Tracking Vermont's Energy Transition

Overview of EAN's Data & Analysis Resources for the Senate Natural Resources & Energy Committee

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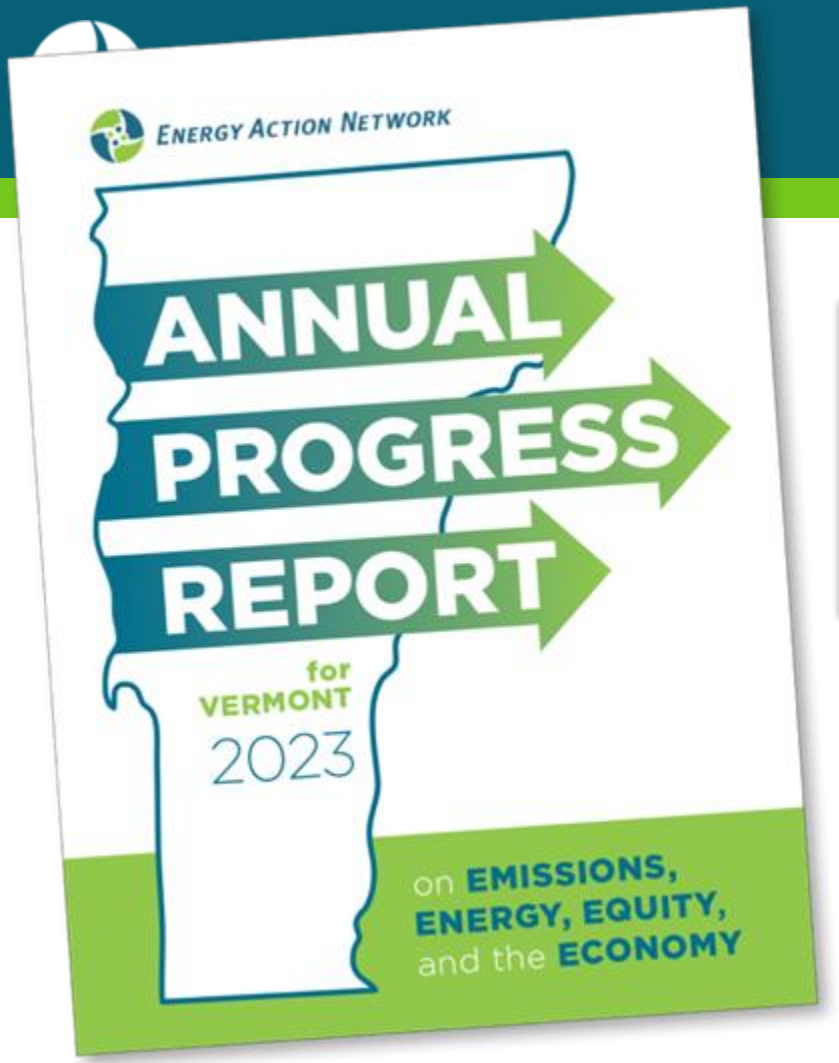
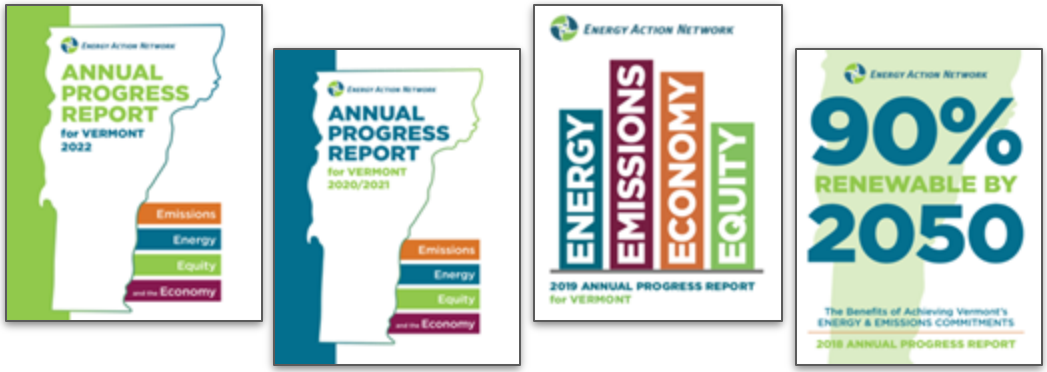
ENERGY ACTION NETWORK

Data & Analysis





Data & Analysis

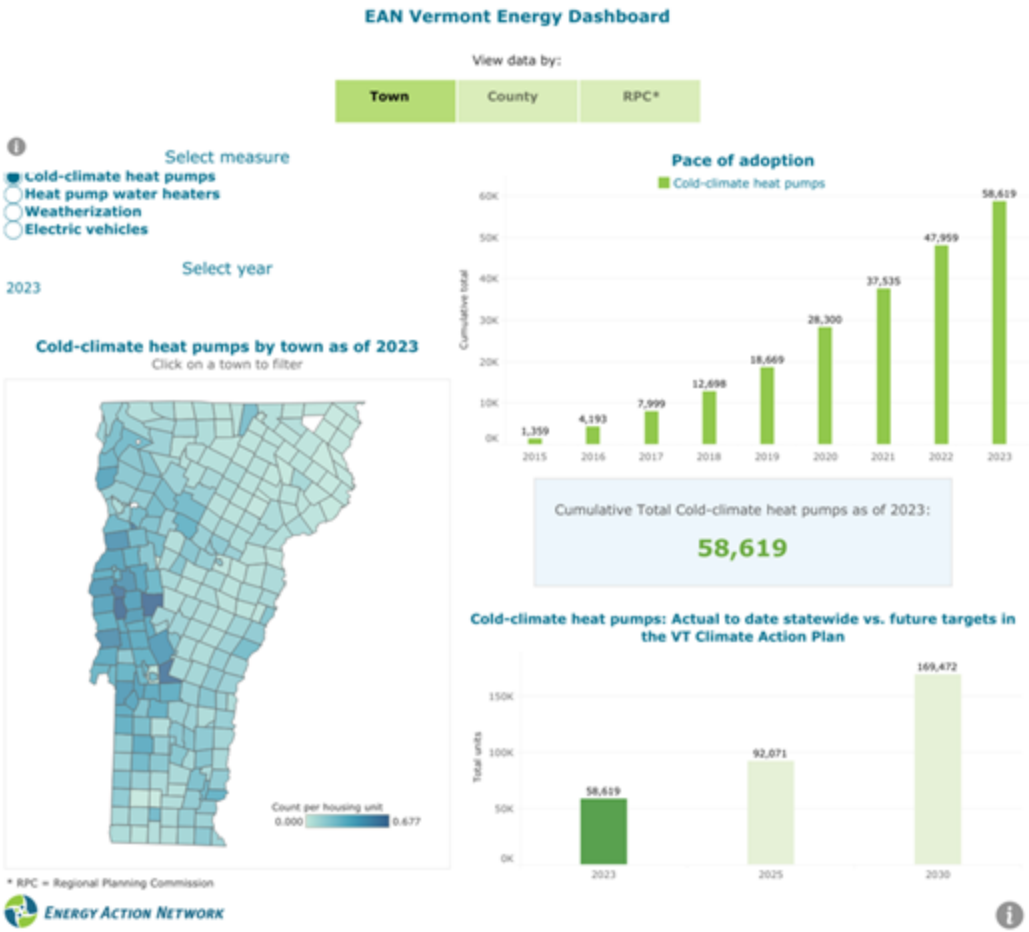
EAN is dedicated to producing **high-quality, transparent, and accessible** research and analysis to support the state's progress toward its energy and climate commitments.

In addition to our Annual Progress Report for Vermont, we provide additional resources (including research papers and briefs) and tools (including our statewide dashboards) for individuals, organizations, and communities throughout Vermont to access energy & emissions data.

Vermont Energy Dashboard

- Published in February 2024
- Data from Efficiency Vermont, VGS, Burlington Electric Department, and state weatherization programs
- Designed to track progress toward the highest impact "Pathways" targets in the Vermont Climate Action Plan
- Simple, user-friendly interface
- Visualize and download data at the local level

Vermont Energy Dashboard



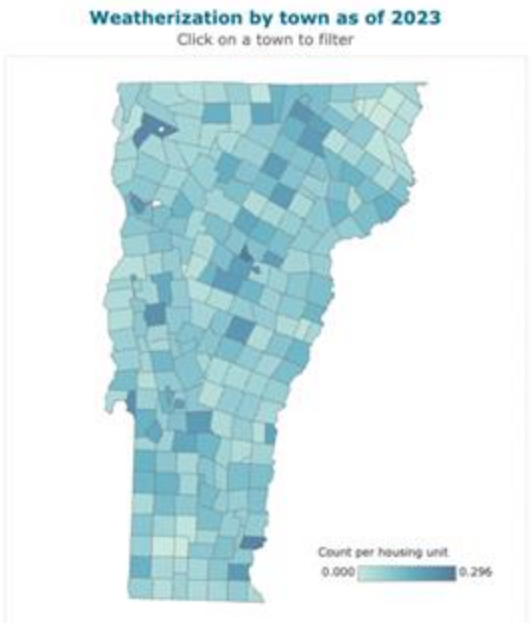
Vermont Energy Dashboard

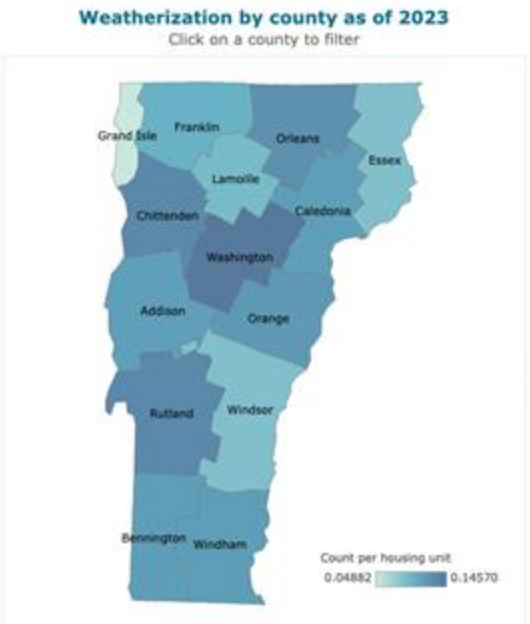
The tool tracks adoption of the four highest-impact climate pollution reducing activities recommended in the 2021 Vermont Climate Action Plan:

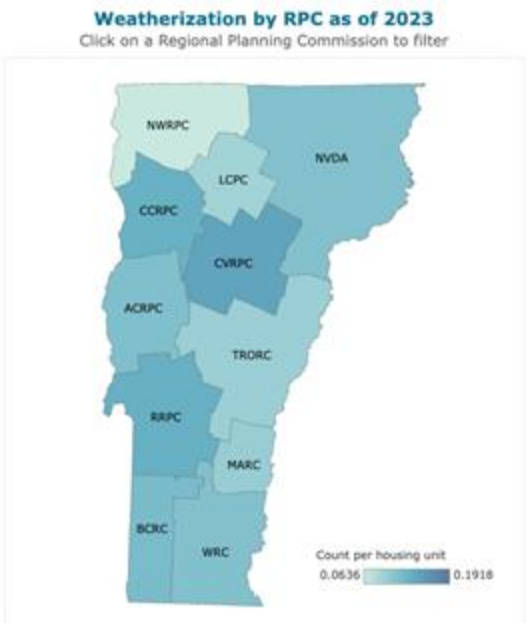
- Comprehensive home weatherization
- Cold-climate heat pumps
- Heat pump water heaters
- Electric vehicles

