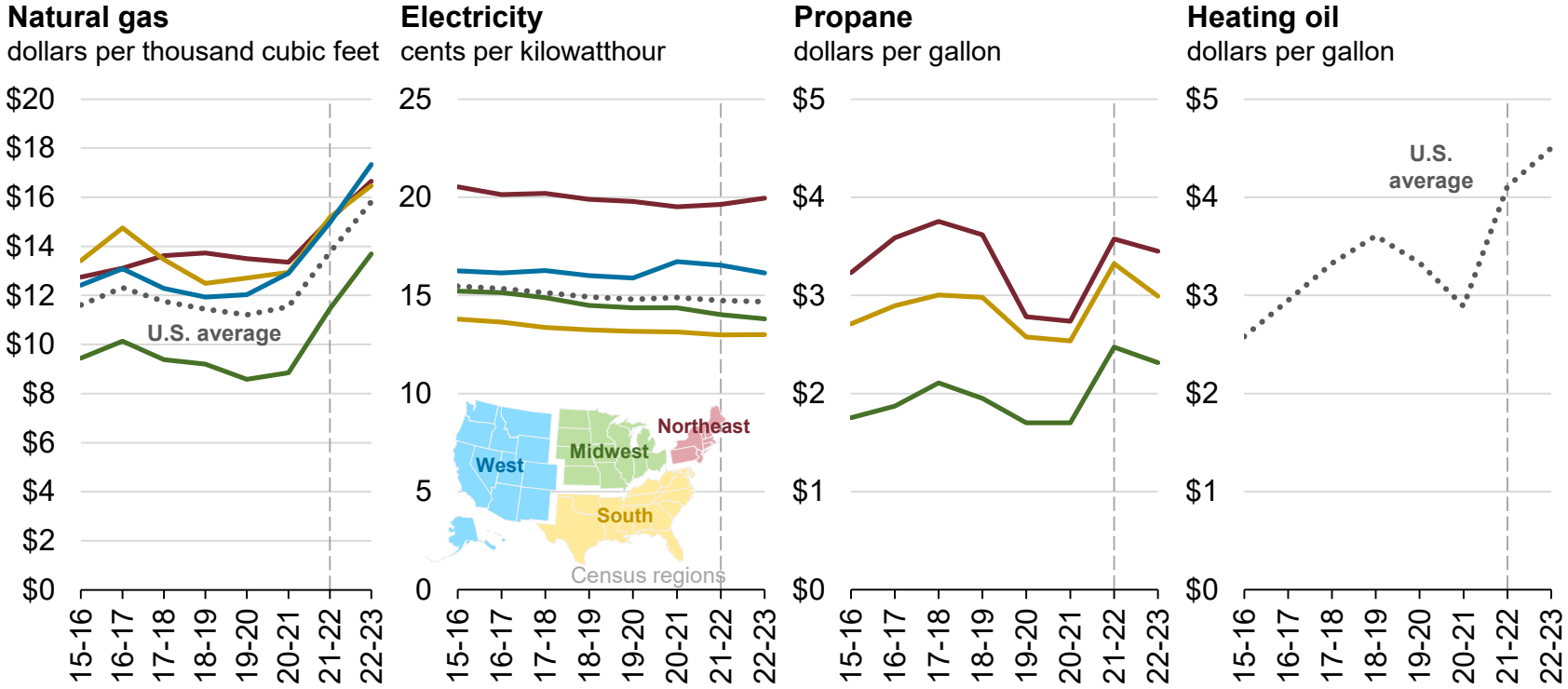
Average real winter household energy expenditures (winter = Oct–Mar, 2012–2023)



Note: Propane price reflects the average of Northeast and Midwest regions through winter 2013–14 and average of Northeast, Midwest, and South regions after winter 2013–14. Expenditures are adjusted for inflation based on the Consumer Price Index history and forecasts from the S&P Global macroeconomic model.

Data source: U.S. Energy Information Administration, Short-Term Energy Outlook, October 2022 and S&P Global

Real prices for natural gas are up the most compared with last winter; we expect propane prices will be lower than last year

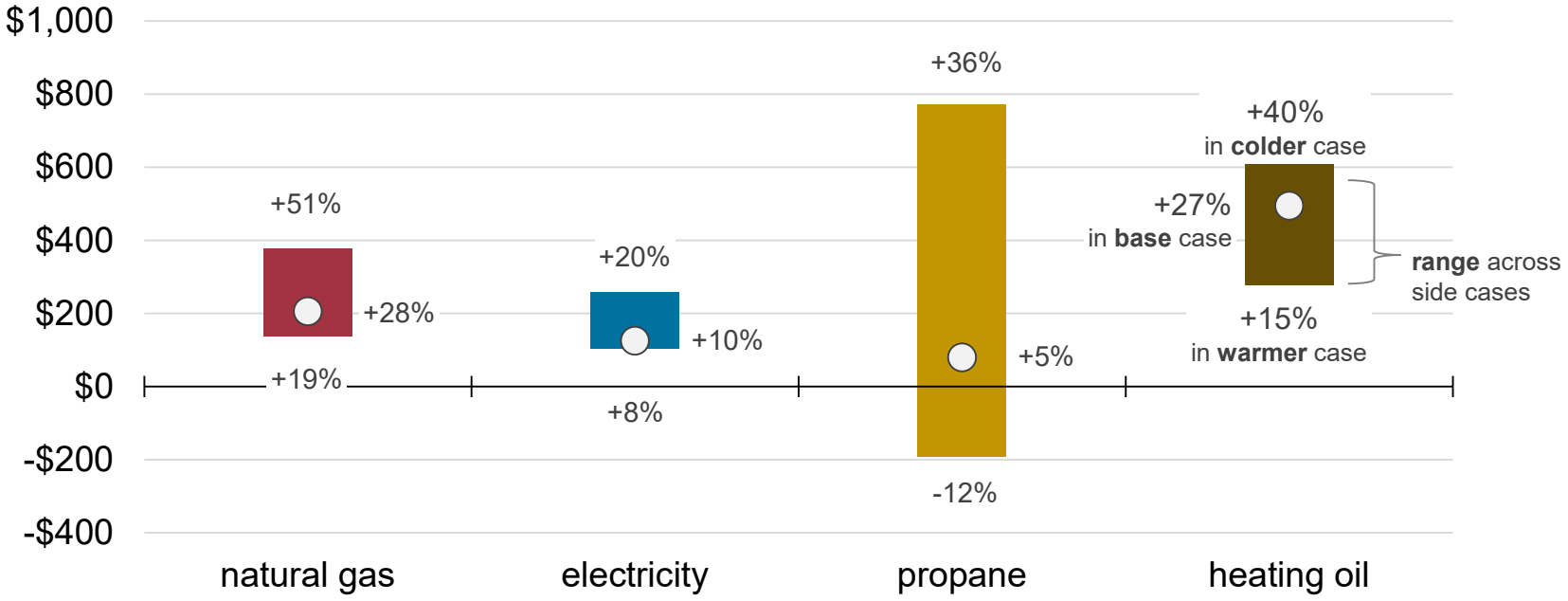


Data source: U.S. Energy Information Administration, Short-Term Energy Outlook, October 2022 and S&P Global

