



2025 White Paper



The Energy Wallet

U.S. and State-Level Household Energy Expenditures,
Past, Present, and Future



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Please visit energywallet.epri.com to view the web-based version of this report, including an interactive state level map.

EXECUTIVE SUMMARY

Direct household expenditures on energy—including electricity, gas and other heating fuels, amortized residential solar systems, and retail purchases of gasoline and public EV charging—are a key measure of energy affordability. To distinguish total expenditures across fuels from electricity bills and account for fuel-switching opportunities, we refer to this metric as a household’s **Energy Wallet**.

In 2024, the U.S. average energy wallet spending was \$5,530 per household, of which \$1,850 was for utility electric bills. The largest component of the energy wallet was gasoline, which accounted for \$2,930 per household. Energy expenditures vary significantly across households and regions, due to factors such as fuel prices, climate, household characteristics, and consumption patterns (Figure ES-1). In all states, average electricity bills represent less than half of the total energy wallet. See Appendix for data sources.

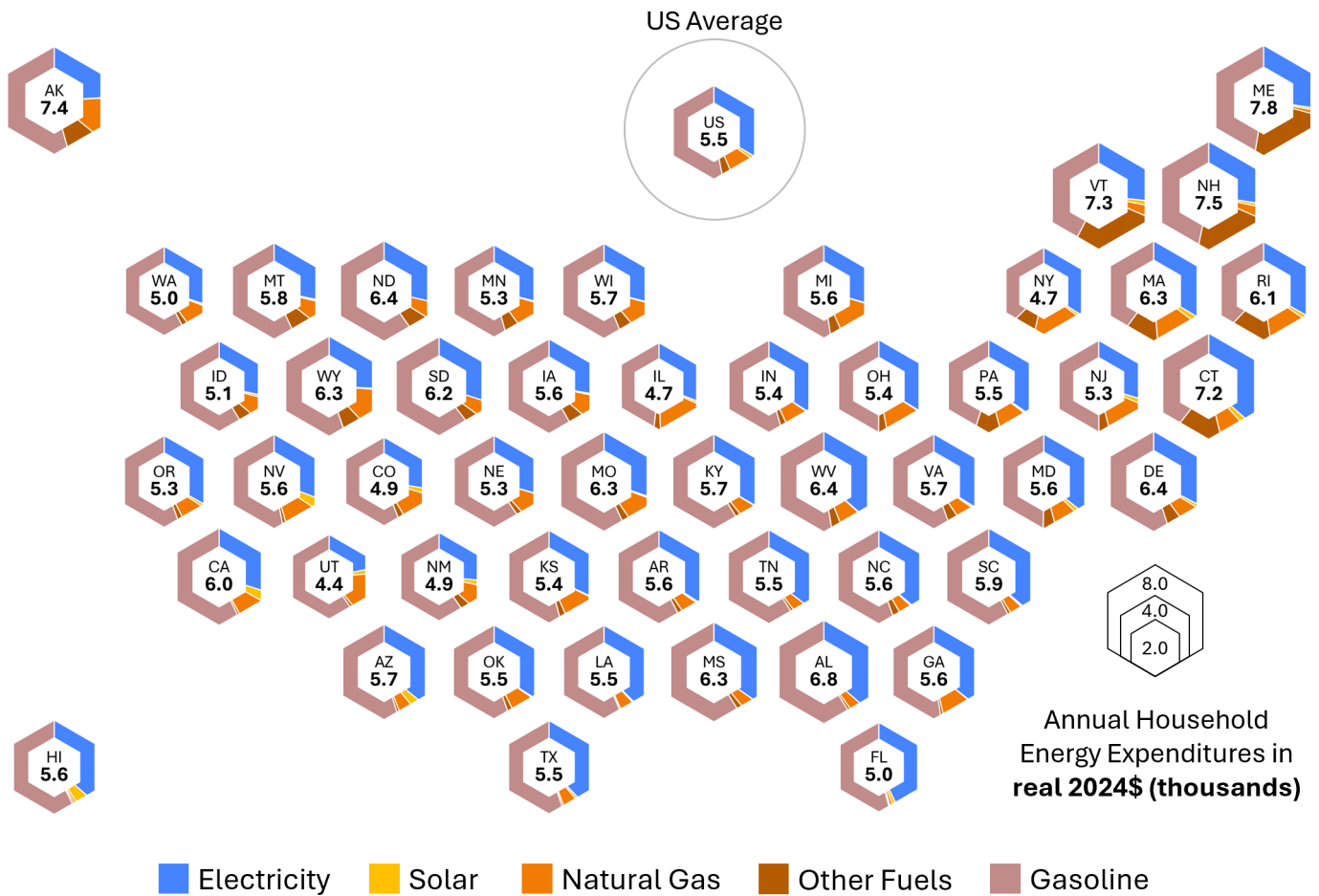


Figure ES-1. U.S. Energy Wallet: Break-out by State and Fuel in 2024

Adjusting for economy-wide inflation, the U.S. average energy wallet in 2024 was at a similar level per household as in 2000, around \$5,350 (in 2024\$). However, over that period it fluctuated between \$4,590 (the 2020 pandemic) and \$7,860 (a high point for fossil fuel prices in 2008). The electric bill component was steadier, ranging from roughly \$1,600 to \$2,000 (Figure ES-2).

Looking forward, future technological and structural changes, particularly electrification of light-duty vehicles, have the potential to reduce average household energy expenditures significantly. In a scenario projection using [EPRI’s US-REGEN model](#), assuming recent energy policy changes and economic adoption of new technologies, the U.S. average household energy wallet declines by 36% (in real terms) by 2050 (Figure ES-2). State-level average declines range from 10%–50%. This trend is driven primarily by replacing gasoline expenditures with increased spending on electricity as personal vehicles are electrified, which results in substantial net savings due to the efficiency advantages of electric vehicles. Efficiency and electrification of building end-uses also contribute to reduced household energy costs even as service demands increase in the future. We also consider a scenario with lower fuel prices and no phase-out of the Inflation Reduction Act (IRA) clean energy subsidies, which further reduces direct household expenditures, leading to a 42% decline in U.S. average energy wallet (in real terms).

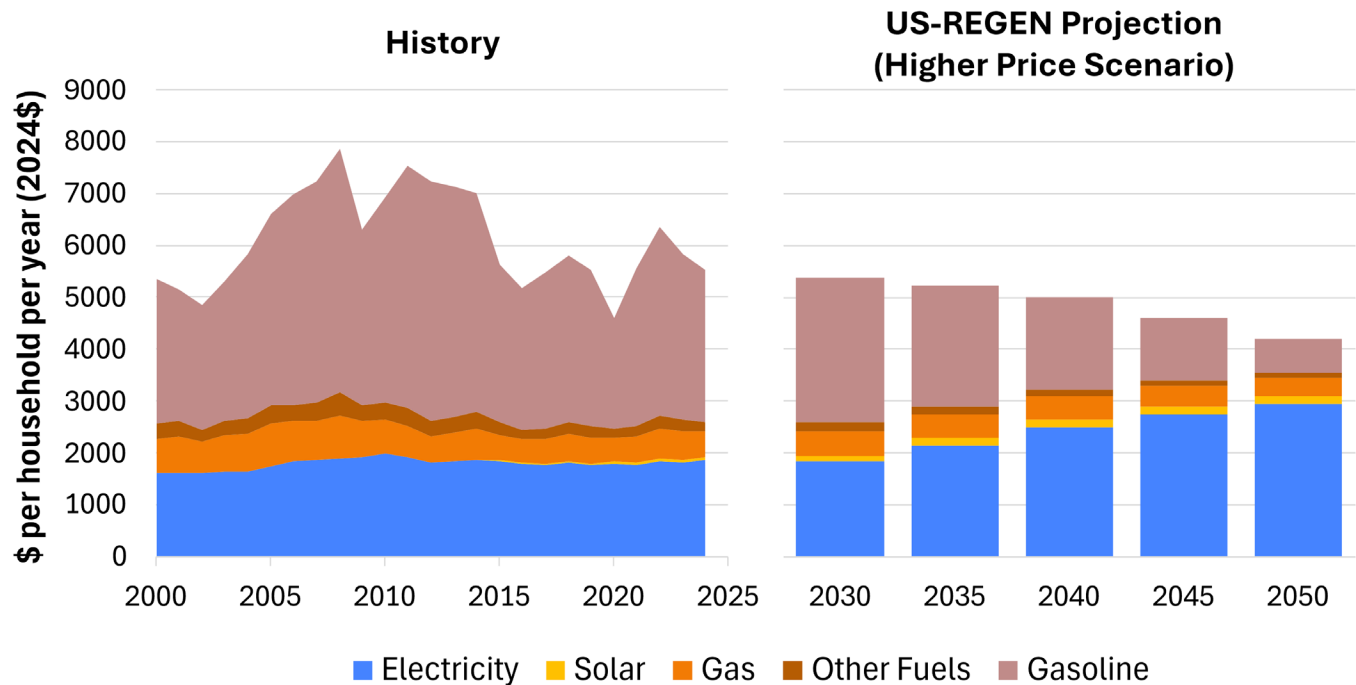


Figure ES-2. U.S. Energy Wallet: History and Projections in 2024\$

This report presents a straightforward calculation of the **Energy Wallet** metric describing total direct energy expenditures by households and how it evolves over time, in particular as a result of electrification trends. Additional follow-on analysis will leverage EPRI’s modeling tools to explore electrification trade-offs and provide a more detailed accounting of non-energy costs of end-use technologies, both in aggregate and at the level of individual representative households; economy-wide energy service costs including non-household energy purchases (which are embedded in household purchases of many goods and services, such as air travel); and distributional implications of household energy costs for affordability.

INTRODUCTION

Direct household expenditures on energy—including electricity, gas and other heating fuels, amortized residential solar systems, and retail purchases of gasoline and public EV charging—are a key measure of energy affordability. To distinguish total expenditures across fuels from electricity bills and account for fuel-switching opportunities, we refer to this metric as a household’s **Energy Wallet** (Figure 1). A broad perspective is needed to integrate expenditures on utility bills, distributed energy resources, and other fuel purchases into a comprehensive view of household energy costs. This perspective allows a more accurate assessment of current energy expenditures and how they may evolve over time with structural and technological change, especially electrification and efficiency improvements. This report provides a detailed, state-level break-out of historical and projected direct household energy costs and discusses key drivers for variation and potential future declines in households’ energy wallet. Even broader metrics are needed to assess trade-offs between fuels and technologies, including the non-energy capital and operating costs of end-use appliances and vehicles. These metrics and trade-offs will be the focus of future analyses.