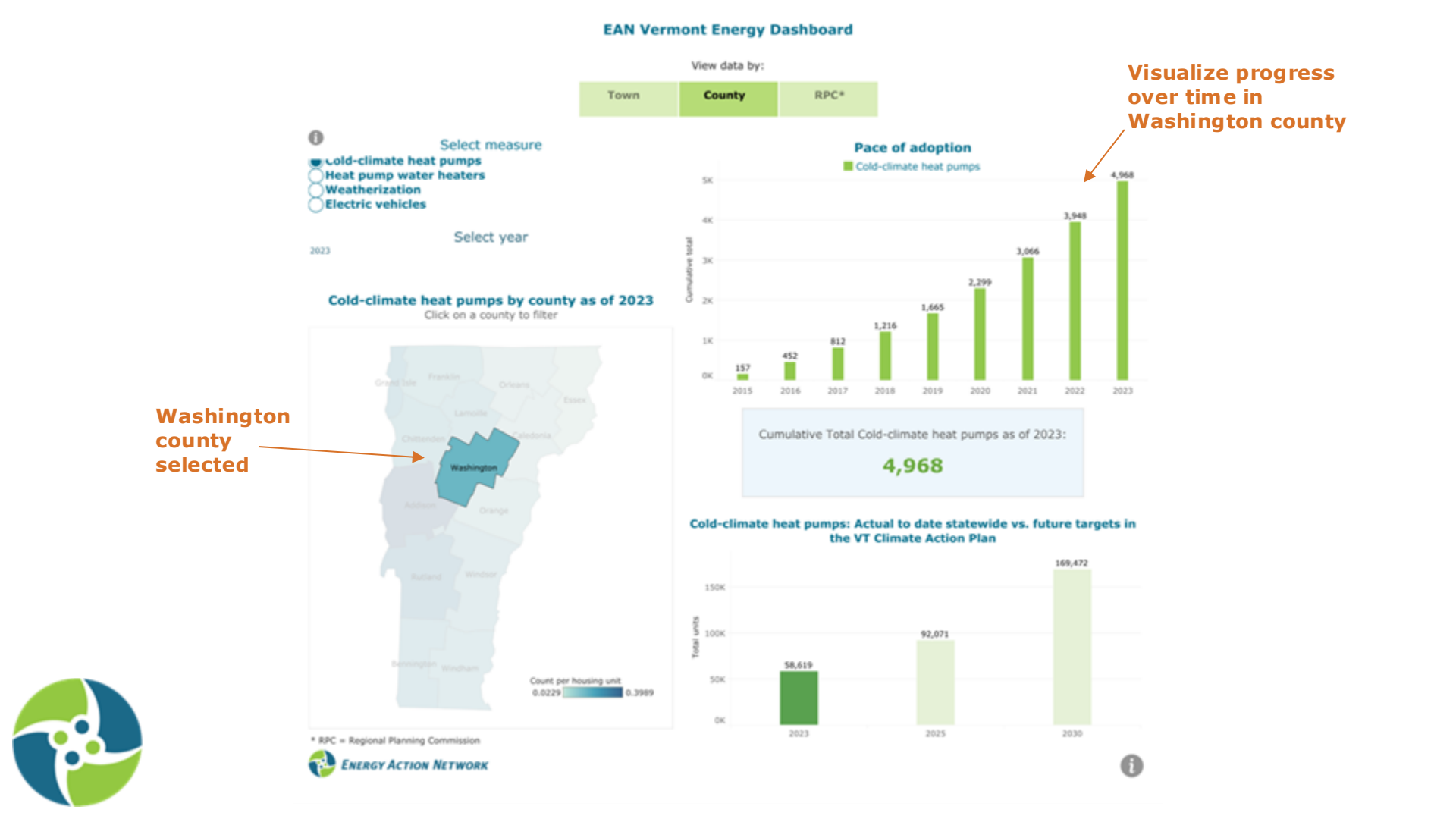
Vermont Energy Dashboard

Aggregate data by town, county, Regional Planning Commission, or statewide

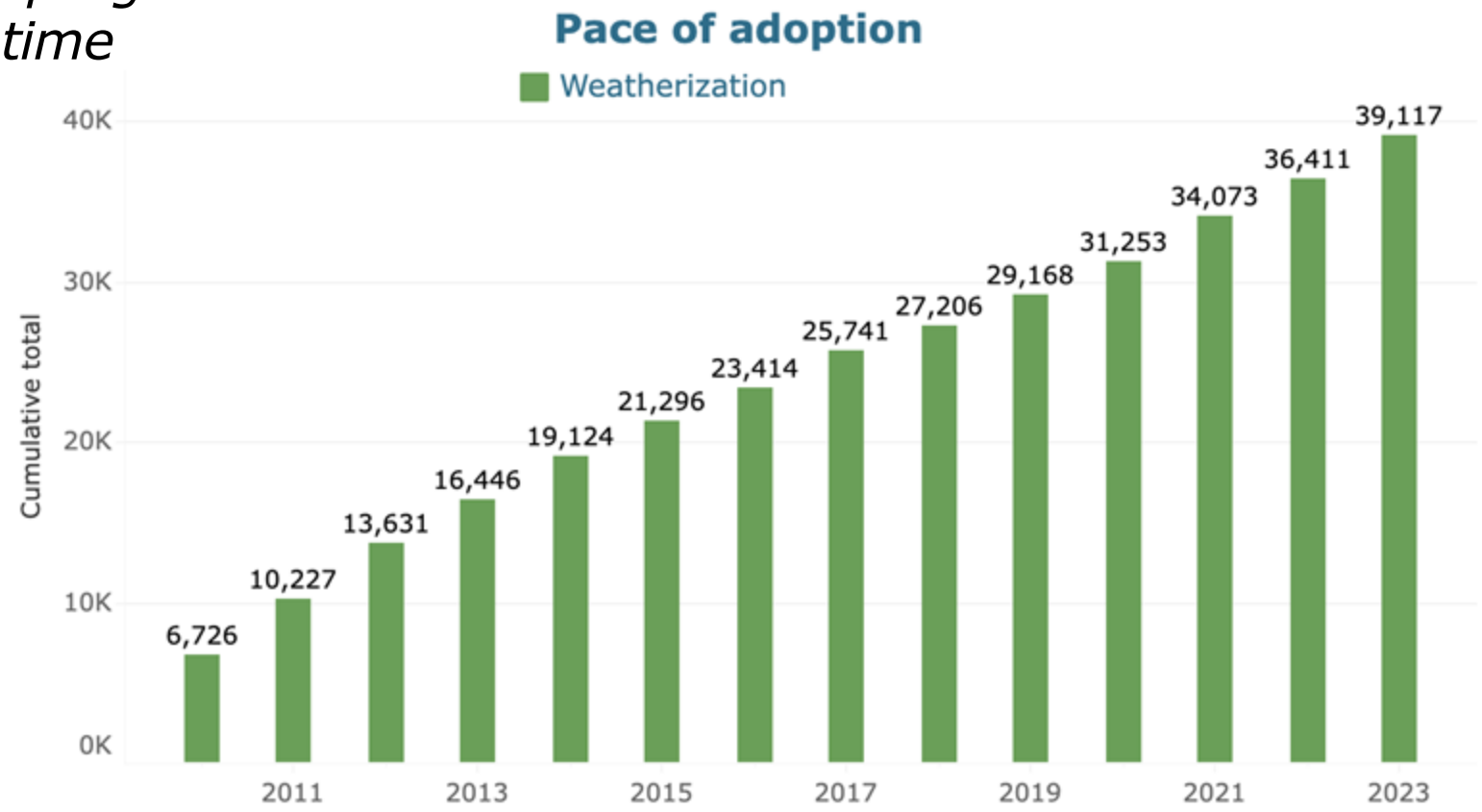


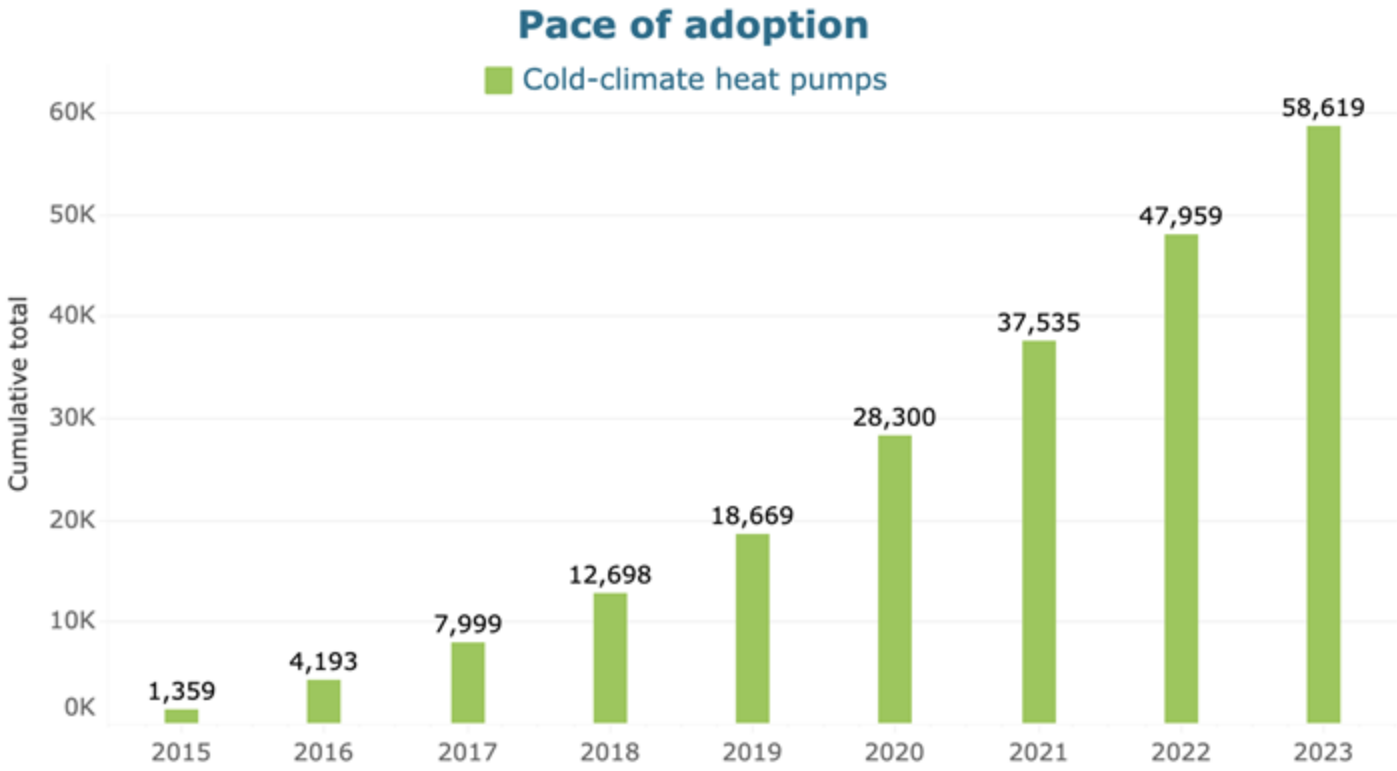




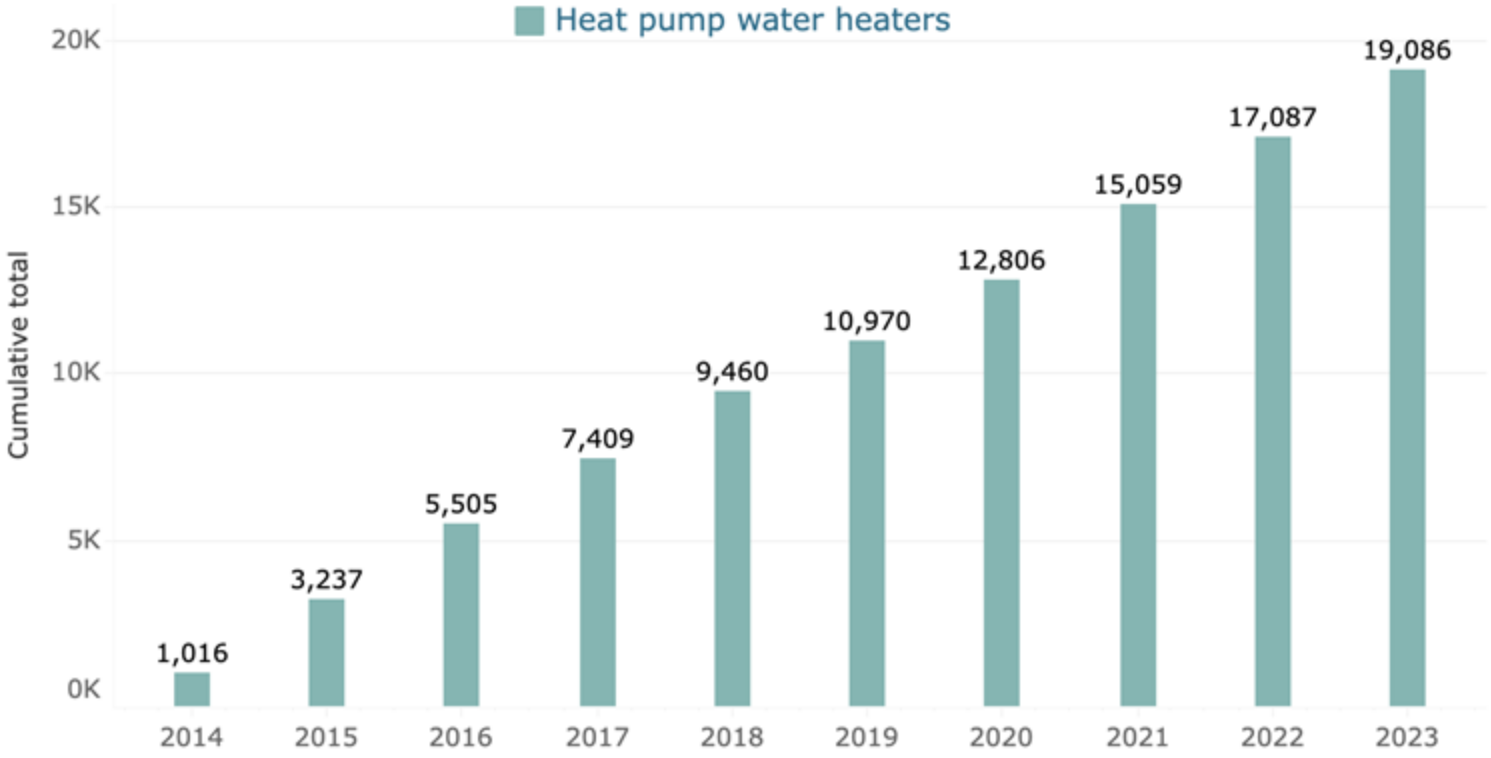

EAN Vermont Energy Dashboard
View data by:
Town
County
RPC*
Visualize progress over time in Washington county
Select measure
Cold-climate heat pumps
Heat pump water heaters
Weatherization
Electric vehicles
Select year
2023
Pace of adoption
Cold-climate heat pumps
Cumulative total
5K
4K
3K
2K
1K
0K
157
452
812
1,216
1,665
2,299
3,066
3,948
4,968
2015
2016
2017
2018
2019
2020
2021
2022
2023
Cold-climate heat pumps by county as of 2023
Click on a county to filter
Washington county selected