Propane and heating oil expenditures have the widest range of expenditures across weather cases

Average nominal winter household energy expenditures (winter = Oct–Mar)

change from previous winter, dollars



Data source: U.S. Energy Information Administration, Short-Term Energy Outlook, October 2022

Natural Gas

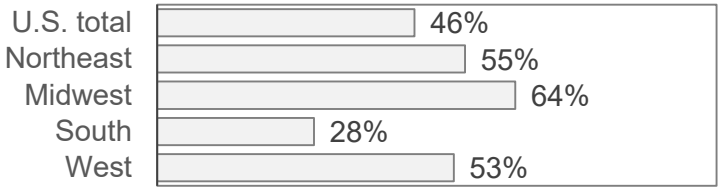
Nominal natural gas prices and expenditures are higher than last winter

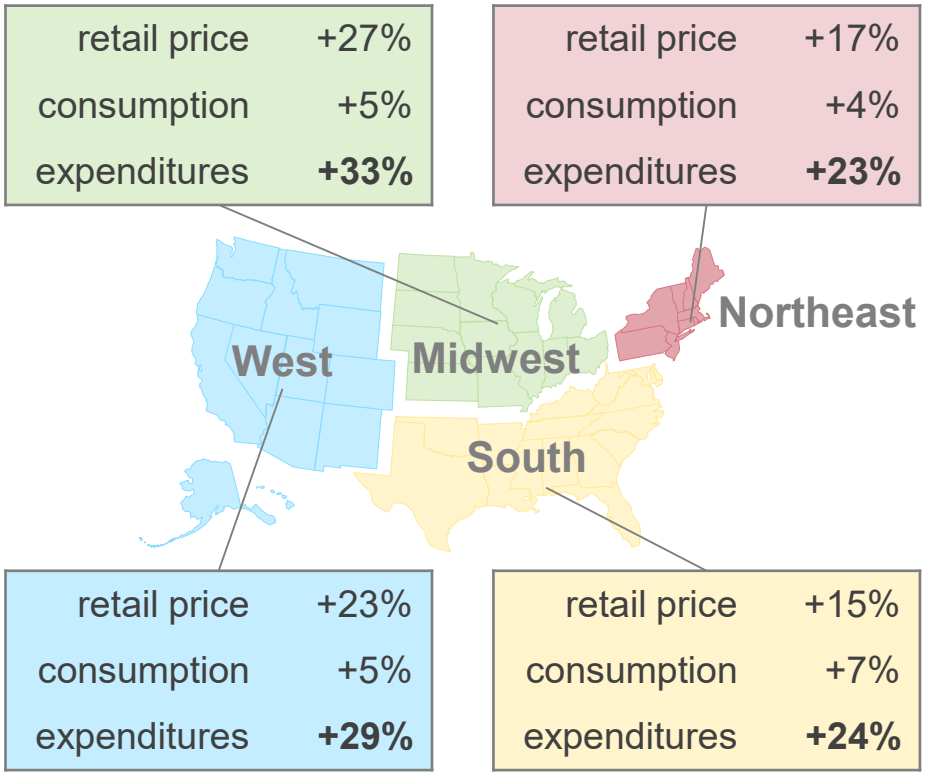
U.S. average

change from previous winter

nominal retail price	+22%
consumption	+5%
expenditures	**+28%**

heating fuel share within region

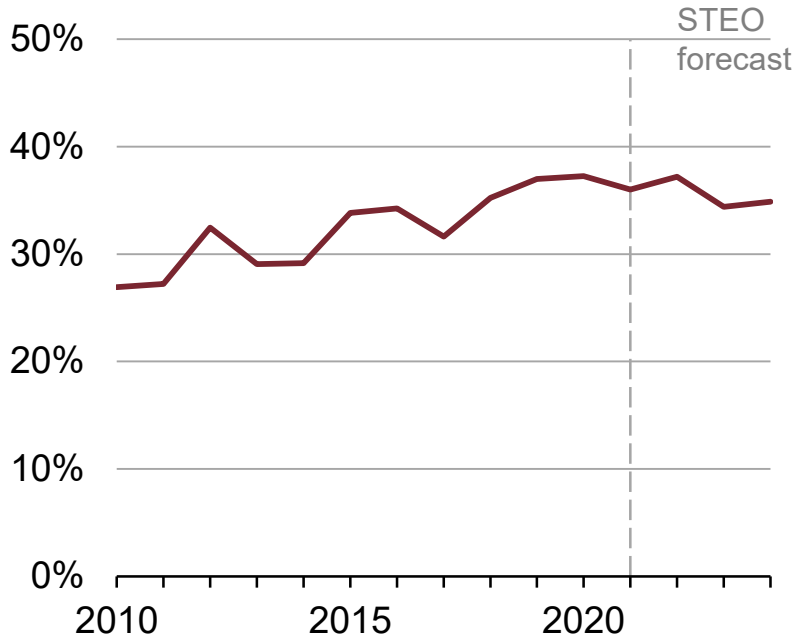