Energy Wallet

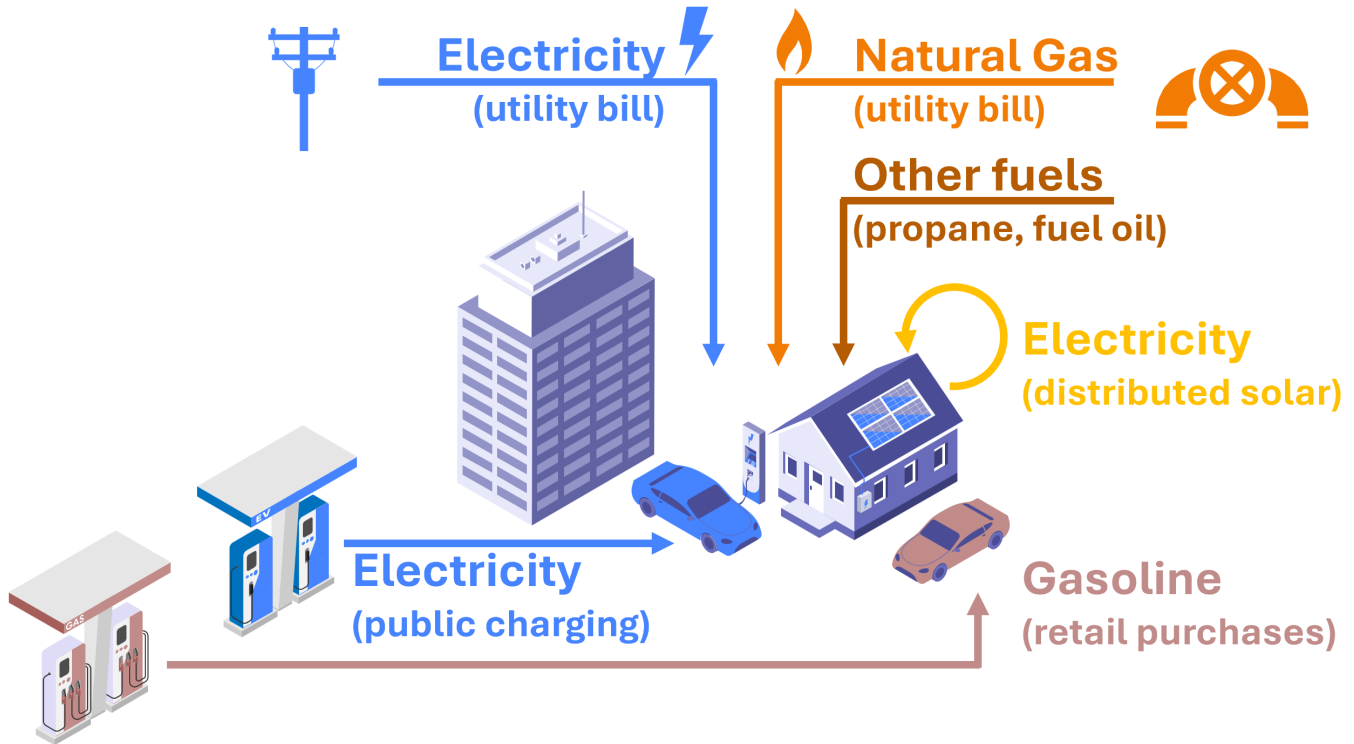


Figure 1. Illustration of Energy Wallet Metric

CURRENT ENERGY WALLET

Household energy expenditures consist of utility bills for electricity and gas, delivery of other heating fuels including propane and fuel oil, retail purchases of gasoline for personal vehicles, electricity purchases for public EV charging, and the amortized costs of distributed solar systems installed in the home or community. Based on publicly available data from the Energy Information Administration (EIA) and other sources (see Appendix), total household energy expenditures across the U.S. in 2024 amounted to \$731 billion, of which \$245 billion was residential retail sales of electricity. Normalizing these totals by the number of households (roughly 132 million in 2024, per the [U.S. census bureau](#)), U.S. average energy wallet spending was \$5,530 per household, of which \$1,850 was for utility electric bills. The largest component of the energy wallet was gasoline, which accounted for \$2,930 per household. Figure 2 shows total expenditures across all households in each category in 2024 and average per household costs calculated as total expenditures divided by the number of households.

Individual homes’ expenditure profiles vary significantly around the average depending on household characteristics, e.g. size and occupancy, construction materials and design, what fuels are used for heating and cooking, number and type of vehicles, whether they have distributed solar, and behavior and consumption patterns, in addition to regional variation in climate and fuel prices. The average expenditure metric represents total costs normalized to the scale of an individual household rather than an actual representative household.

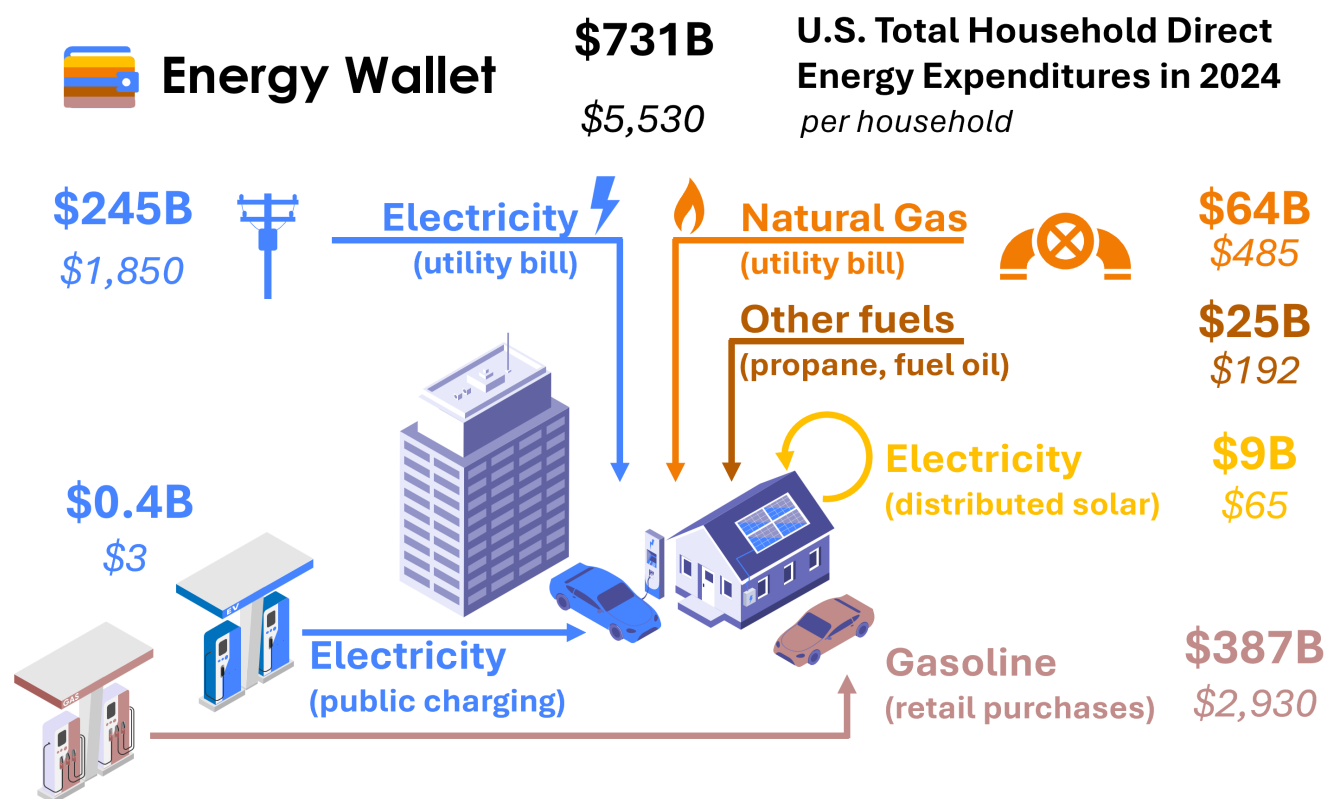


Figure 2. U.S. Direct Household Energy Expenditures and Average per Household in 2024

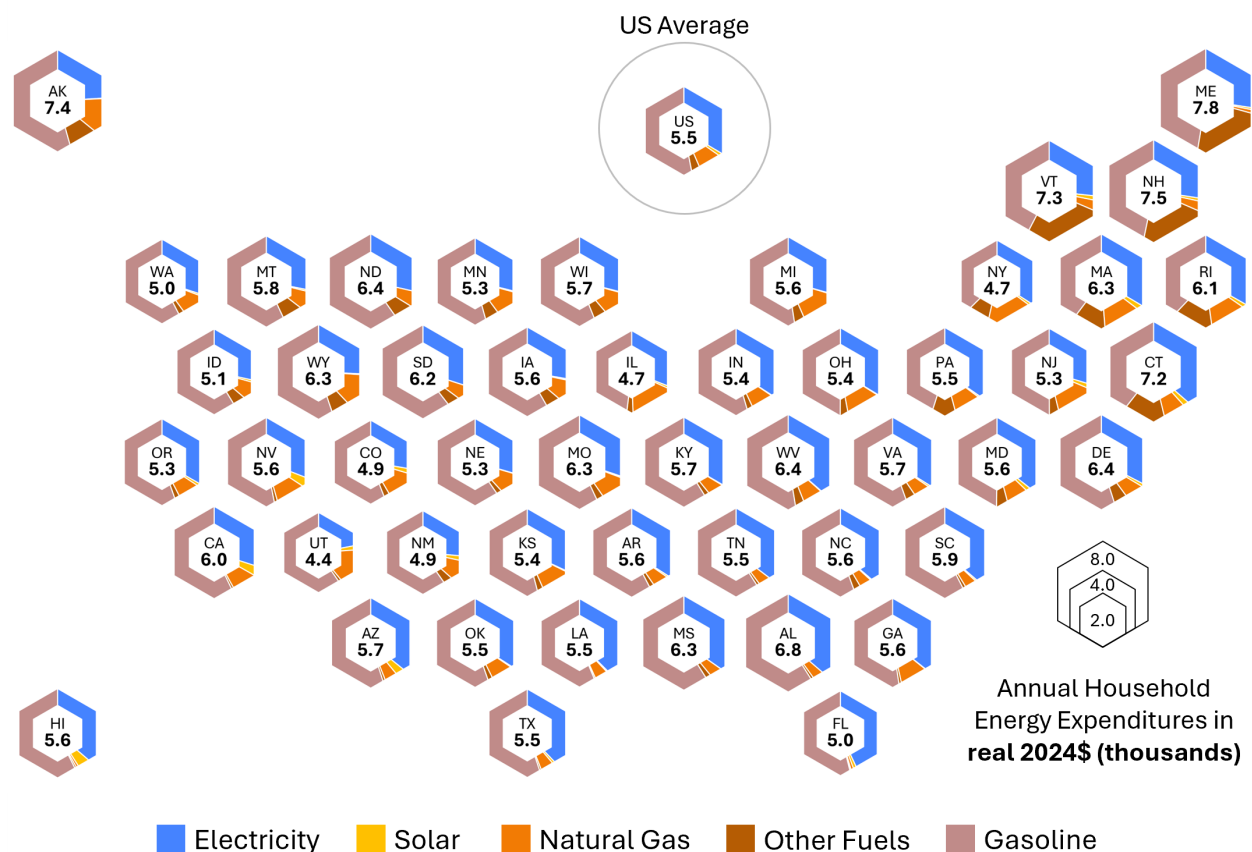


Figure 3. State-level direct energy expenditures per household in 2024

Average household expenditures vary by state due to regional variation in the factors noted above (Figure 3). The highest expenditures are in New England and Alaska, where cold climates drive high quantities of fuel use for space heating, combined with higher shares of heating with fuel oil and propane, which are more expensive per unit of energy than natural gas. States like New York and Illinois with large, dense cities and more public transportation use have lower per capita personal vehicle miles and gasoline consumption. California has mild climates and relatively aggressive energy efficiency standards, leading to lower energy consumption per household, but this is offset in expenditure terms by relatively higher fuel prices, especially for electricity. States with mild climates and relatively low fuel prices tend to have the lowest energy expenditures, with Utah falling at the low end of the range. In all states, electricity bills represent less than half of the total energy wallet.