Washington
Grand Isle
Franklin
Orleans
Essex
Lamoille
Chittenden
Caledonia
Addison
Orange
Rutland
Windsor
Bennington
Windham
Count per housing unit
0.0229
0.3989
Cumulative Total Cold-climate heat pumps as of 2023:
4,968
Cold-climate heat pumps: Actual to date statewide vs. future targets in the VT Climate Action Plan
Total units
150K
100K
50K
0K
58,619
92,071
169,472
2023
2025
2030
* RPC = Regional Planning Commission
Energy Action Network

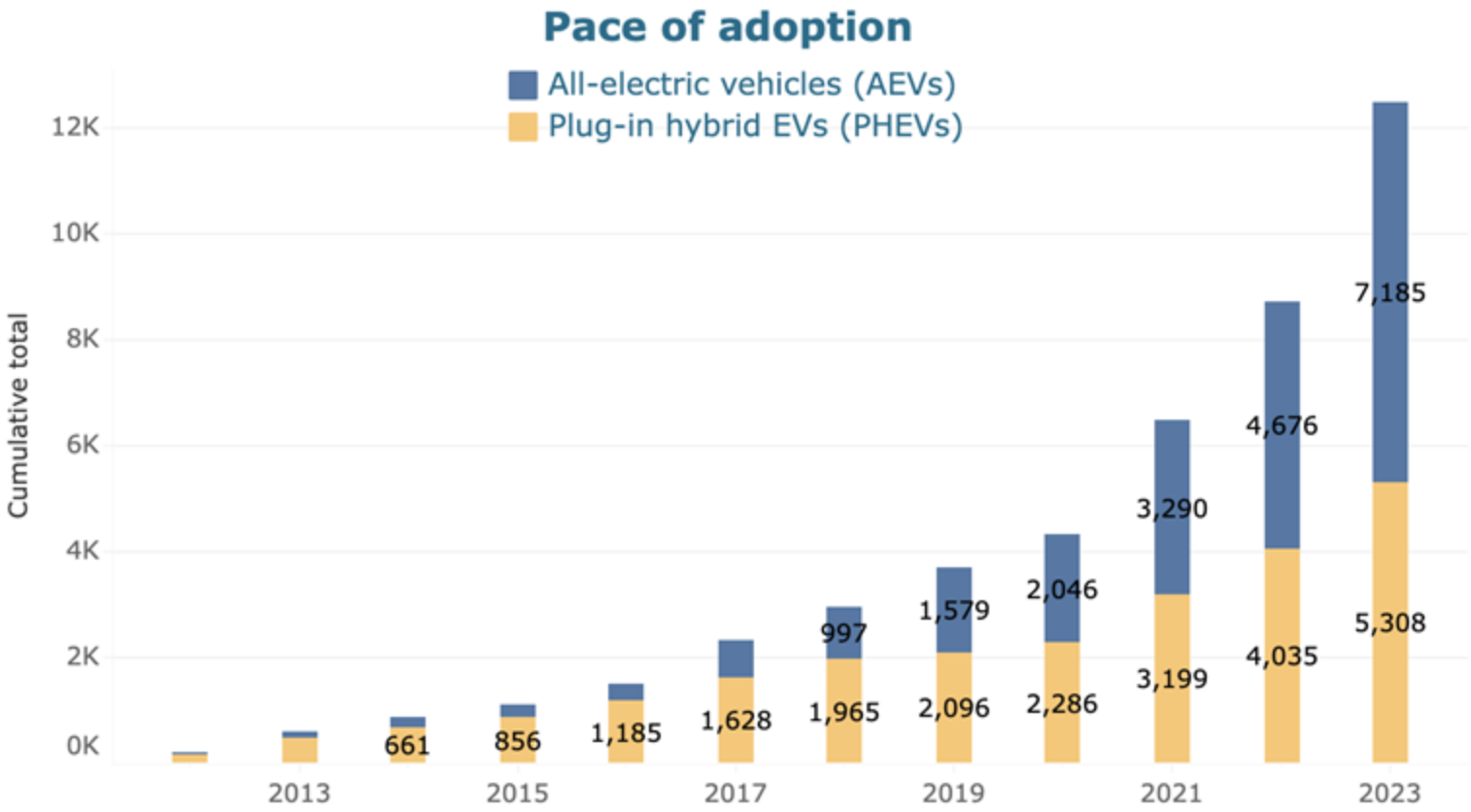
Track progress over time



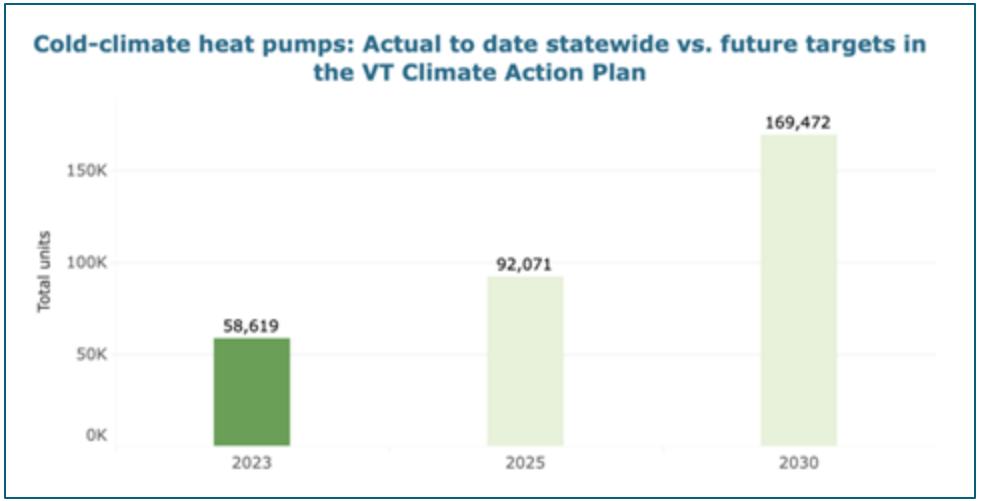

Pace of adoption
Cold-climate heat pumps
Cumulative total
60K
50K
40K
30K
20K
10K
0K
1,359
4,193
7,999
12,698
18,669
28,300
37,535
47,959
58,619
2015
2016
2017
2018
2019
2020
2021
2022
2023