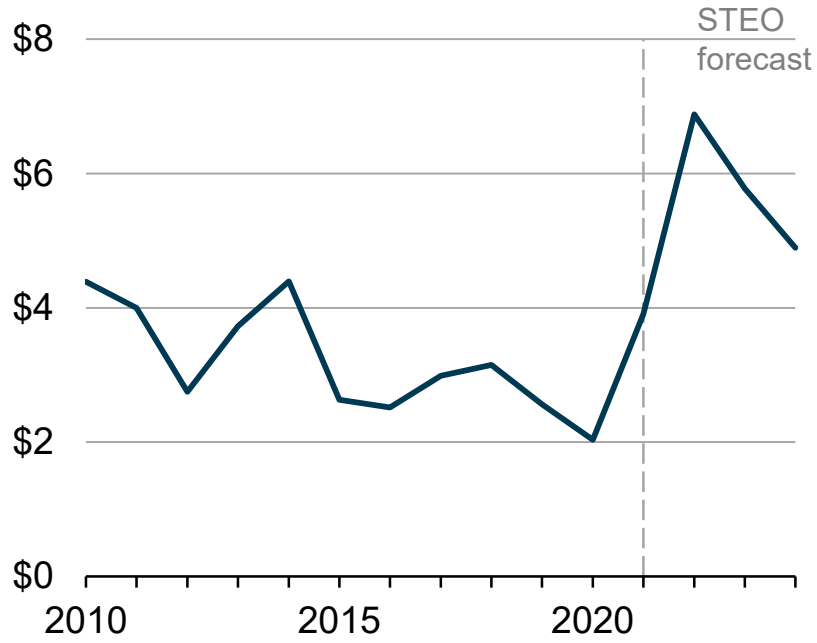
Data source: U.S. Energy Information Administration, Short-Term Energy Outlook, October 2022

Natural gas use for power generation remains elevated because of limited natural gas-to-coal switching

Natural gas use in the electric power sector
capacity factor (utilization percentage)



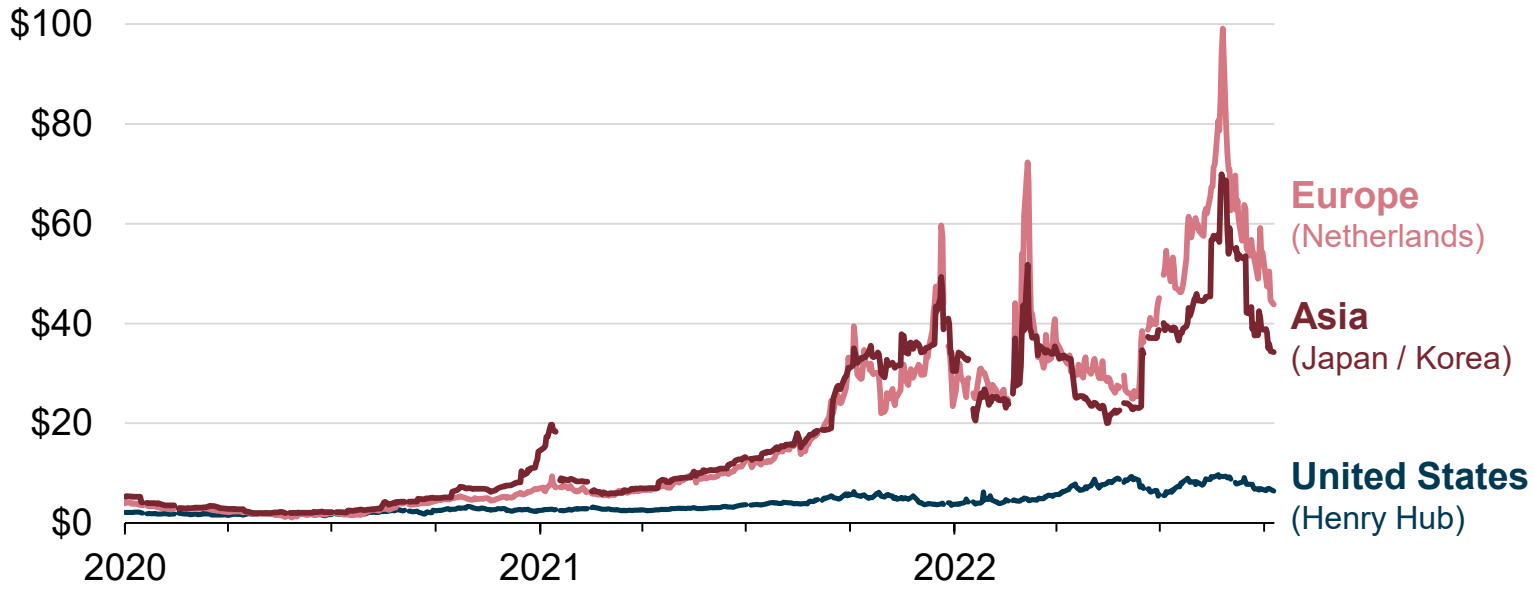
Henry Hub natural gas price (nominal)
dollars per million British thermal units



Data source: U.S. Energy Information Administration, Short-Term Energy Outlook, October 2022 and Refinitiv, an LSEG Business

High natural gas prices in Europe and Asia continue to support U.S. liquefied natural gas exports