“In all states, electricity bills represent less than half of the total energy wallet.”

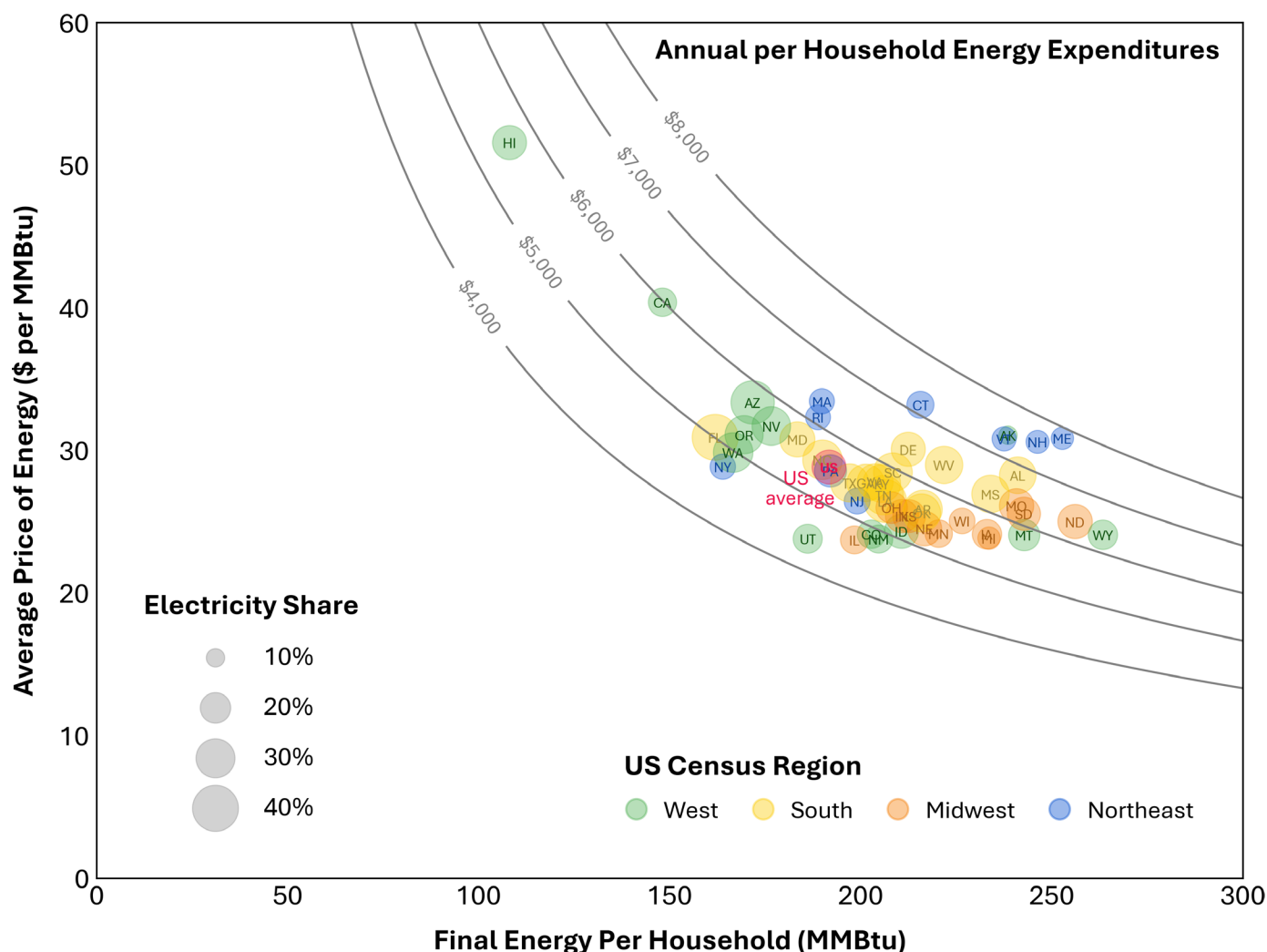


Figure 4. Total final energy vs. Average energy price in 2024. Contours show expenditures, equal to total energy multiplied by average price. Circle size indicates share of electricity in per household final energy.

Variation across states in total expenditures reflects differences in both energy demand and energy prices. Figure 4 plots each state’s average price of energy against total final energy demand per household across all fuels. In this view, states with higher dots have higher average energy prices, states further to the right have higher per household energy demand, and states further from the origin have higher per household energy expenditures (as indicated by the curved contour lines). Ha-waii has the highest energy prices but the lowest energy demand, resulting in roughly average energy expenditures. At the other end of the plot, Wyoming has the highest energy demand but among the lowest average energy prices, in contrast to Alaska and New England, which have both high prices and high demand and thus the highest expenditures. Utah falls at the low end of the expenditure range due to its combination of relatively low demand and near-lowest average energy price. The figure also shows the share of electricity in household final energy. Higher electricity shares are primarily associated with milder climates where electricity is more commonly used for space heating.

HISTORICAL TRENDS

Total household energy expenditures in the U.S. have more than doubled since 2000 in nominal terms (Figure 5). This trend over time in nominal dollars reflects population growth, inflation, and volatility in both fuel prices and demand (especially for gasoline).

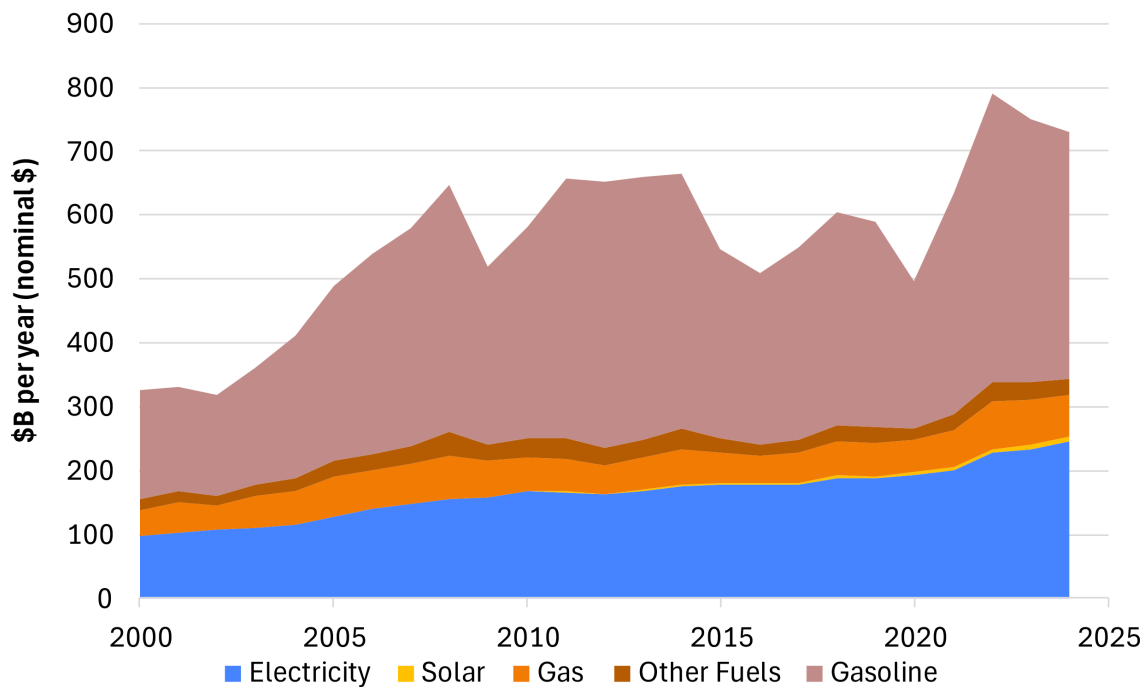


Figure 5. U.S. Total Direct Energy Expenditures by Households (in nominal \$)

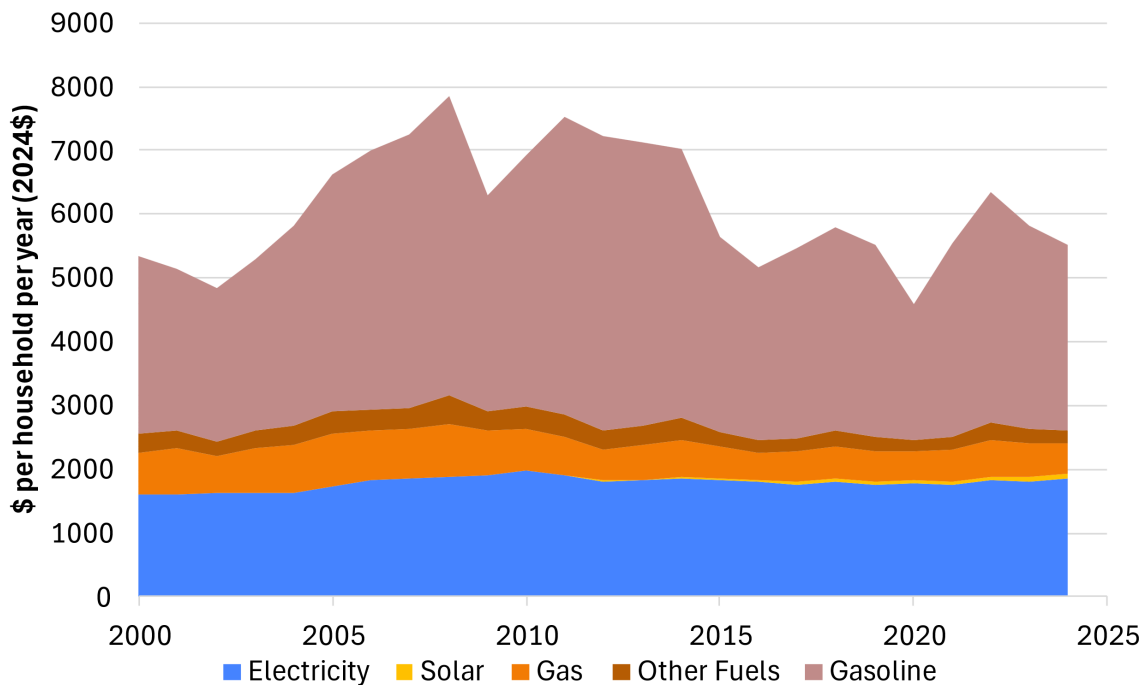


Figure 6. U.S. Direct household energy expenditures per household (in 2024\$)

Normalizing expenditure on a per household basis and adjusting for economy-wide inflation, real per household expenditures have been relatively stationary from 2000 to 2024 (i.e. the trend is neither increasing nor decreasing), notwithstanding significant volatility (Figure 6). The U.S. average energy wallet in 2024 was at a similar level per household as in 2000, around \$5,350 (in 2024\$). However, over that period it fluctuated between \$4,590 (the 2020 pandemic) and \$7,860 (a high point for fossil fuel prices in 2008). The U.S. average retail gasoline price was \$3.30/gallon in 2024, but since 2000 has varied from \$2.15 to \$4.75 (in 2024\$). The electric bill component was steadier, ranging from roughly \$1,600 to \$2,000.