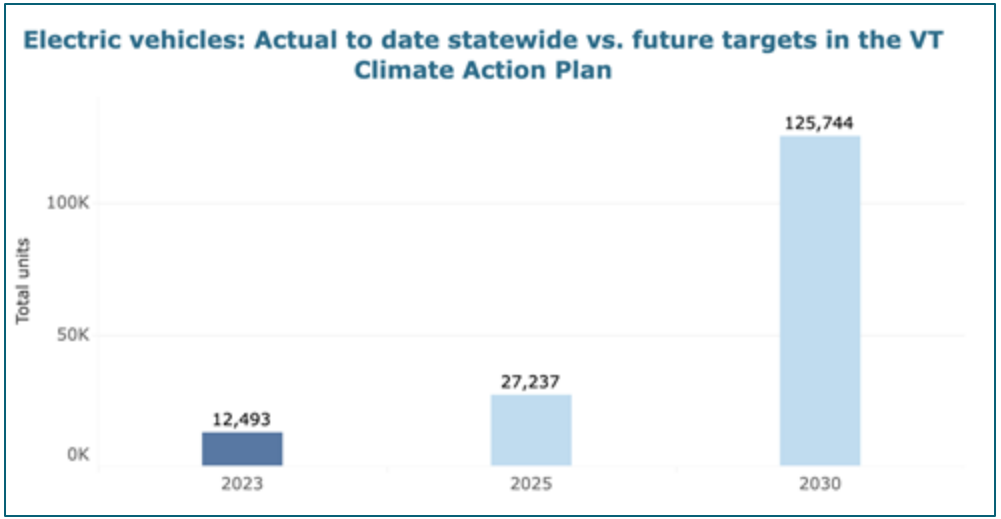
Pace of adoption




Pace of adoption
All-electric vehicles (AEVs)
Plug-in hybrid EVs (PHEVs)
Cumulative total
12K
10K
8K
6K
4K
2K
0K
661
856
1,185
1,628
1,965
2,096
2,286
3,199
4,035
5,308
997
1,579
2,046
3,290
4,676
7,185
2013
2015
2017
2019
2021
2023

Assess progress toward Climate Action Plan targets





Dashboard Link

https://eanvt.org/vermont-energy-dashboard/

H. 125 Questions/observations:

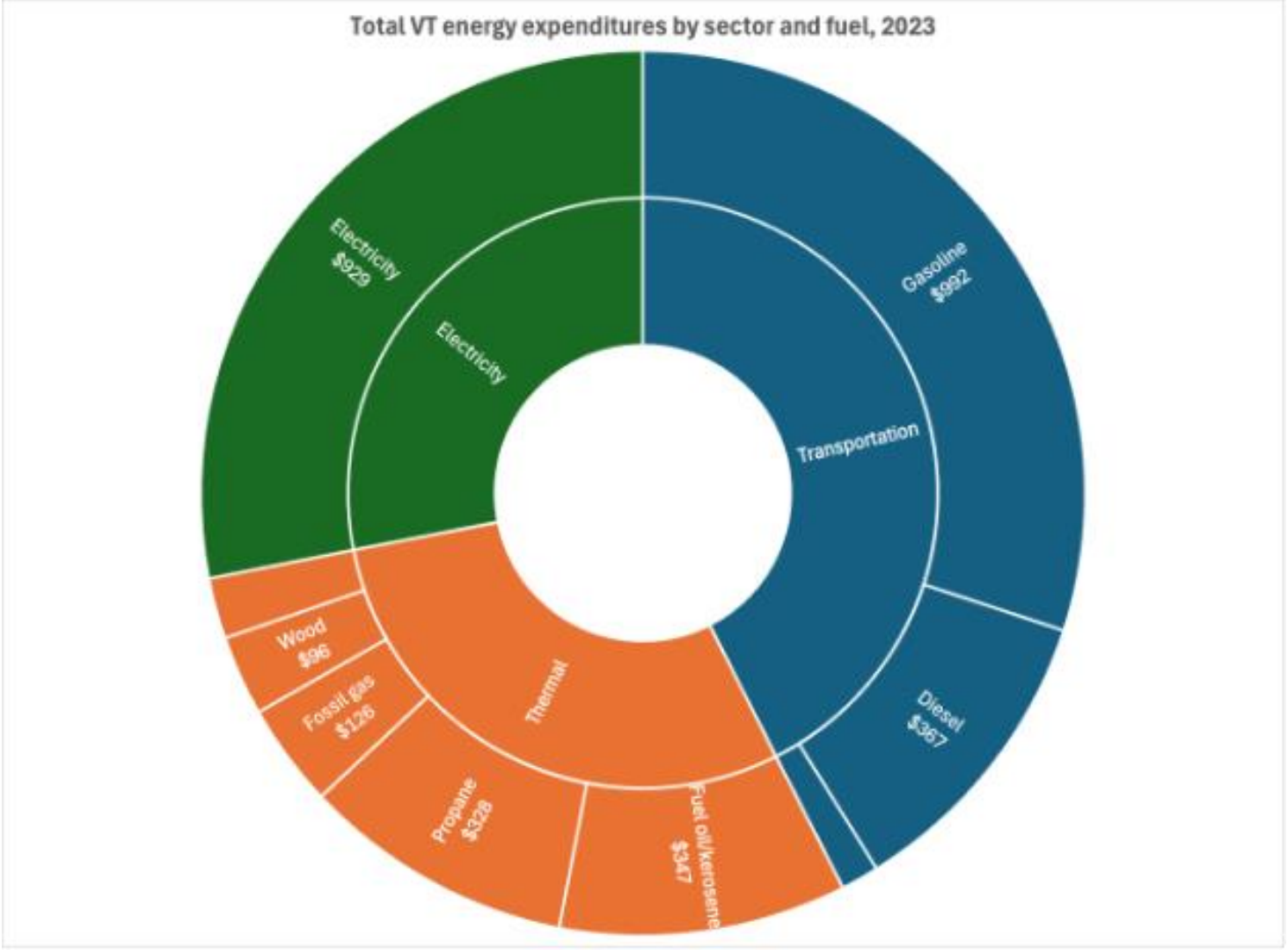
- Potential discrepancy in Sec. 1 (b) (1) which asks for electric rates and (b) (3) which asks for fuel sales volumes. Do you want to know both volumes and prices/costs for electricity and heating fuels, or just one piece of information for different types of energy?
- Sec. 1 (b) (6) re: gasoline and diesel fuel sales: may be helpful to clarify if you mean by volume (i.e., gallons), by costs (total $), or both.
- Would recommend looking at *total* energy spending in Vermont (i.e., all fuels, broken down by type – not just electricity rates).

H. 125 Questions/observations:

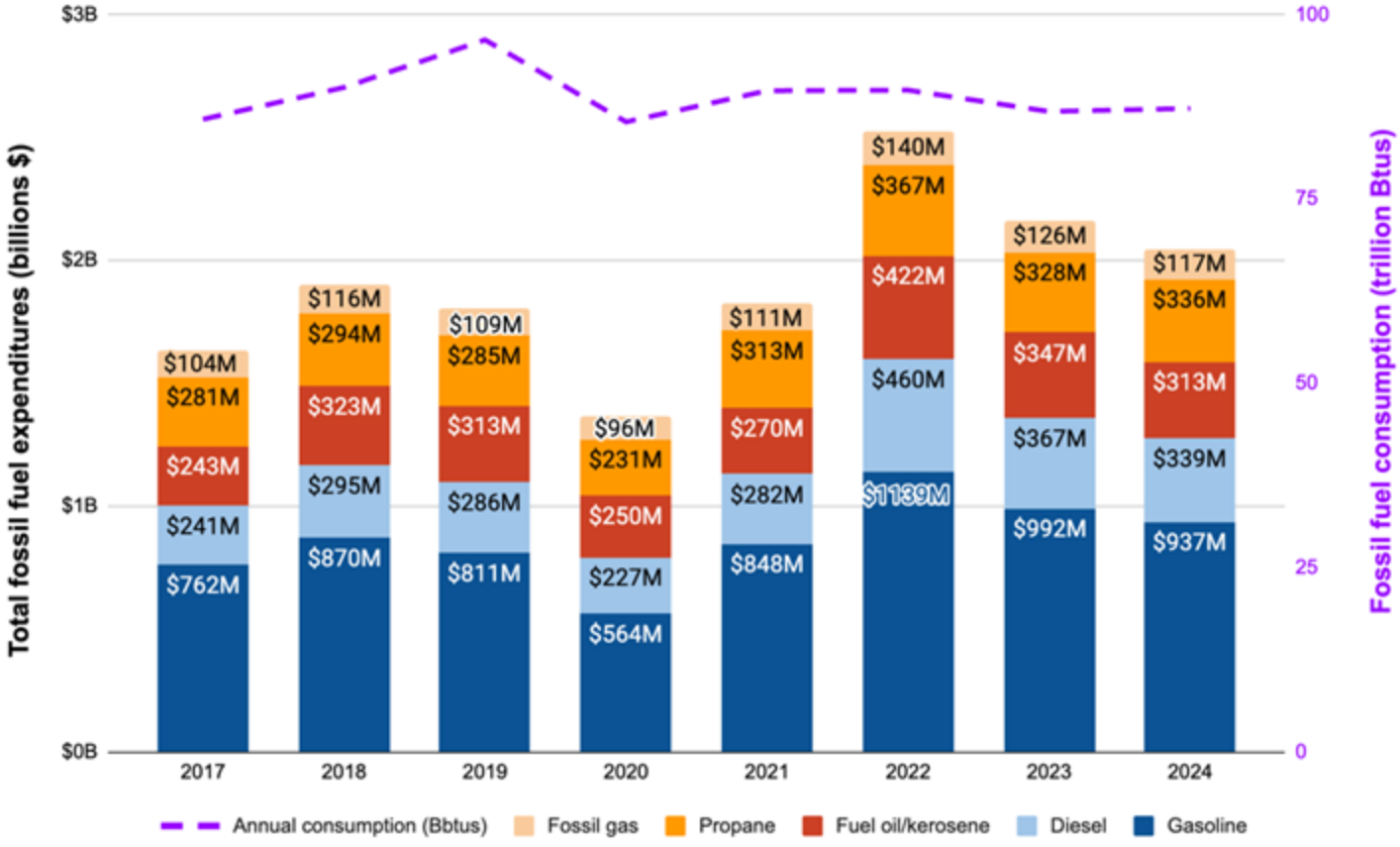
- Note: statewide transportation fuel sales data is available from the Tax Department, as are fuel oil/kerosene and propane sales. Fossil gas (aka natural gas) sales data is available from VGS.
- Note: statewide clean energy employment is tracked and reported in the Clean Energy Industry Report from the Clean Energy Development Fund

H.125 Questions/observations:

- Fuel oil, kerosene and propane prices are tracked by Public Service Department (PSD), in collaboration with (Energy Information Administration) EIA.
- Gasoline prices reported by PSD
- Fossil gas (aka natural gas) prices reported by VGS
- Diesel prices tracked and reported by VTrans (fuel price adjustment document)
- *Prices for cord wood, wood chips, and wood pellets not currently tracked/reported for Vermont*