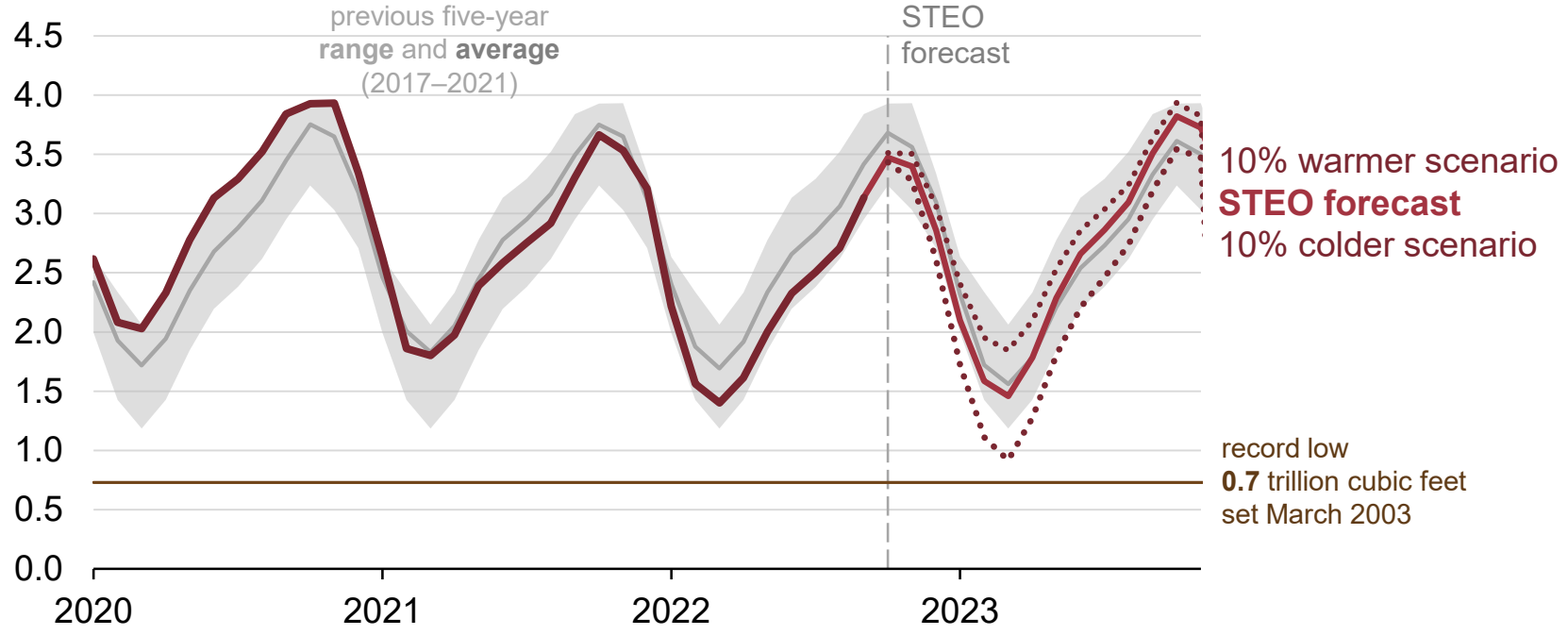
International natural gas futures prices
dollars per million British thermal units



Data source: CME Group and Bloomberg L.P.

Natural gas inventories are likely to be lower than the five-year average in the base case and cold scenarios

End-of-month U.S. working natural gas in storage (2020–2023)
trillion cubic feet

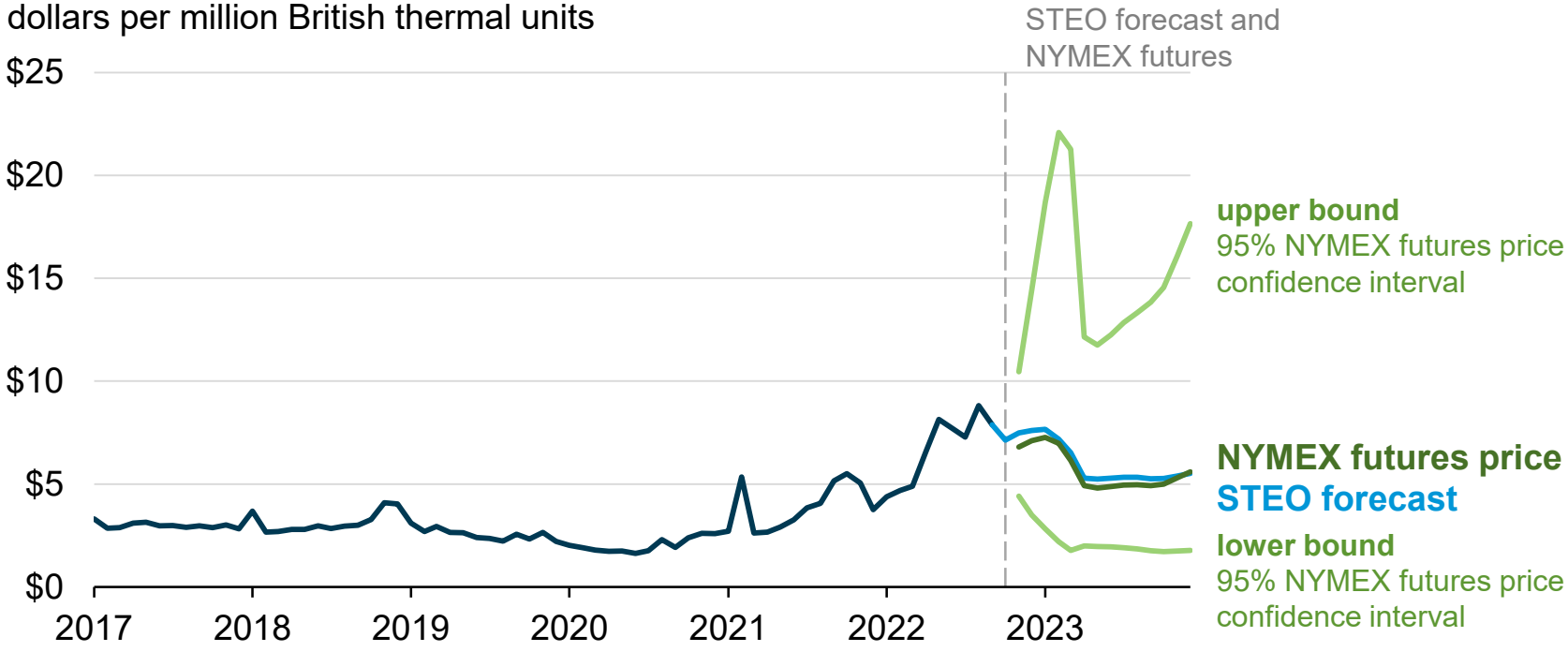


Data source: U.S. Energy Information Administration, Short-Term Energy Outlook, October 2022

Futures and options markets data implies the 95% confidence interval for Henry Hub prices in early 2023 ranges from $2 to $22

Henry Hub natural gas price and NYMEX confidence intervals

dollars per million British thermal units



Data sources: CME Group and Refinitiv, an LSEG Business

Electricity

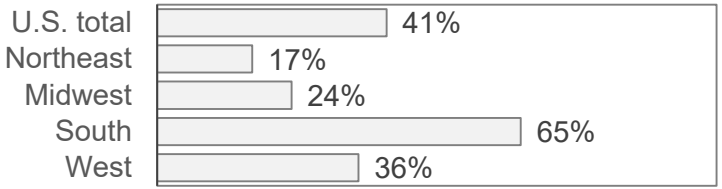
With relatively flat retail electricity prices, expenditures rise with consumption