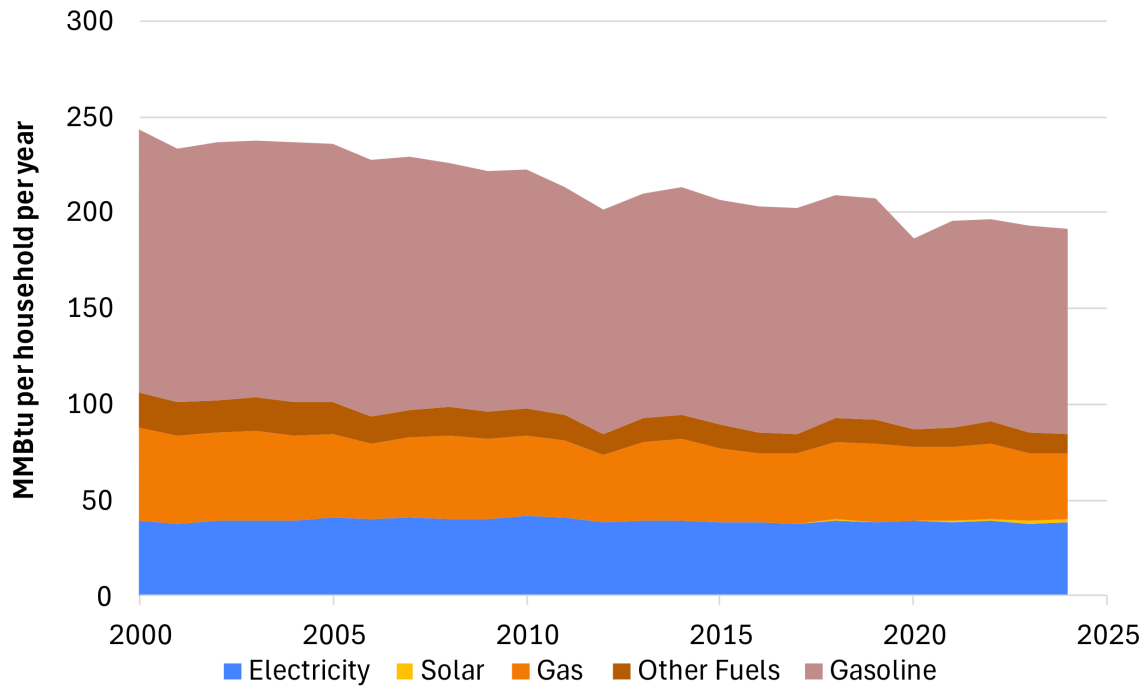


Figure 7. U.S. Household Final Energy Consumption per household

Over the same period, household energy consumption per household has decreased as a result of efficiency and electrification, with some volatility in demand based on weather fluctuations from year to year and disruptions such as the pandemic in 2020 (Figure 7).

The average U.S. residential electricity price has increased significantly in nominal terms, roughly doubling since 2000, including a sharp increase of 30% from 2020 to 2024 (Figure 8). At the same time, the real average electricity price, adjusted for economy-wide inflation, has increased by only about 15% since 2000, and by only 5% since 2020. Over the same period, total grid-supplied demand (i.e. retail sales) increased slightly, but more slowly than population growth, leading to a slight downward trend in per household electricity purchases. This is the result of both efficiency and increased deployment of behind-the-meter solar. These two offsetting trends, shown in Figure 8, explain the roughly constant per household electricity expenditure trend.

“The average U.S. residential electricity price has increased by 30% in nominal terms since 2020, while the real price, adjusted for economy-wide inflation, has increased by only 5%.”

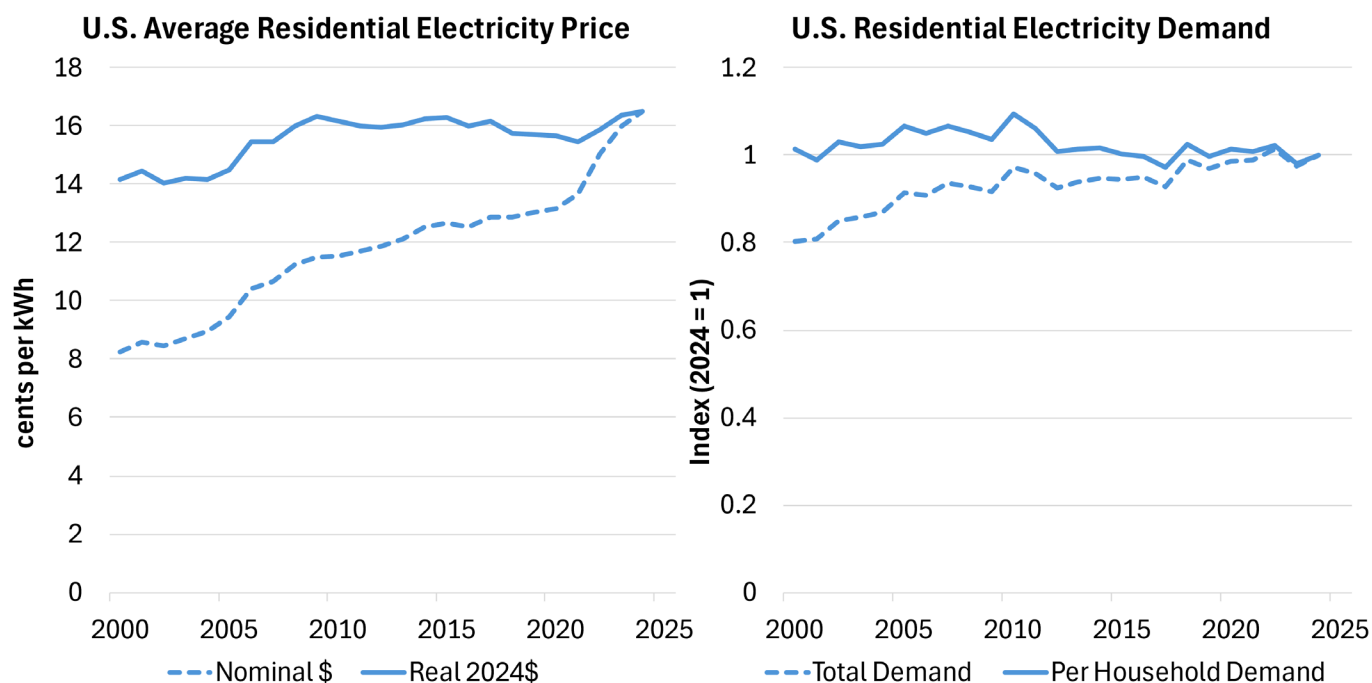


Figure 8. U.S. Residential Electricity Price and Demand over time, normalized for inflation and household growth

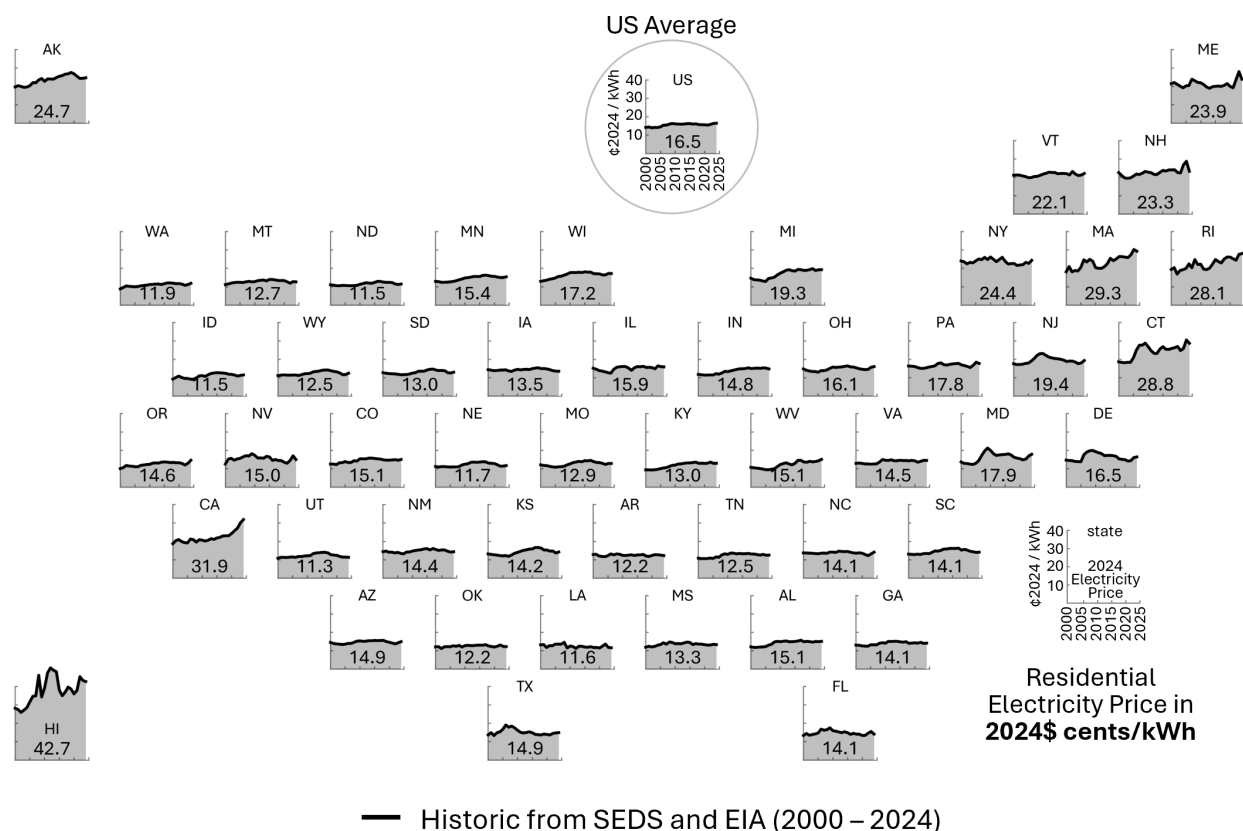


Figure 9. Residential electricity price by state, 2000–2024 (cents per kWh in 2024\$)

At the state level, real electricity price increases have been most prominent in a few states (Figure 9). The nearly 50% increase in residential prices in California since 2020 is primarily the result of [wildfire related costs and investments](#) allocated for recovery from the electricity rate base, among [other factors contributing to higher rates](#) in the state. New England has also experienced higher than average increases, likely due to [rising transmission and distribution costs](#).