Total VT energy expenditures by sector and fuel, 2023
Electricity
$929
Gasoline
$992
Electricity
Transportation
Diesel
$367
Wood
$96
Fossil gas
$126
Thermal
Propane
$328
Fuel oil/kerosene
$347

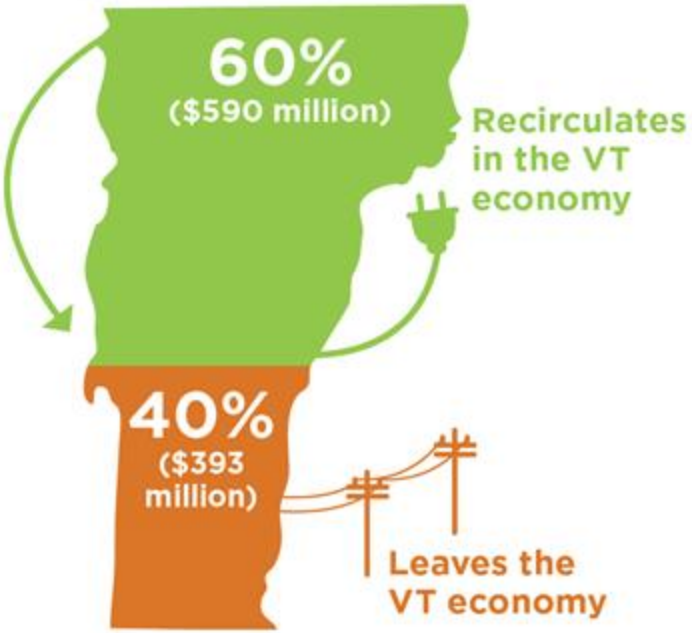
Vermont annual fossil fuel consumption and expenditures, 2017-2024



Vermont fossil fuel spending, 2023

Sources: Fossil fuel spending: Vermont Department of Taxes, 2024; VGS, 2024. Dollar recirculation share: Ken Jones, Senior Fellow for Economic Analysis, 2024. **Note:** This graph includes spending on thermal and transportation fuels only.

Vermont electricity spending, 2023



Sources: Electricity spending: Vermont electric utilities. Dollar recirculation share: Ken Jones, Senior Fellow for Economic Analysis, 2024. **Note:** Dollar recirculation share was updated in January 2025 to reflect out-of-state transmission costs.

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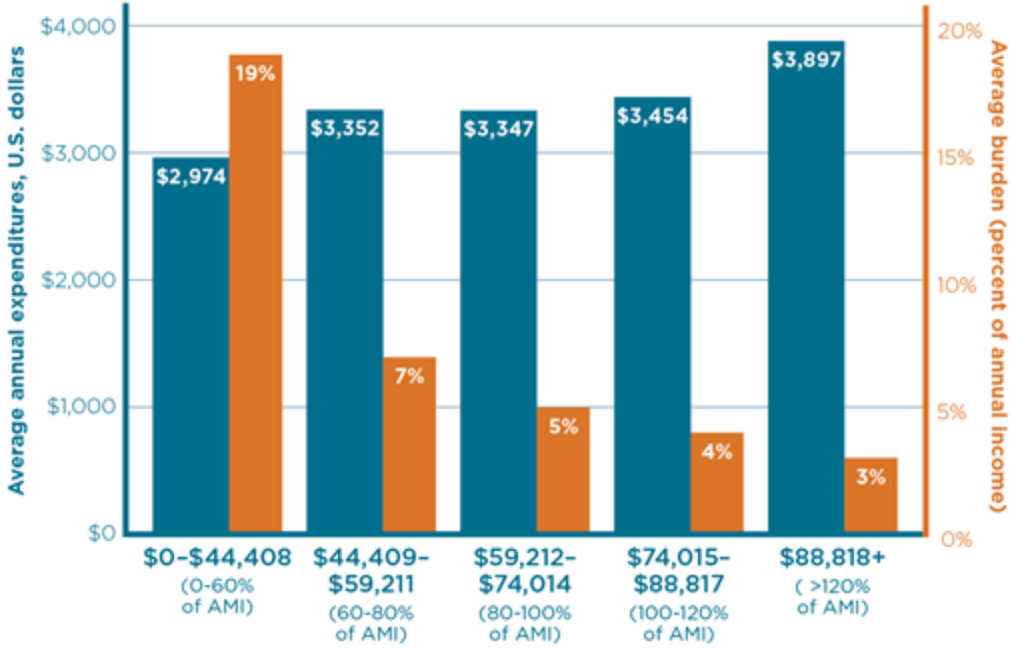
Table 1. Average spending by energy category +/- standard deviation for the current report and the previous version of the report released in 2019.

Energy Type	Average Expenditure (2019)	Range of expenditures (2019)	Proportion of total energy cost (2019)	Average Expenditure (2023)	Range of expenditures (2023)	Proportion of total energy cost (2023)
Electricity	$1,150 ±$199	$302 - $1,777	20%	$1,417 ±$209	$619 - $2,073	20%
Thermal	$2,050 ±$290	$1,041 - $2,916	35%	$2,447 ±$390	$1,050 - $4,340	35%
Transportation	$2,638 ± $126	$2,047 - $2,874	45%	$3,217 ±$417	$1,682 - $4,196	45%
Total	$5,837 ± $471	$3,859 - $6,949	-	$7,071 ±$741	$3,498 - $9,100	-

Vermont combined average household heating and electricity fuel costs and burden by income level, 2018–2022



Source: U.S. Census Bureau, 2018-2022 American Community Survey 5-year Public Use Microdata Samples. **Notes:** Income categories are based on 2018-2022 median household income in Vermont of $74,014. Energy burden refers to the share of annual household income spent on energy. Costs include fuel only and are not inclusive of equipment and maintenance costs.

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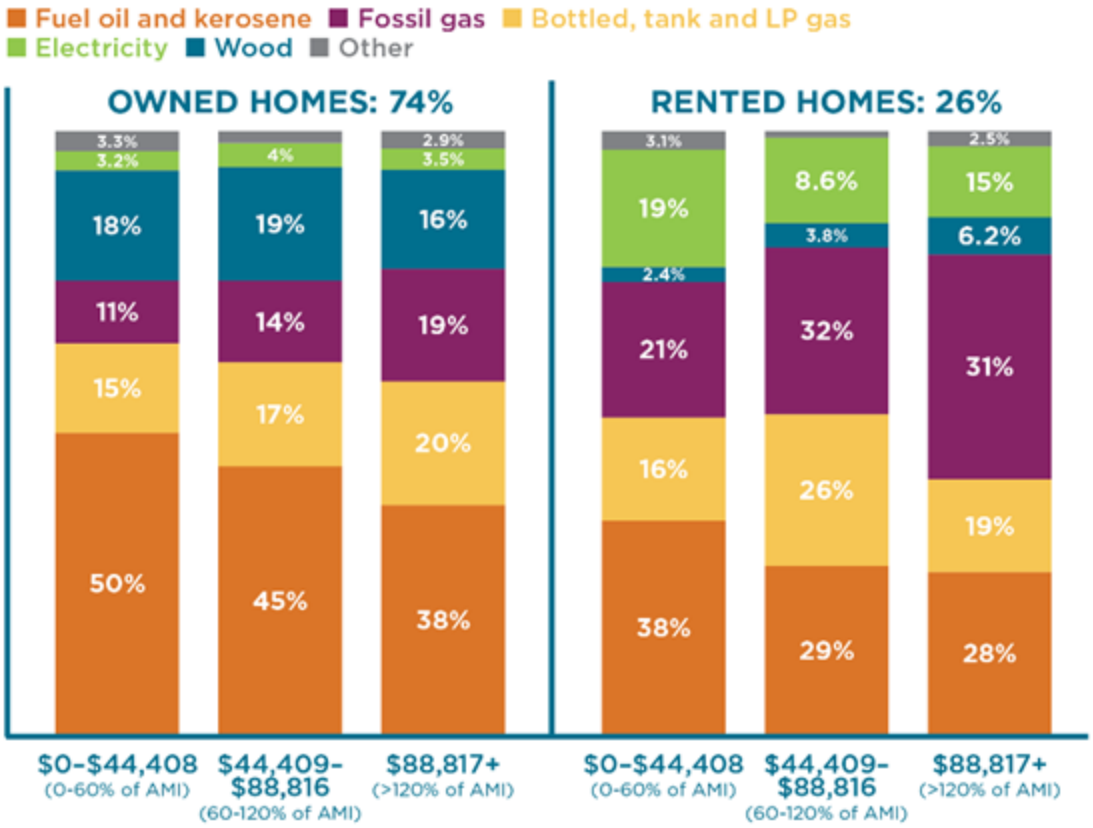
Vermont primary household fuel use by income and housing type



Source: U.S. Census Bureau, 2018-2022 American Community Survey 5-year Public Use Microdata Samples. **Note:** Income categories are based on 2018-2022 median household income in Vermont of $72,014. Data is self-reported.