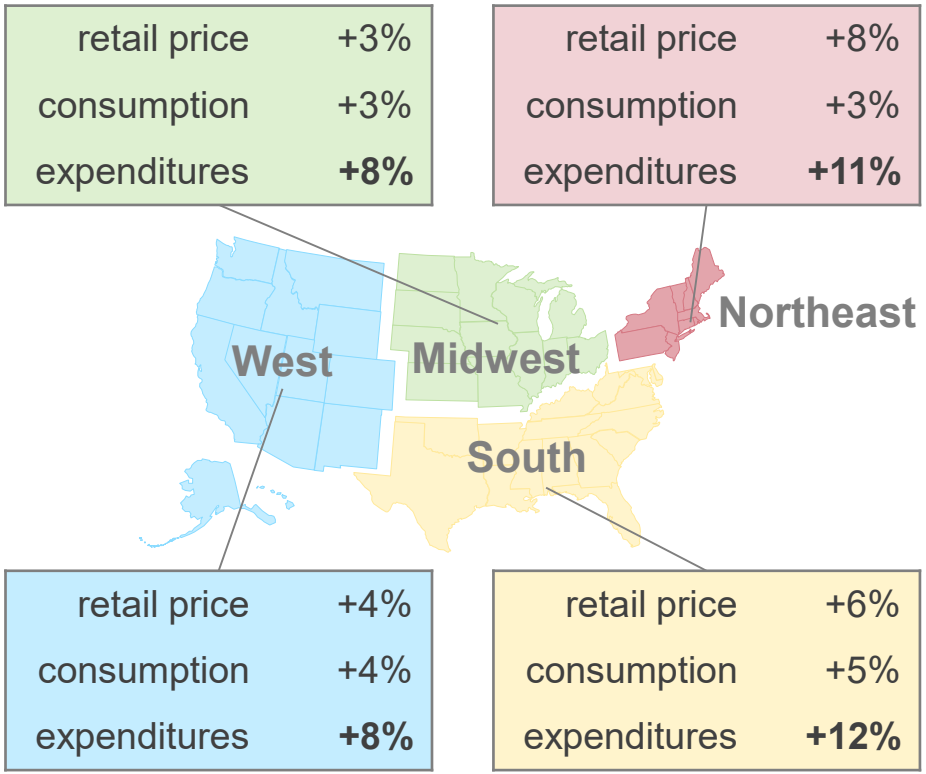
U.S. average

change from previous winter

nominal retail price	+6%
consumption	+4%
expenditures	**+10%**

heating fuel share within region





Data source: U.S. Energy Information Administration, Short-Term Energy Outlook, October 2022

Propane

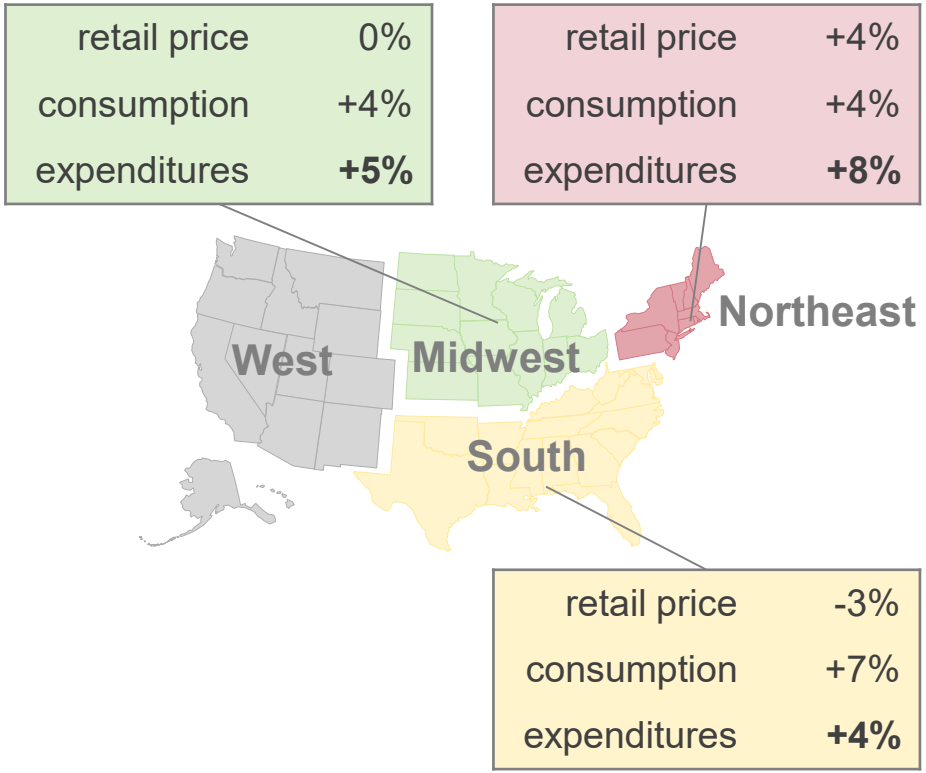
Propane retail prices are similar to last winter in our forecast