Although the trend over time in electricity demand per household is similar across states, the level of demand varies by a factor of nearly three, ranging from 6.6 and 7.1 MWh/household in Hawaii and California, respectively, to 17.8 MWh/household in Louisiana (Figure 10). In Hawaii, a mild climate, high prices, and the country’s highest penetration of distributed residential solar explain its low level of grid-supplied demand (only 4.7 MWh/household, with 1.9 MWh average supply from rooftop solar). In California, low per household demand is the result of mild climate, demographic characteristics, and aggressive efficiency policies combined with high prices that discourage electrification of space and water heating (but encourage behind-the-meter solar, which supplies 1.4 MWh/household on average). Meanwhile, in Louisiana and other states in the South, high cooling loads and high penetration of electricity for space heating contribute to high levels of per household electricity use.

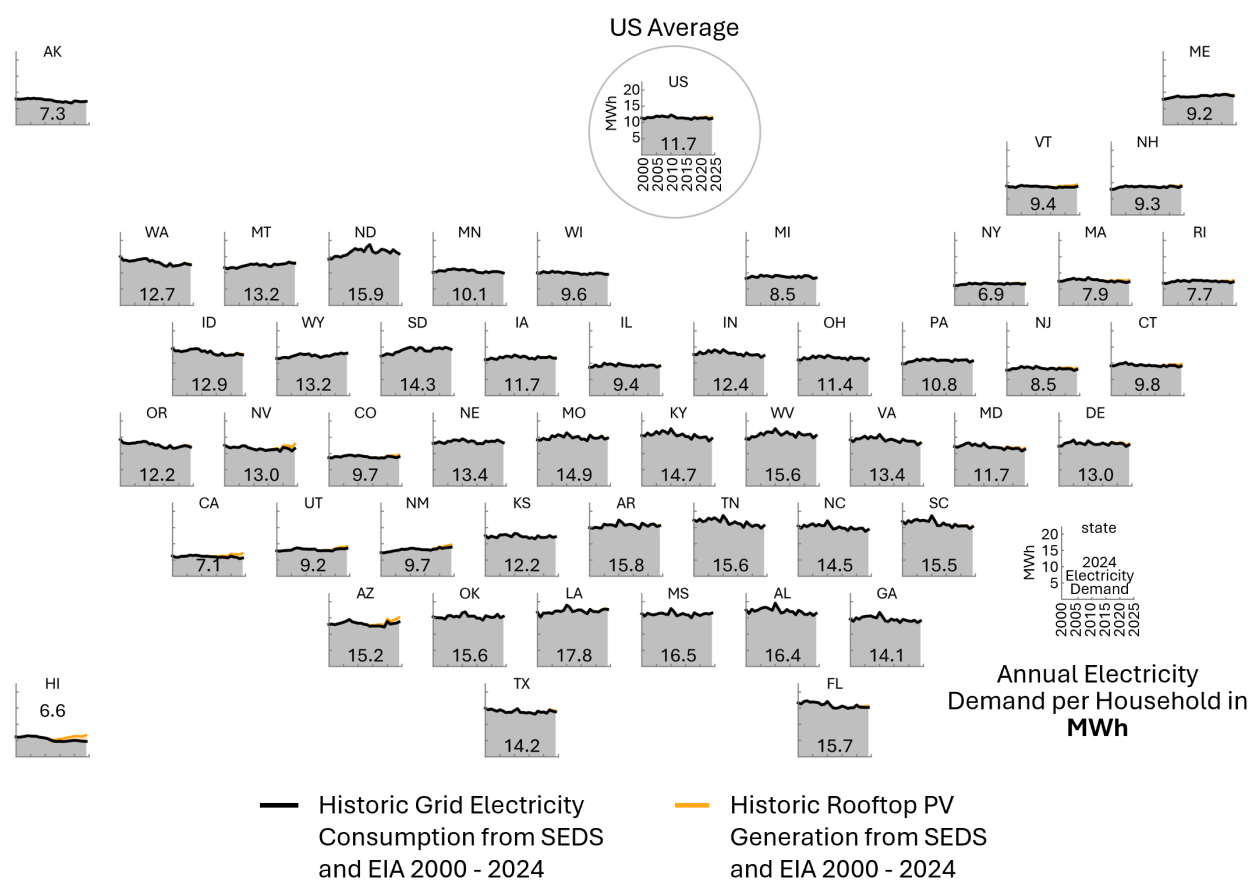


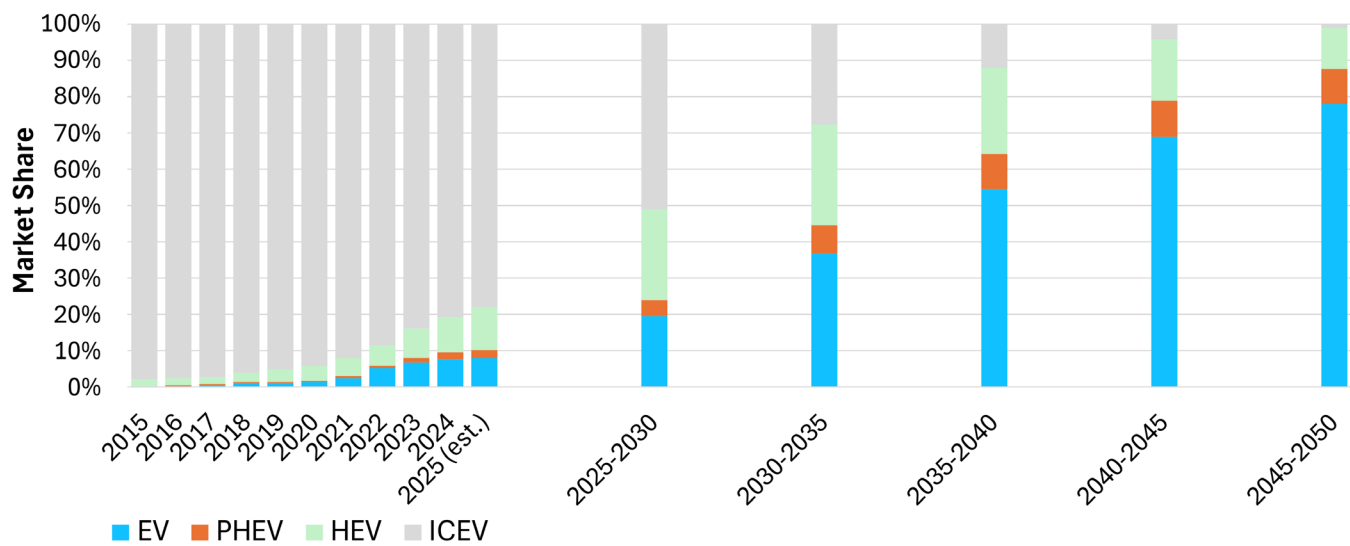
Figure 10. Electricity demand per household, 2000 to 2024 (MWh per year)

FUTURE PROJECTIONS

EPRI used the [US-REGEN energy systems model](#) to explore scenarios for future household energy consumption and expenditures. Two scenarios were considered to illustrate possible future trends:

- Lower Price scenario includes the 2022 Inflation Reduction Act (IRA) and other existing policies with reference fuel prices (based on [AEO 2023 Reference Case](#))
- Higher Price scenario assumes IRA credits expire beginning in 2026 (roughly consistent with the 2025 budget bill) and higher fuel prices (based on the [AEO 2023 Low Oil & Gas Supply Case](#)) as a proxy for greater emphasis on LNG exports and domestic production

In each case, adoption of end-use electrification technologies, such as EVs and heat pumps, is driven by economic trade-offs from the consumer’s perspective. Following the insights developed in previous EPRI research, including the [U.S. National Electrification Assessment](#), the modeled scenarios reflect opportunities for efficiency and economic benefits of electrification, particularly for personal vehicles. Final energy consumed by a light-duty EV per vehicle mile is about a third of that consumed by a comparable ICEV, which results in significant fuel cost savings and is a major driver for the favorable economics of EV adoption (in addition to lower maintenance costs, which together over the vehicle’s life offset a potentially higher upfront cost). The results in this study reflect modeled EV adoption reaching around 90% of the light-duty fleet by 2050 (Figure 11). The future rate and long-term potential of EV adoption remain uncertain; these projections reflect a hypothetical scenario consistent with economic adoption.



Sales data from edmunds.com

US-REGEN Scenario Projections

Figure 11. U.S. New Vehicle Sales Shares by Vehicle Type: History and US-REGEN Scenario Projections. EV=fully electric vehicle; PHEV=plug-in hybrid electric vehicle; HEV=hybrid electric vehicle (non-plug); ICEV=internal combustion engine vehicle.

Efficiency and electrification of building end-uses also contribute to reduced household energy use even as service demands increase in the future in both scenarios. For example, heat pump adoption continues to grow, displacing both non-electric space heating technologies and less efficient electric resistance heating. Appliance and lighting efficiency are projected to improve at technology-specific rates, which combined with heating and vehicle electrification accelerate a trend of declining final energy per household, even as electricity consumption increases (Figure 12). See the [US-REGEN model documentation](#) for more information about efficiency and electrification assumptions.

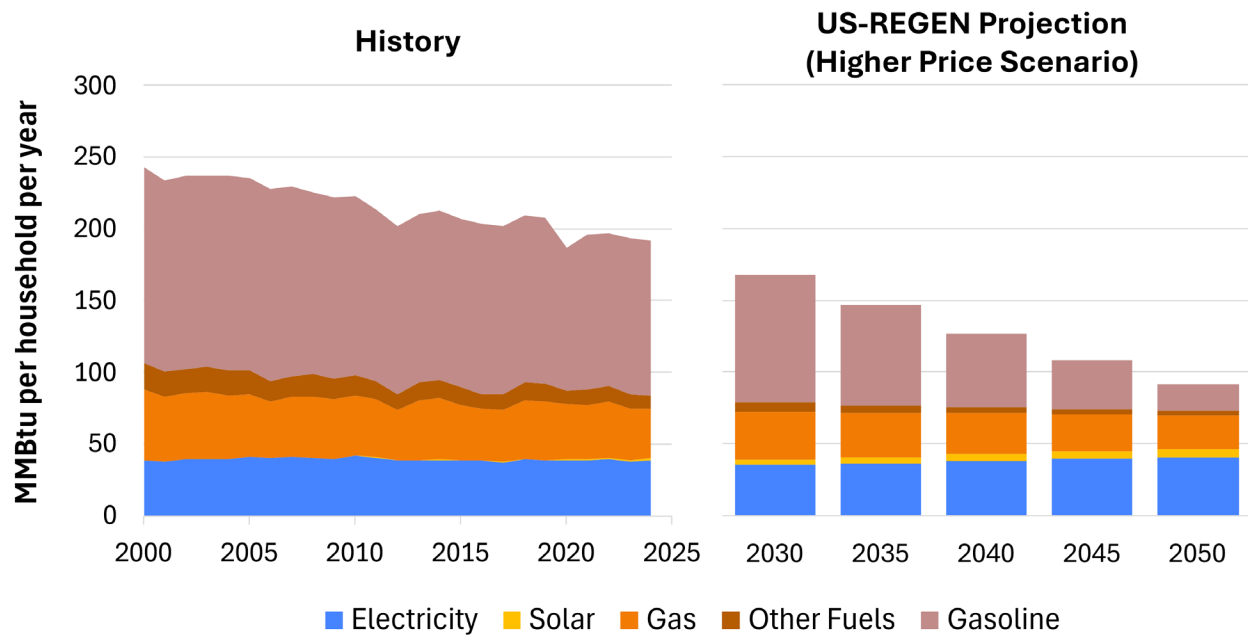


Figure 12. U.S. Final Energy Per Household: History and US-REGEN Higher Price Scenario Projection to 2050

Per household energy wallet is projected to decline over time as a result of electrification, despite increased expenditures on grid-based electricity (Figure 13). U.S. average household energy wallet declines by 36% (in real terms) by 2050 in the Higher Price Scenario. This decline is driven primarily by replacing gasoline expenditures with increased spending on electricity as personal vehicles are electrified, which results in substantial net savings due to the efficiency advantages of electric vehicles. Efficiency and electrification of building end-uses also contribute to reduced household energy costs even as service demands increase in the future.