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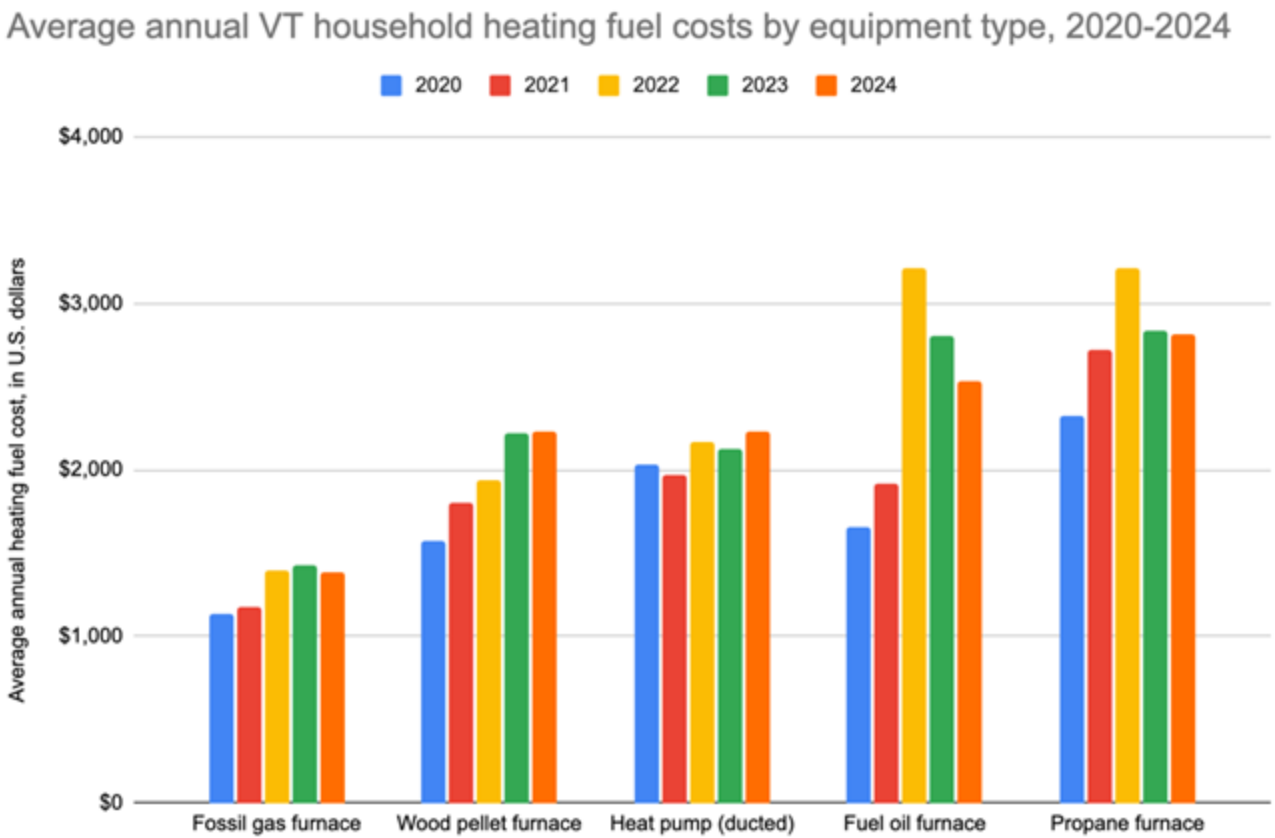
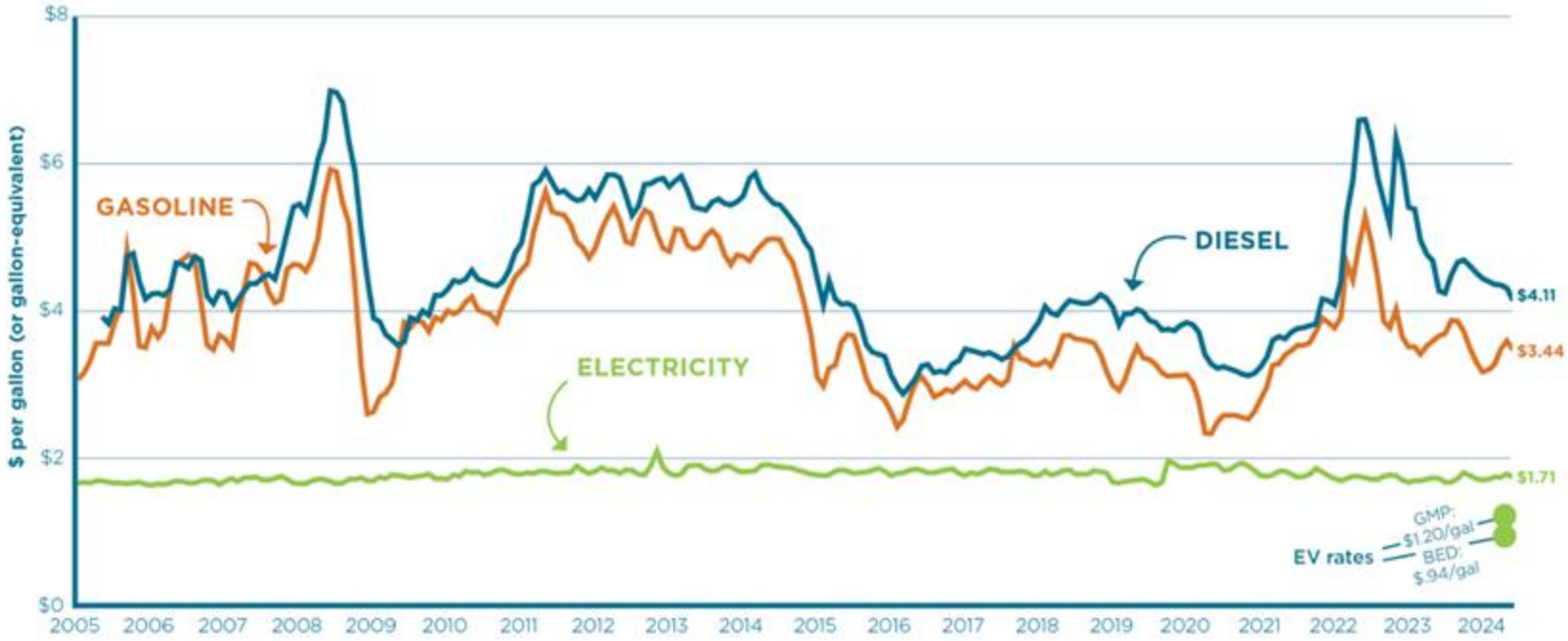


Consumption data from VT Department of Taxes and VGS; expenditures estimated based on monthly average prices from the PSD, EIA, and VGS.

Cost comparison of different transportation fuels over time in VT (adjusted for inflation, June 2024 dollars)



Sources: VT gas and electric prices: EIA, 2024. Diesel: Vermont Agency of Transportation, 2024. EV rates: Green Mountain Power and Burlington Electric Department, 2024. **Note:** Data through June 2024. Prices shown are in June 2024 dollars, using the U.S. Bureau of Labor Statistics Consumer Price Index.

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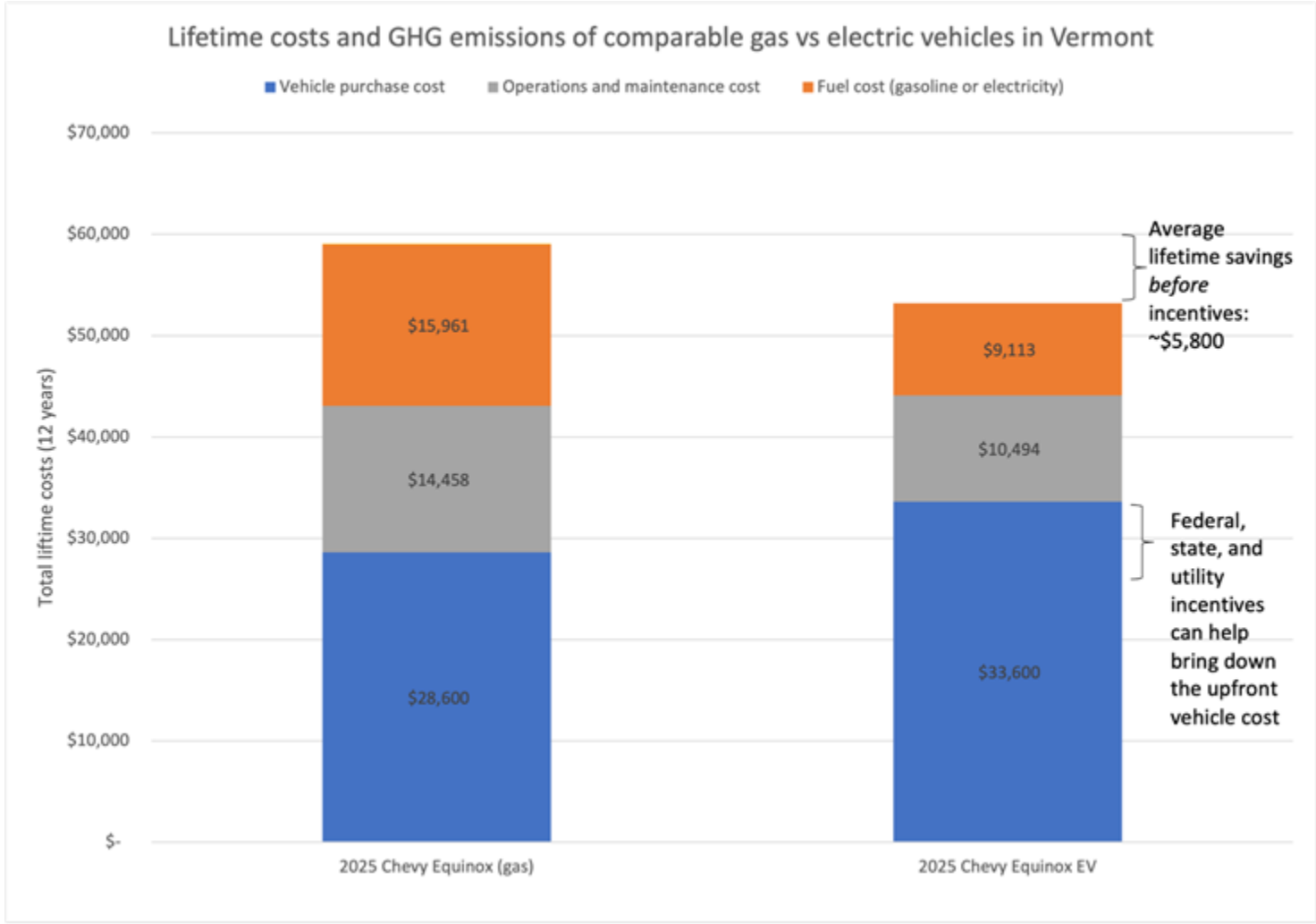
Lifetime cost savings of switching to an electric vehicle

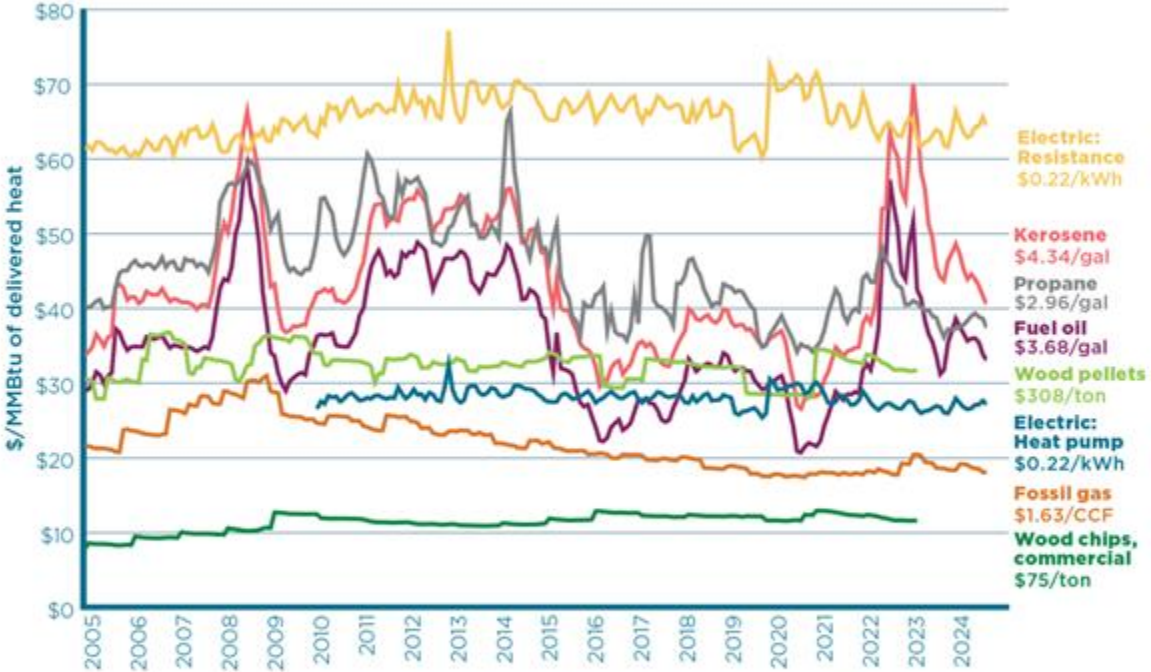
Estimated savings on fuel and maintenance: ~ $9,500