U.S. average

change from previous winter

Nominal retail price	0%
consumption	+5%
expenditures	**+5%**

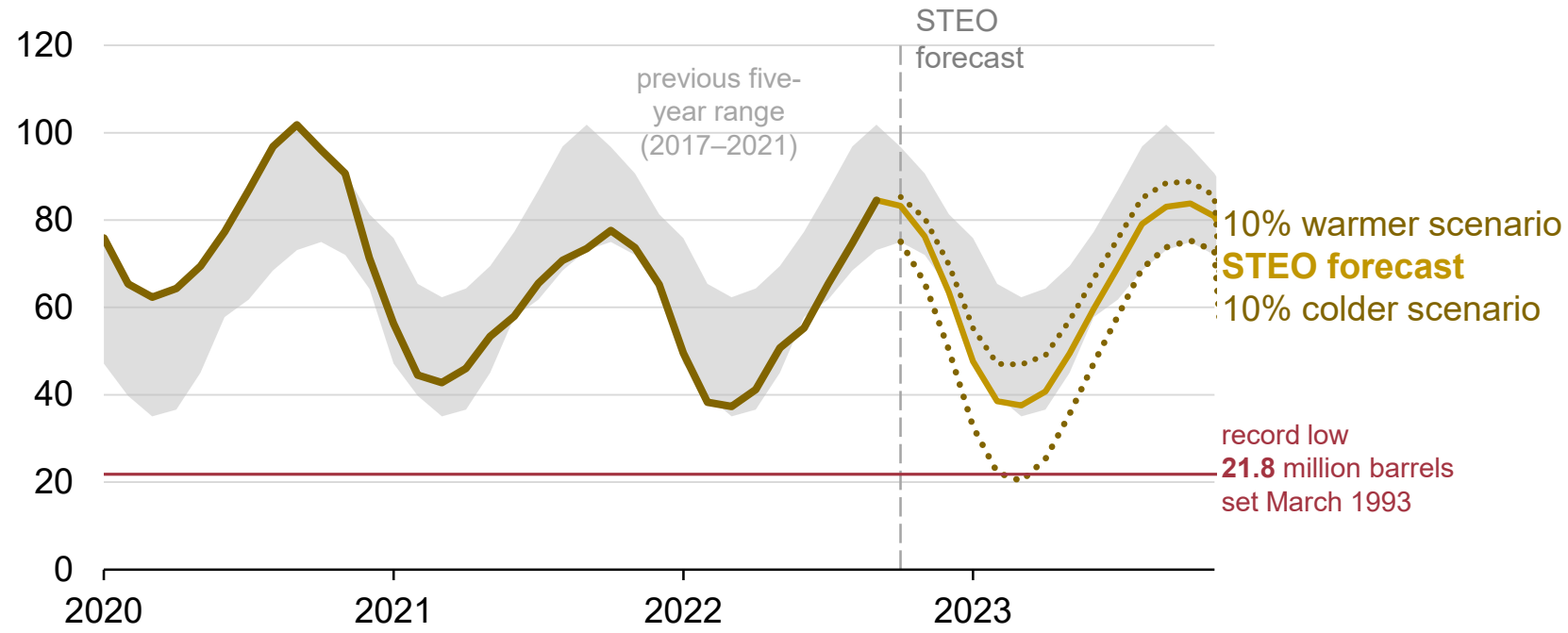
heating fuel share within region



Data source: U.S. Energy Information Administration, Short-Term Energy Outlook, October 2022

Propane inventories, already low, could fall to record lows if weather is colder-than-forecast

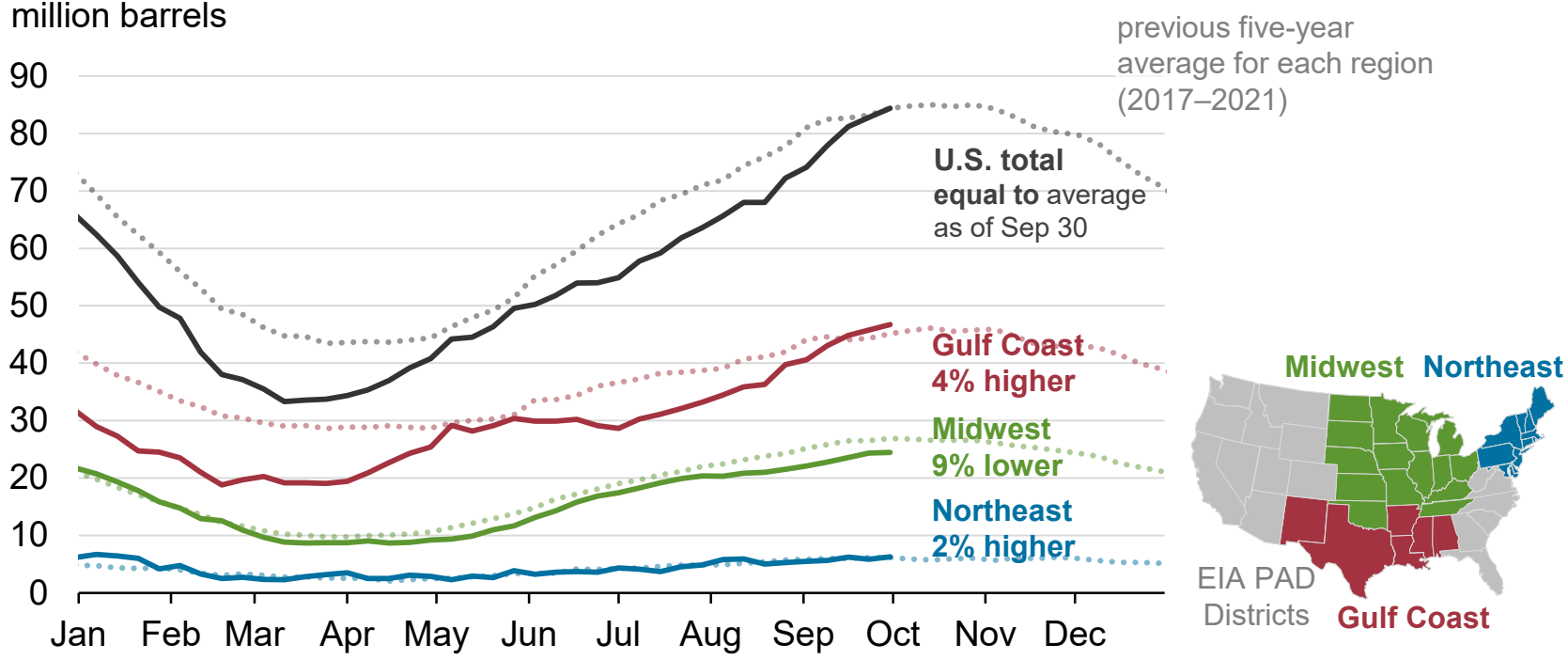
End-of-month U.S. propane and propylene inventories (2020–2023)
million barrels



Data source: U.S. Energy Information Administration, Short-Term Energy Outlook, October 2022

Propane inventories are particularly low in the Midwest, but average at the U.S. level