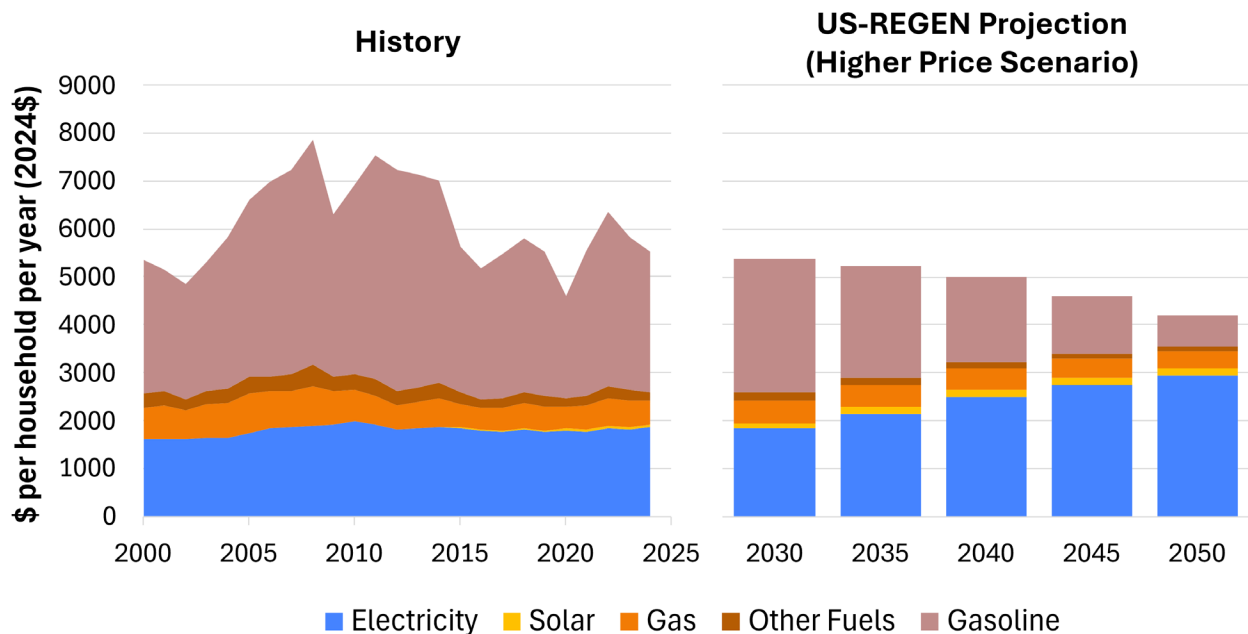


Figure 13. U.S. Energy Wallet: History and US-REGEN Higher Price Scenario Projection to 2050

We also consider a scenario with lower fuel prices and no phase-out of IRA clean energy subsidies, which leads to lower electricity prices and overall lower direct household expenditures, with U.S. average energy wallet declining by 42% in 2050 (Figure 14).

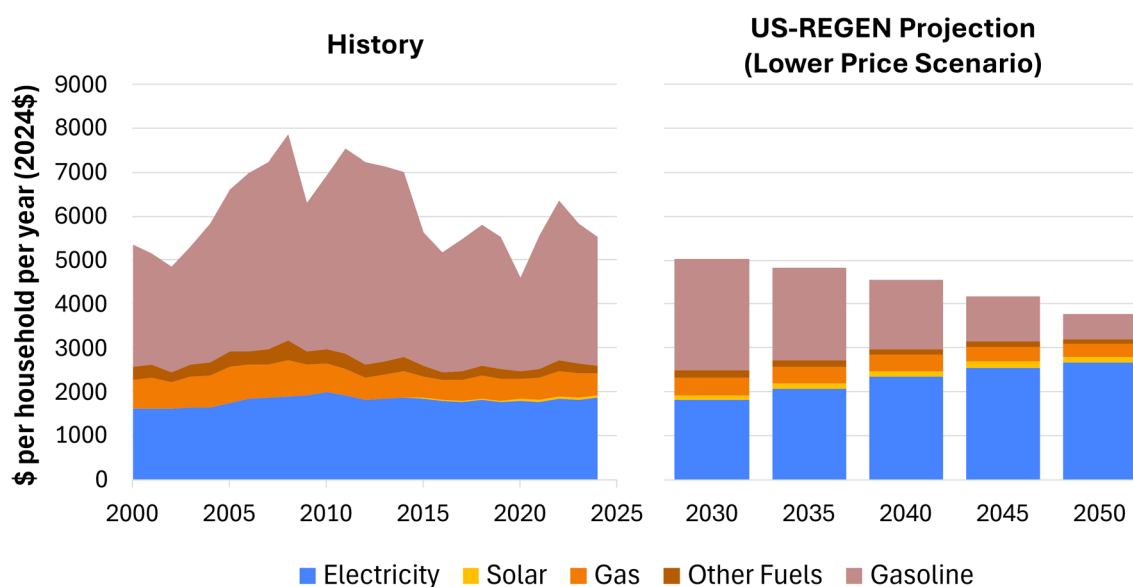


Figure 14. U.S. Energy Wallet: History and US-REGEN Lower Price Scenario Projection to 2050

A net-zero scenario was not examined in this analysis. EPRI’s [LCRI Net-Zero study](#) illustrates the energy wallet impacts of such a scenario. Electricity expenditures increase with targets for deeper decarbonization, as the supply mix includes higher cost mitigation technologies, but overall per household energy expenditures are still lower than today.

STATE-LEVEL PROJECTIONS

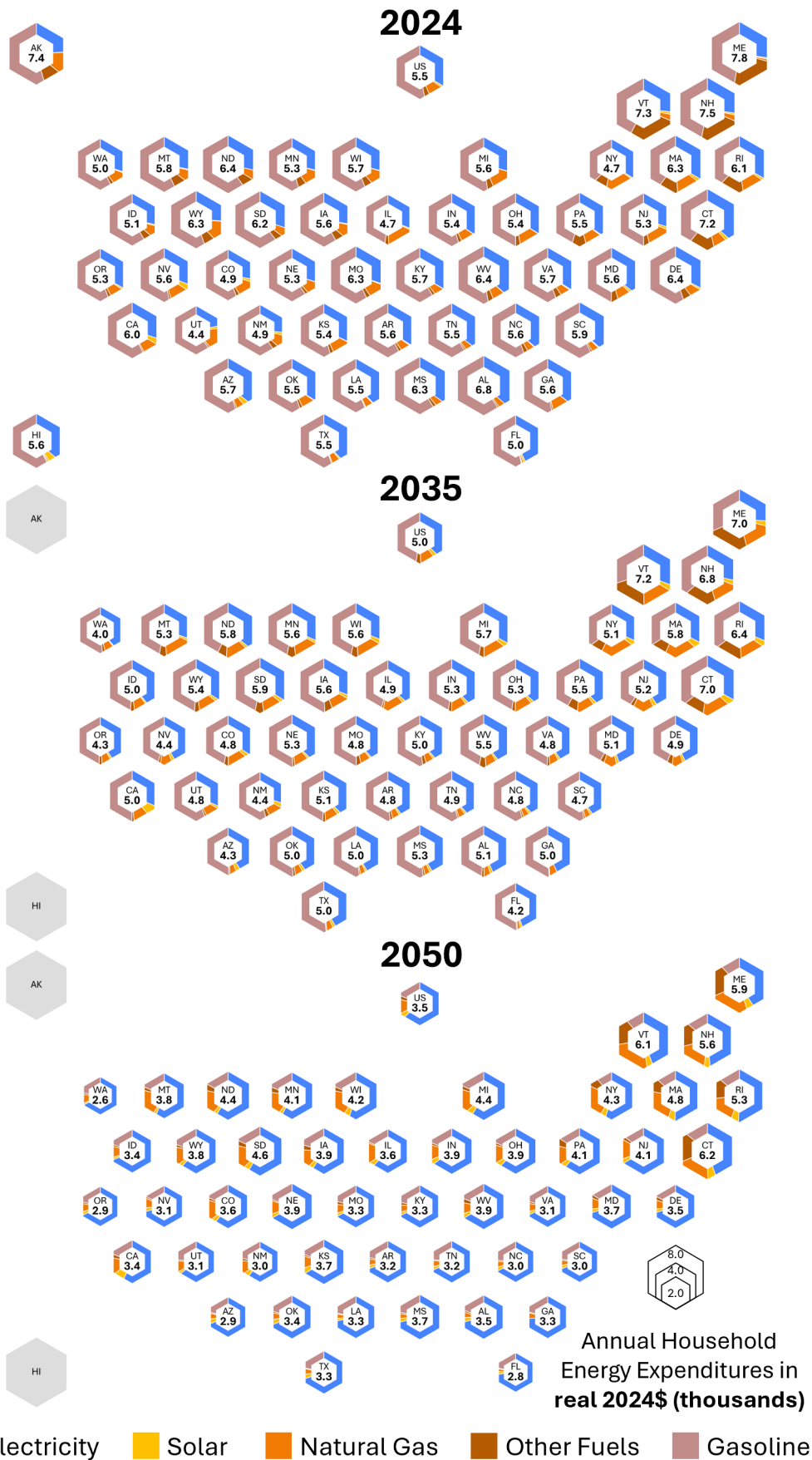
Household energy expenditures decline in all states, although the relative contribution of electrification and price trends varies by region (Figure 15 and Figure 16). EV adoption drives down gasoline expenditure everywhere, which generates savings for household energy wallet costs despite increased electricity expenditure. Impacts on electricity bills from building electrification, distributed solar, and the changing cost structure of the distribution system drive regional variation.

“EV adoption drives down gasoline expenditure everywhere, which generates savings for household energy wallet costs despite increased electricity expenditure.”

In the web-based version at energywallet.epri.com, Figure 15 appears as an interactive map with the option to select alternative scenarios and projection years and zoom in on individual states. Figure 16 shows an alternative view, with 2024 and future years together on the same chart. Note that US-REGEN projections are for the Lower 48 states only. Alaska and Hawaii are interesting cases but are only shown for the base year.