+

Avoided social costs from reduced fuel-related GHG emissions over the life of the vehicle: ~ $7,000


Lifetime costs and GHG emissions of comparable gas vs electric vehicles in Vermont
Vehicle purchase cost
Operations and maintenance cost
Fuel cost (gasoline or electricity)
Total liftime costs (12 years)
$70,000
$60,000
$50,000
$40,000
$30,000
$20,000
$10,000
$-
$15,961
$14,458
$28,600
$9,113
$10,494
$33,600
2025 Chevy Equinox (gas)
2025 Chevy Equinox EV
Average lifetime savings *before* incentives: ~$5,800
Federal, state, and utility incentives can help bring down the upfront vehicle cost

Cost comparison of different heating fuel options over time (adjusted for inflation, June 2024 dollars)



Sources: Fuel oil, propane, kerosene prices: VT Department of Public Service, Retail Prices of Heating Fuels, 2024. Fossil gas: VGS, 2024. Electricity: EIA, 2024. Wood chips, wood pellets: Biomass Energy Research Center, 2023. **Notes:** Electricity prices presented here are a statewide average but vary by utility territory. The reason propane is usually more expensive per MMBtu than fuel oil but less expensive on a per gallon basis is because propane has a lower energy content per gallon (66% of the energy of fuel oil per gallon). Prices reflect data availability at the time of publication: through June 2024. Prices shown are in June 2024 dollars, using the U.S. Bureau of Labor Statistics Consumer Price Index.

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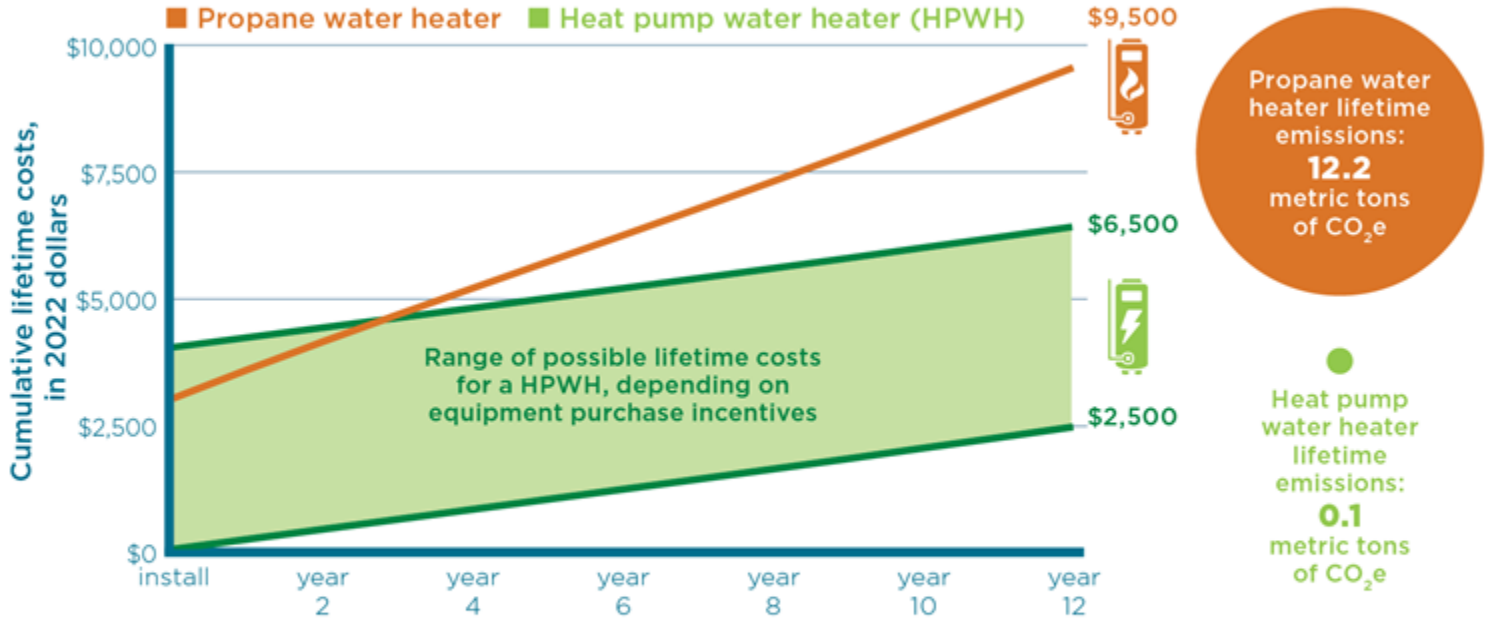
Lifetime costs of propane water heater vs. heat pump water heater (installed cost + fuel)



Sources: Annual energy load and efficiency assumptions from the Efficiency Vermont 2023 Technical Reference Manual; Propane emissions factor from EPA; Electricity emissions factors assume a linear reduction over time, reaching zero emissions by 2035 in accordance with Vermont's Renewable Energy Standard. Prices shown are in 2022 dollars and reflect projections from EIA's 2023 Annual Energy Outlook for 2024-2035. **Note:** While installed costs of propane water heaters can vary, there is greater variation in heat pump water heater installed costs due to the availability of incentives. Different installed costs for heat pump water heaters reflect federal tax credits and state-level incentives for various income levels, including Switch and Save and Weatherization Assistance Program incentives that can bring the upfront cost as low as $0.

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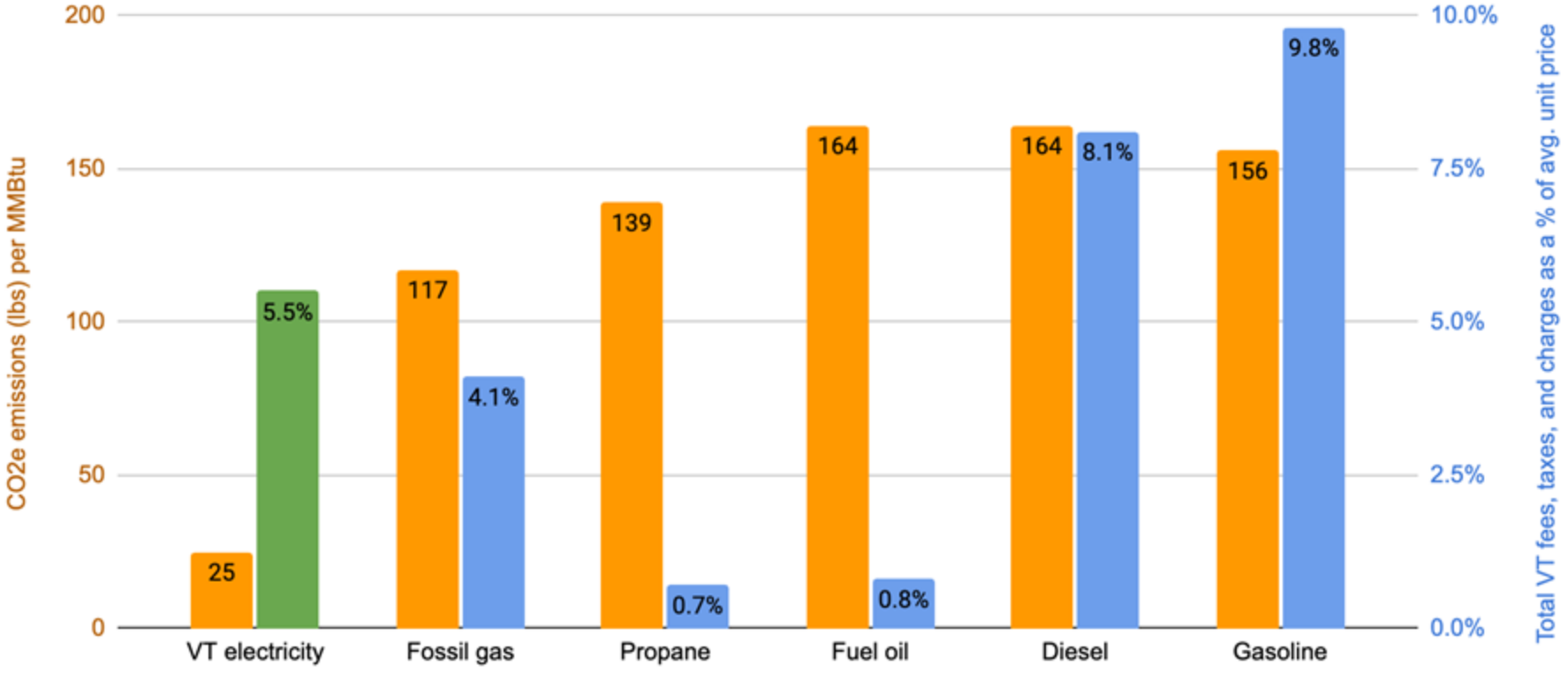
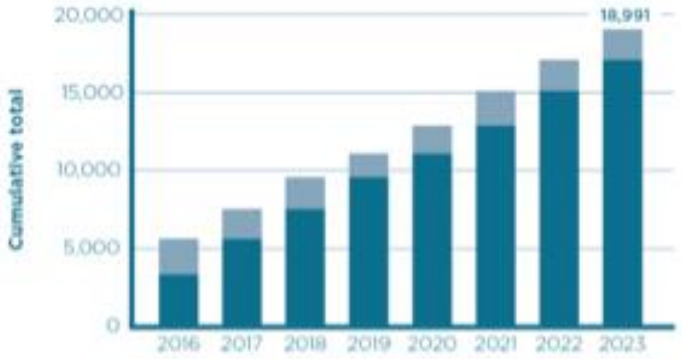
Vermont fees, taxes, and charges vs. emissions by fuel, 2024



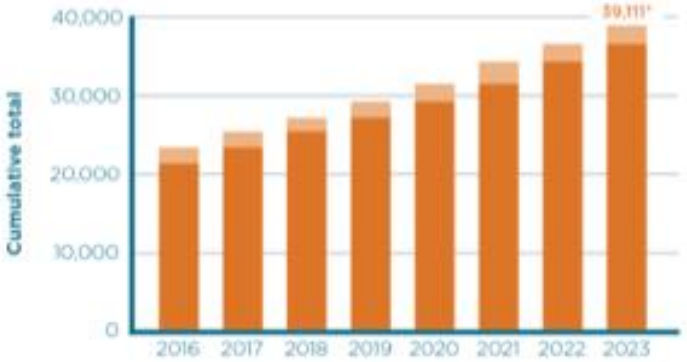
Residential heat pump water heaters



Heat pump water heaters by county as of 2022

Click on a county to filter

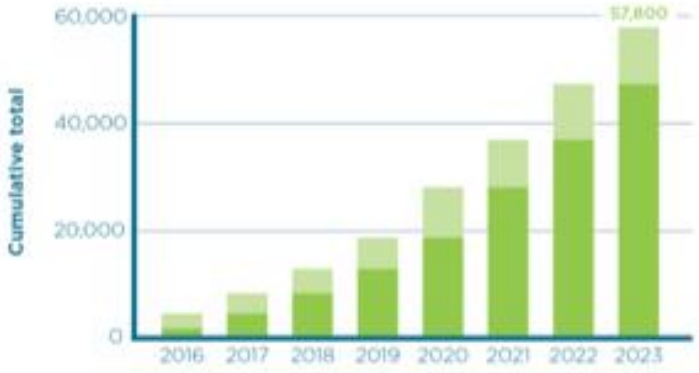
Housing units comprehensively weatherized