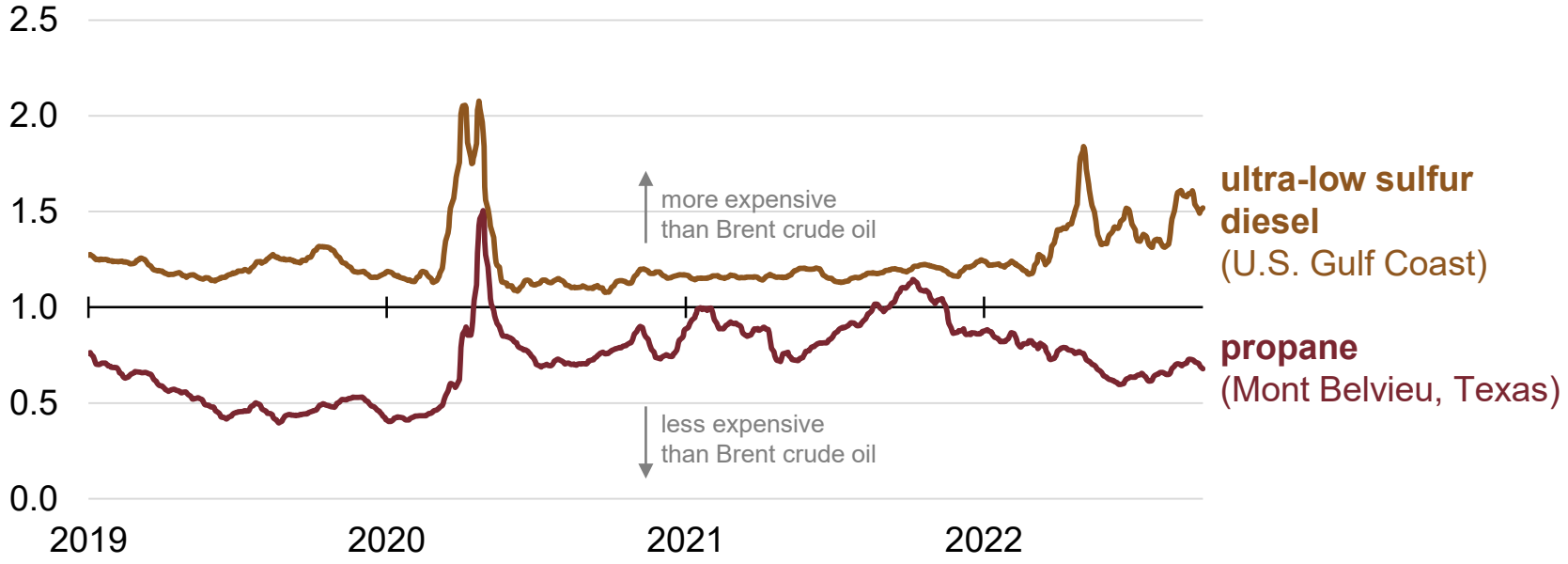
Weekly propane inventories by region (through Sep 30, 2022)
million barrels



Data source: U.S. Energy Information Administration, Short-Term Energy Outlook, October 2022

Propane spot prices have fallen relative to Brent crude oil but distillate spot prices have increased relative to Brent

Spot prices of selected petroleum fuels (Jan 2019–Sep 2022)
price ratio to Brent crude oil, adjusted for relative energy content
seven-day moving average



Data source: Refinitv, an LSEG business

Heating oil

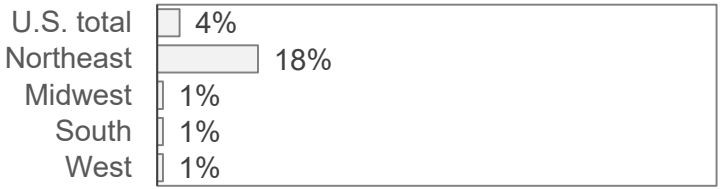
Heating oil prices are up this winter as a result of tight distillate fuel market conditions globally

U.S. average

change from previous winter

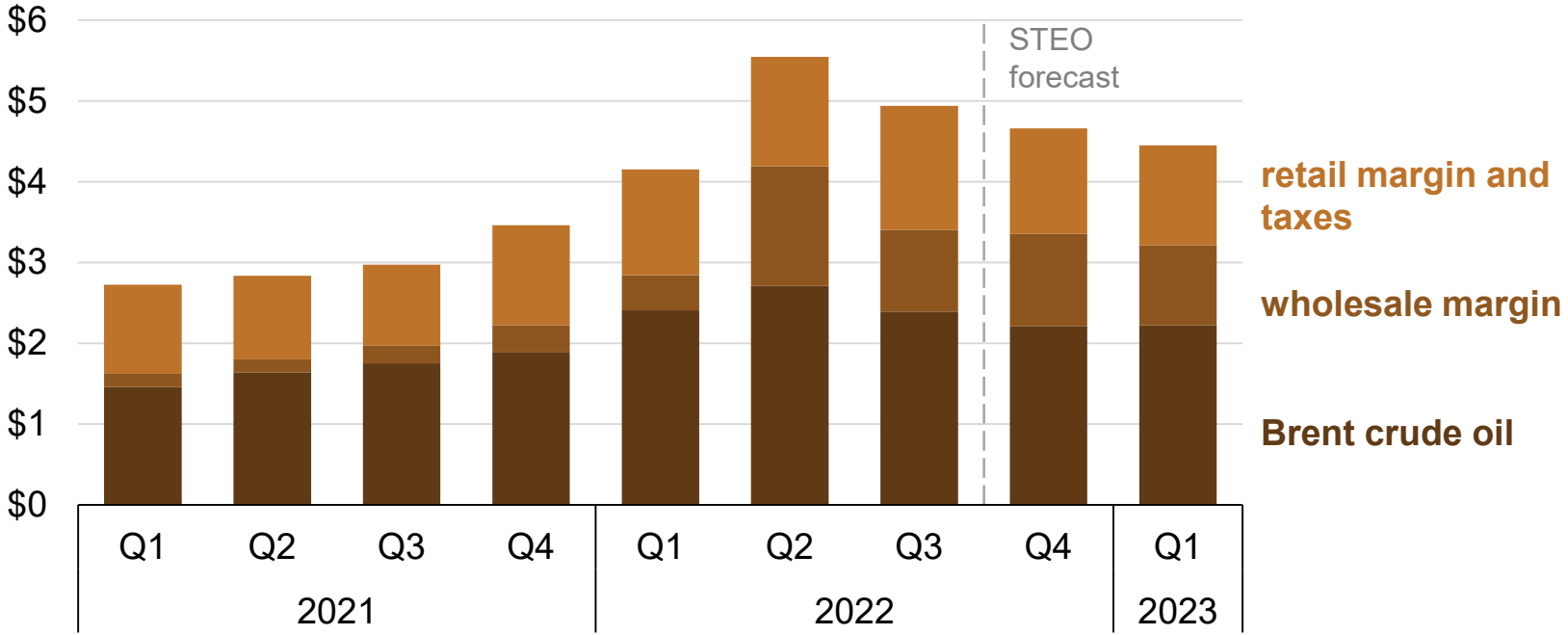
nominal retail price	+16%
consumption	+9%
expenditures	**+27%**

heating fuel share within region



Forecast nominal heating oil prices are higher than last winter because of higher wholesale margins