In the Lower Price scenario, electricity prices are projected to be relatively flat in real terms over time at the U.S. level (Figure 17). Although the distribution component of the retail price is projected to increase, this trend is generally offset by reductions in the generation component driven by IRA incentives and technology cost declines. In certain states, particularly in New England, distribution costs drive electricity prices higher over time. The adoption of electricity for space heating, partially motivated by the high costs of non-electric fuels in the region, leads to increased winter peaks and higher leveled distribution costs (due to a higher peak-average ratio of electricity demand). The trend is exacerbated by increased adoption of behind-the-meter solar, which results in system costs being allocated over fewer grid-based electricity purchases. There is significant uncertainty about how rate design and policy choices will evolve to address these issues. Despite the projected electricity price increases in these scenarios, overall energy wallet declines in all states.

Note these projections are in real terms, that is, adjusted for economy-wide inflation. Assuming a long-run average inflation rate, nominal prices would increase by roughly 2.4% per year.



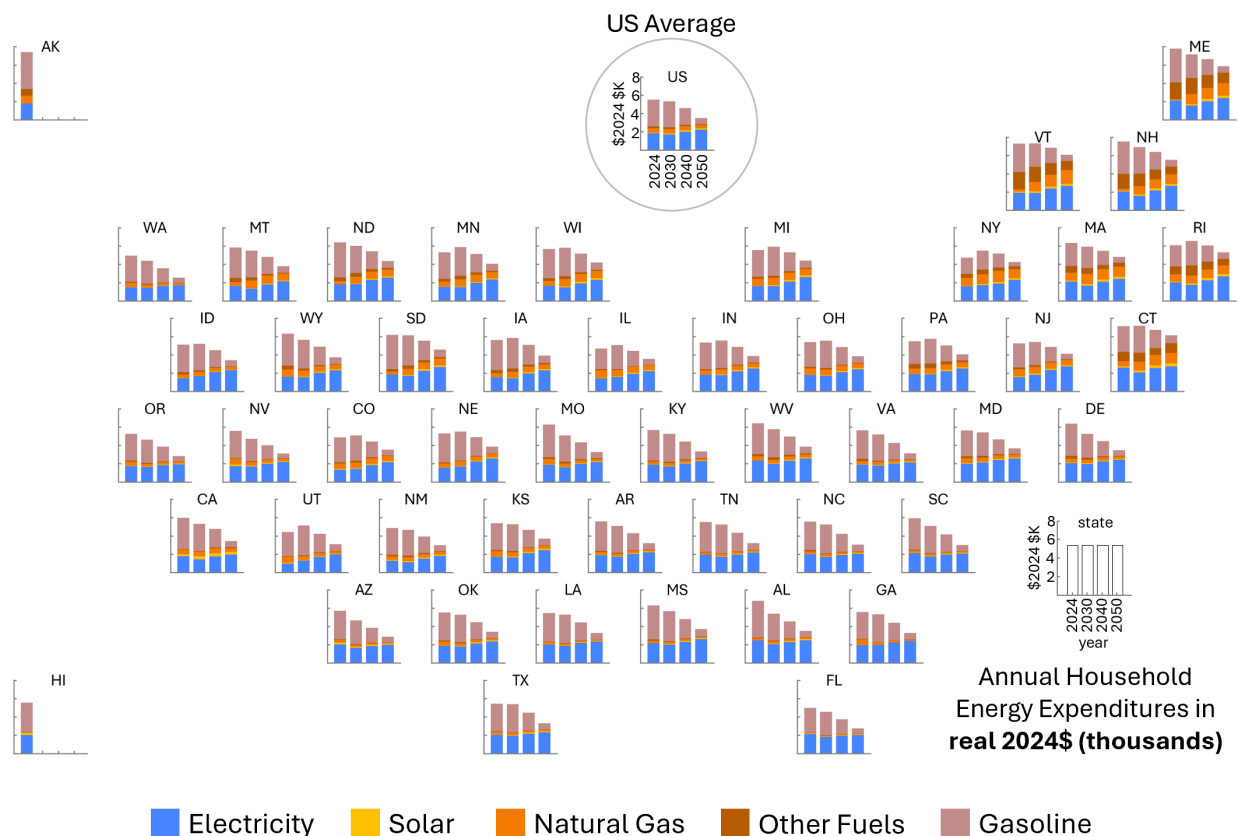


Figure 16. State-Level Energy Wallet: History and US-REGEN Higher Price Scenario Projections

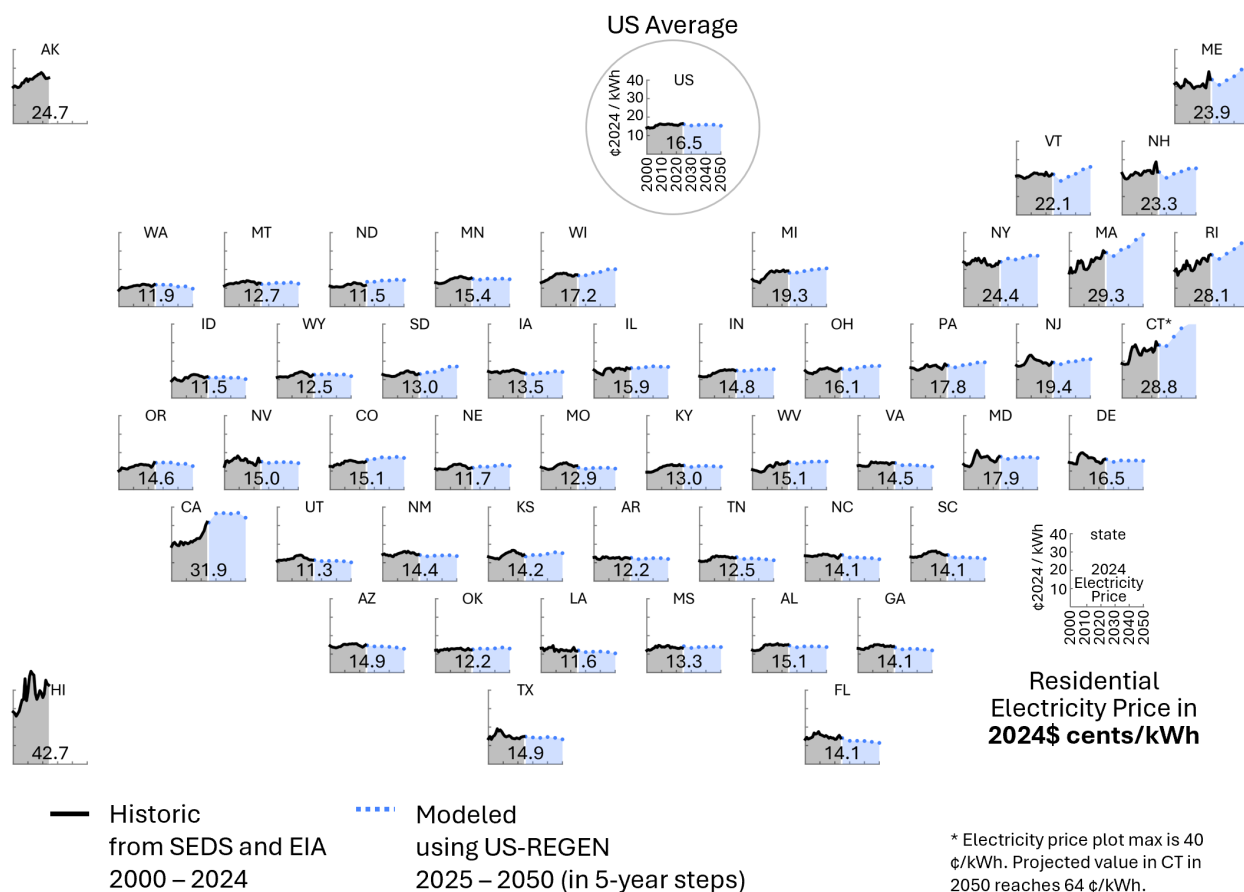


Figure 17. Residential Electricity Price: History and US-REGEN Lower Price Scenario Projections

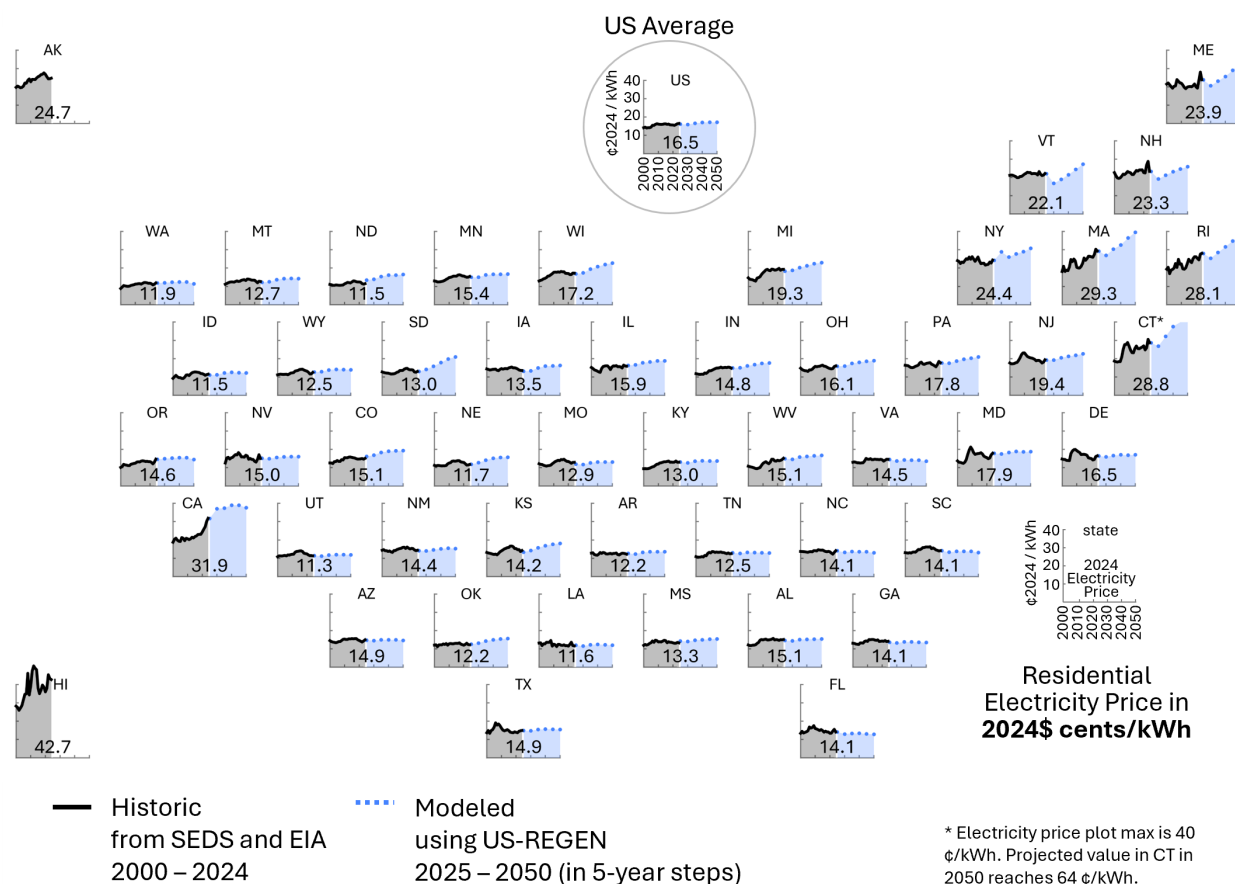


Figure 18. Residential Electricity Price: History and US-REGEN Higher Price Scenario Projections

In the Higher Price scenario, the phase-out of IRA clean energy subsidies and increased fuel (particularly natural gas) prices lead to a slight increase over time in real U.S. average electricity prices (Figure 18).