Weatherization by county as of 2022

Click on a county to filter

Residential cold-climate heat pumps

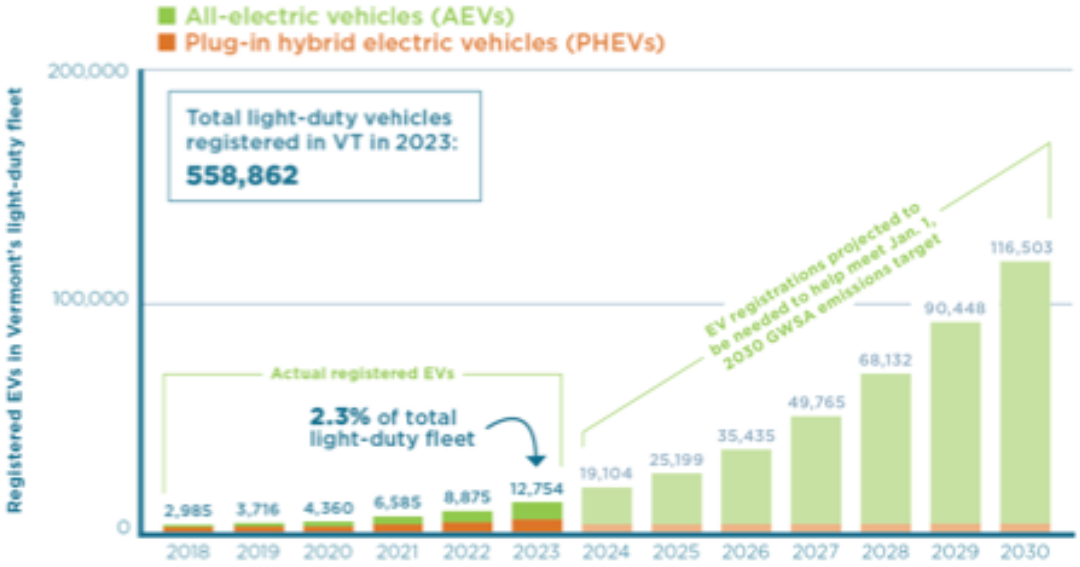


Cold-climate heat pumps by county as of 2022

Click on a county to filter

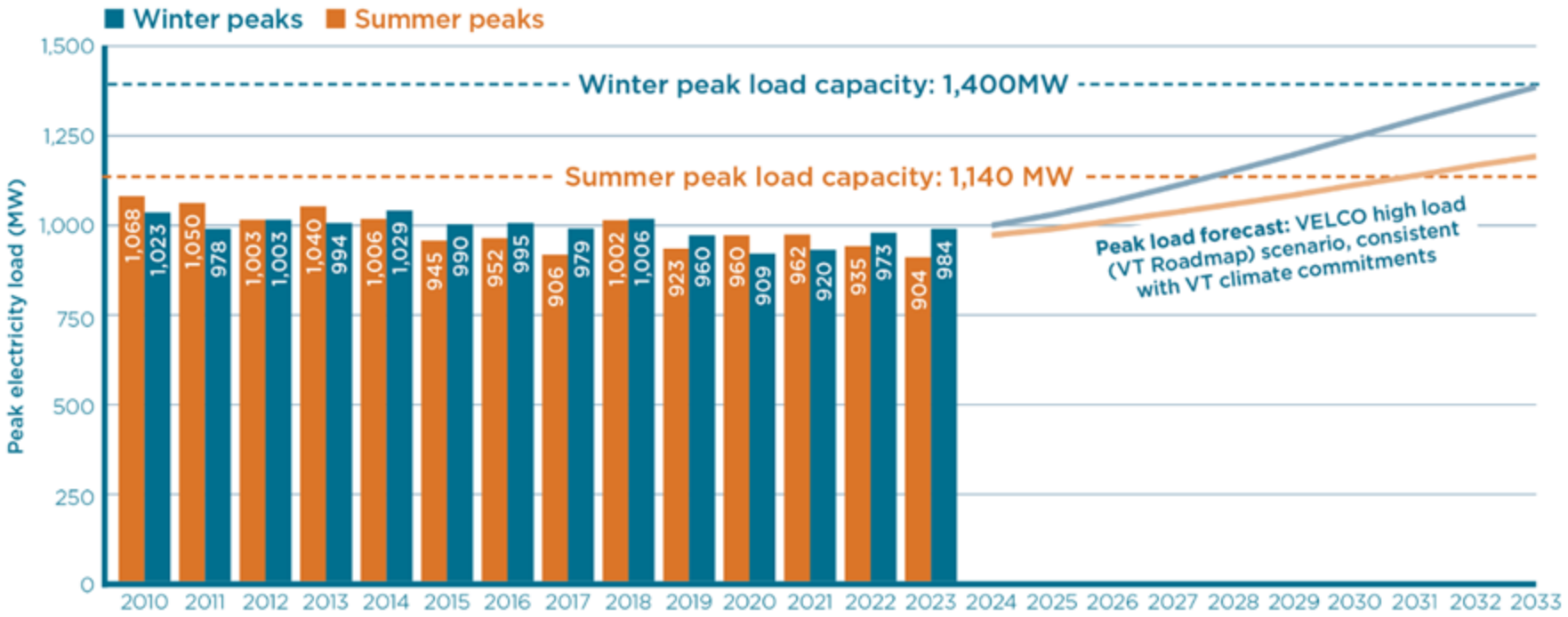
- VT has the highest number of EVs per capita in New England
- **17,939** plug-in EVs in VT as of January 2025
  - **60%** all-electric

Vermont EV registrations and future Pathways targets



Source: Drive Electric Vermont, 2024; Vermont Pathways Report 2.0, 2022; VT Agency of Natural Resources, 2024.

Vermont historical and forecasted peak loads



Source: VELCO, "2024 Vermont Long-Range Transmission Plan," 2024. **Note**: Peak load forecast shown is for a high growth scenario consistent with Vermont climate commitments.

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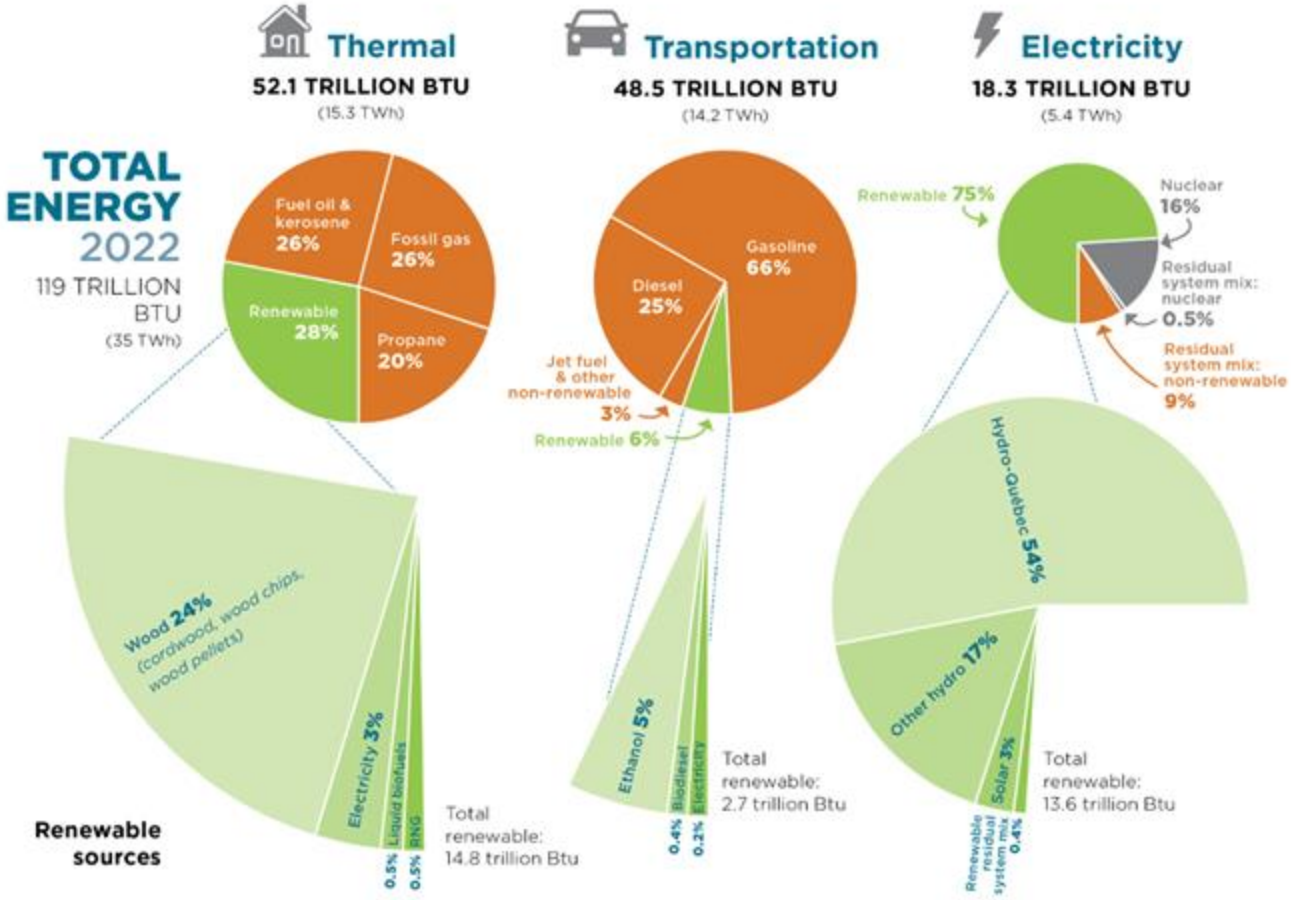

Sources: Energy Information Administration, 2024; Efficiency Vermont, 2024; Vermont Department of Public Service, 2024; Vermont Department of Taxes, 2024; EAN, 2024. **Notes:** The electricity pie chart does not include electricity used for thermal and transportation purposes, as that electricity usage is shown in the respective thermal and transportation pie charts. Percentages may not sum exactly to 100% due to independent rounding. The electricity pie chart shows Vermont's electricity portfolio after accounting for RECs. One result of this is that wind and biomass generation in Vermont do not show up as electricity resources, since RECs from those resources are primarily sold out of state. Fuel oil includes a small amount of kerosene, which accounts for 0.6% of total thermal energy use.

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