Estimated components of U.S. heating oil retail price (1Q21–1Q23)
dollars per gallon (nominal)

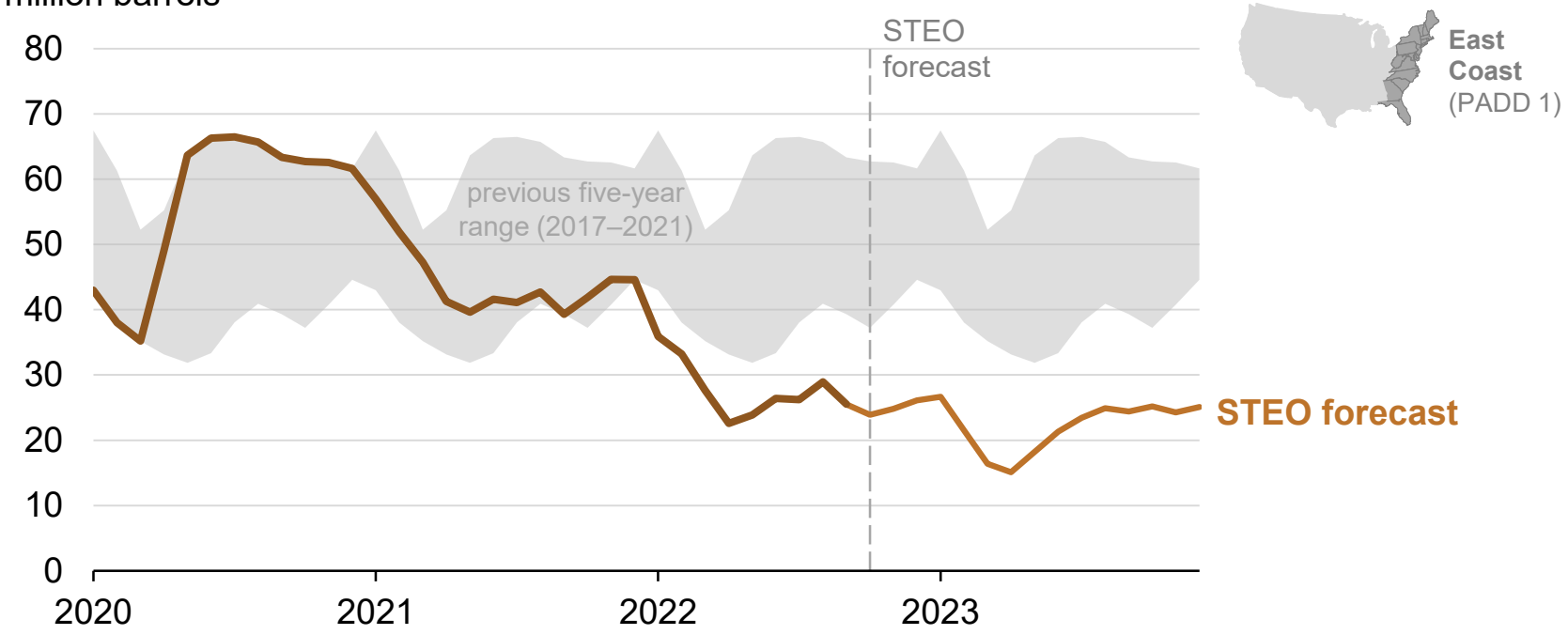


Data source: U.S. Energy Information Administration, Short-Term Energy Outlook, October 2022 and Refinitiv, an LSEG Business

Distillate inventories in the East Coast region are relatively low because of recent geopolitical events and reductions in refining capacity

End-of-month East Coast distillate fuel inventories (2020–2023)

million barrels

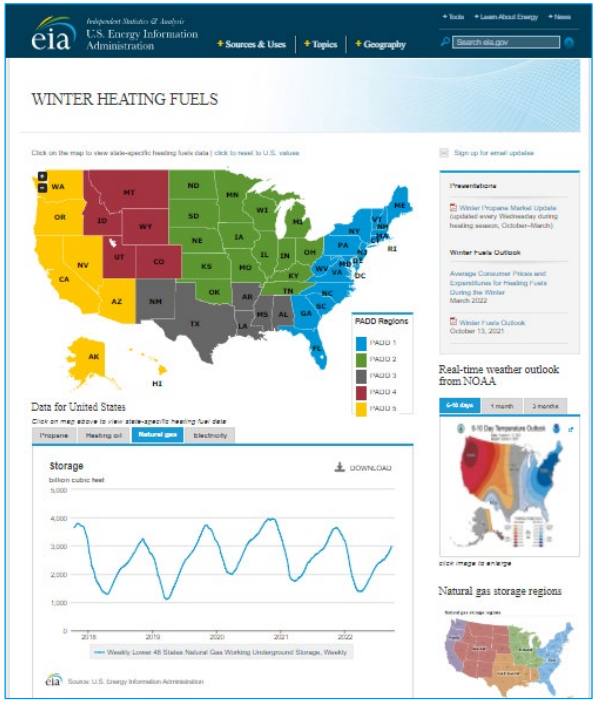


Data source: U.S. Energy Information Administration, Short-Term Energy Outlook, October 2022

Other winter heating fuels resources at EIA

- Availability and pricing for the four principal 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 the National Oceanic and Atmospheric Administration (NOAA)
- Downloadable graphs as an image or as a spreadsheet
- New England Dashboard
- Natural Gas Storage Dashboard



For more information on EIA products go to:

U.S. Energy Information Administration home page | www.eia.gov

Annual Energy Outlook | www.eia.gov/forecasts/aeo

Short-Term Energy Outlook | www.eia.gov/forecasts/steo

Consumption and Efficiency Data | www.eia.gov/consumption

Today in Energy | www.eia.gov/todayinenergy

Monthly Energy Review | www.eia.gov/totalenergy/data/monthly

State Energy Portal | www.eia.gov/state