Household electricity demand is projected to increase in the scenario projections as a result of electrification of both personal vehicles and building services such as space and water heating (Figure 19). The share of household electricity demand met with rooftop solar is also projected to increase, particularly in California. The rate of uptake and implications for electricity use vary significantly across states, especially due to differences in climate and in the current level of penetration of electric heating. Differences in relative fuel prices also affect the economics of the trade-off between electrification and conventional non-electric technologies, including effects of state level carbon policies.

Note that this analysis is focused on household electricity demand, encompassing residential buildings and personal vehicles. Other segments, including data centers, manufacturing, and electrification of commercial buildings and vehicles could also be significant drivers of system-level load growth, although the impacts of growth in these segments on residential electricity prices is uncertain.

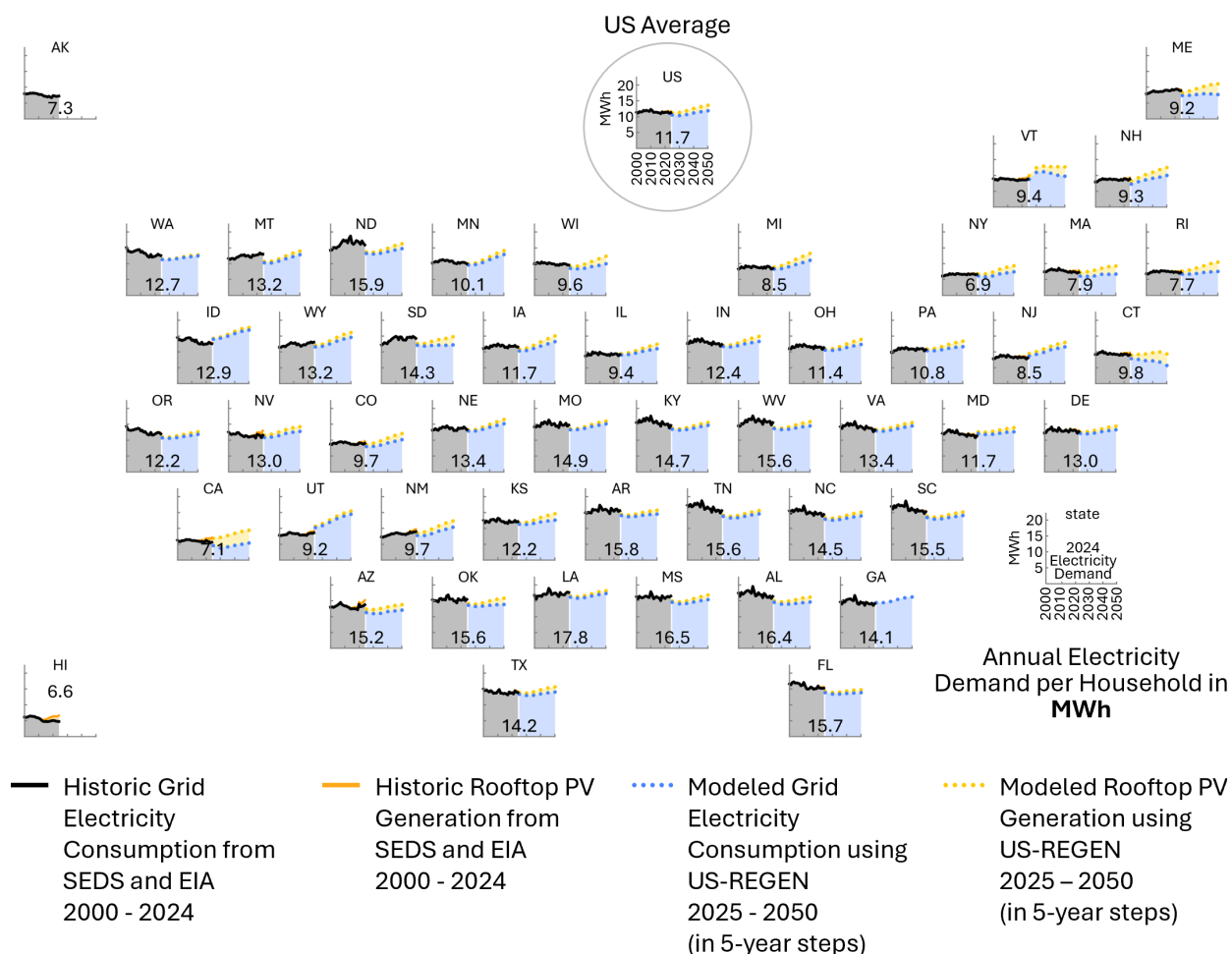


Figure 19. Household Electricity Demand: History and US-REGEN Higher Price Scenario Projections

CONCLUSIONS

In this analysis, total household energy expenditures decline over time due to electrification and efficiency, despite higher electricity bills. In a scenario projection using EPRI's US-REGEN model, assuming recent energy policy changes and economic adoption of new technologies, the U.S. average household energy wallet declines by 36% (in real terms) by 2050. This decline is driven primarily by replacing gasoline expenditures with increased spending on electricity as personal vehicles are electrified, which results in substantial net savings due to the efficiency advantages of electric vehicles. Efficiency and electrification of building end-uses also contribute to reduced household energy costs even as service demands increase in the future.

State-level average declines range from 10%–50% (in real terms). State level heterogeneity reflects differences in existing fuel mix and fuel prices, climate impacts on heating, cooling, and charging load, and structural differences in household energy demands.

We also consider a scenario with lower fuel prices and no phase-out of clean energy subsidies, which further decreases direct household expenditures, results in a 42% decline in U.S. average energy wallet over time (in real terms, with state-level declines ranging from 17%–55%). Although not analyzed here, based on other EPRI studies, decarbonization policy increases electricity and fuel prices relative to a reference case without net-zero targets, but not by enough to counteract electrification and efficiency.

Scope

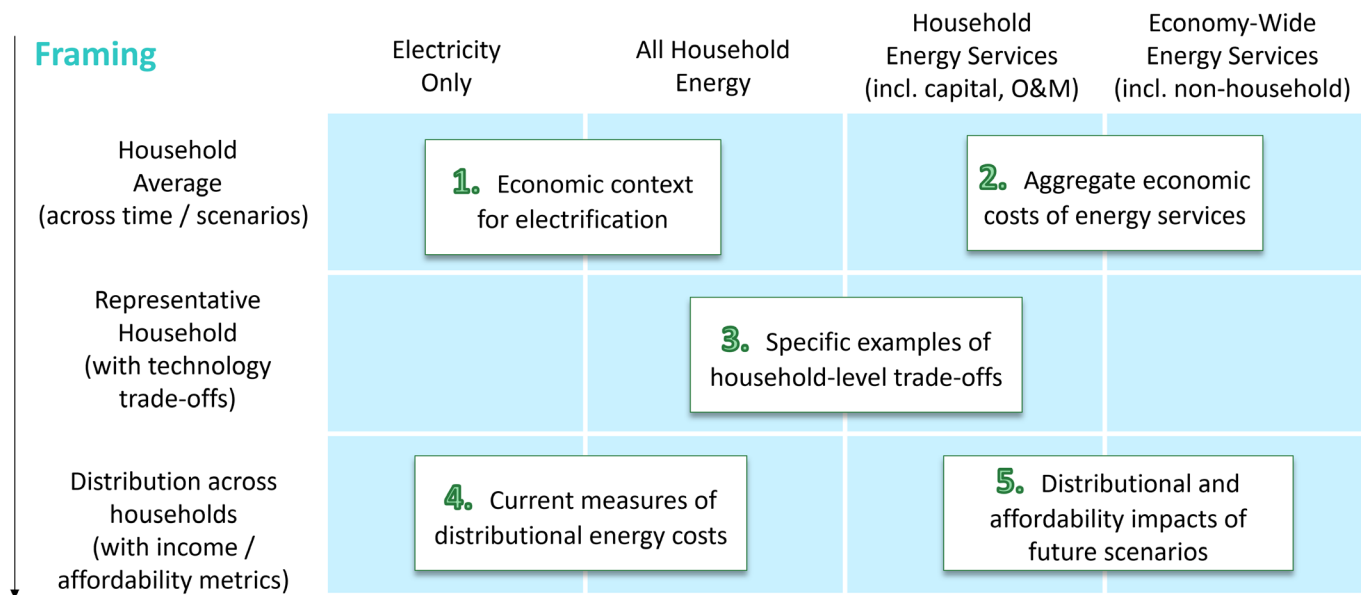


Figure 20. Dimensions of Energy Wallet Analysis

Analysis of household energy expenditures can take many forms (Figure 20). This report presents a straightforward calculation of the **Energy Wallet** metric describing total direct energy expenditures by households and how it evolves over time, in particular as a result of electrification trends. Additional follow-on analysis will explore electrification trade-offs that take into account non-energy costs of end-use technologies, both in aggregate and at the level of individual representative households; economy-wide energy service costs including non-household energy purchases (which are embedded in household purchases of many goods and services, such as air travel); and distributional implications of household energy costs for affordability.

APPENDIX: DATA SOURCES

Most of the data for energy demands and prices used in the report comes from the [Energy Information Administration \(EIA\)](#), in particular the [State Energy Database System \(SEDS\)](#). Complete state-level data by sector, fuel, and state through 2023 was released on June 27, 2025. Other EIA reports provide estimates of 2024 values, including:

- [Electric Power Monthly \(EPM\)](#)
- [Natural Gas monthly data tables](#)
- [Gasoline weekly data tables \(by PADD region only\)](#)
- [Seasonal heating fuel outlook](#)

Sector- and state-level energy prices reported by EIA and in this analysis refer to the average retail price paid by end-use consumers, inclusive of delivery costs and state and federal excise taxes in the case of gasoline. Residential electricity and natural gas prices reflect averages across individual customer retail rates.

Gasoline use reported in SEDS for the transportation sector includes fuel purchases by non-households, including fleet light-duty vehicles and some medium- and heavy-duty trucks. US-REGEN uses various sources to allocate gasoline demand at a state level across these uses, including outputs from EIA's Annual Energy Outlook (AEO) and the MOVES model for criteria pollutant sources developed by the U.S. Environmental Protection Agency (EPA). This analysis used these data sources to adjust the SEDS data to estimate direct household purchases of gasoline.

Costs for residential solar capacity also come from US-REGEN input assumptions. Historical capacity for residential sector small-scale solar comes from EIA Form 861M.

Estimates for current public charging expenditures are based on several data sources, including the [Department of Energy's Alternative Fuel Data Center \(AFDC\)](#) for number of charging ports by state; a recent [National Renewable Energy Laboratory \(NREL\)](#) report on public charging utilization patterns; and state-level average electricity prices for public charging from the [American Automobile Association \(AAA\)](#).

The adjustment for economy-wide inflation is based on the Gross Domestic Product (GDP) implicit price deflator published by [Federal Reserve Bank](#).

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