

Analyzing changes in fossil heating fuel use in Vermont, 2018-2023

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Vermont’s thermal sector—also referred to as the residential, commercial, and industrial (RCI) fuel use sector—is responsible for more than one-third of the state’s total greenhouse gas (GHG) emissions. The majority of thermal sector emissions are related to the direct combustion of fossil fuels in buildings, largely for space and water heating. Specifically, fuel oil, propane, and fossil gas are responsible for the vast majority—over 90%—of GHG emissions in Vermont’s thermal sector.

Between 2018 and 2023, total annual sales of these fossil heating fuels decreased by 12%, according to data from the Vermont Department of Taxes. The decline was largely driven by a 22% reduction in sales of fuel oil, in addition to a 9% reduction in fossil gas sales. Propane sales, on the other hand, increased by just over 4%.

Vermont annual fossil heating fuel sales, 2018–2023

	Sales of fuel oil, kerosene, other (gallons)	Propane sales (gallons)	Fossil gas sales (MMcf)	Total heating fuel sales (MMBtus)
2018	142,760,715	105,640,210	13,750	43,678,368
2019	144,042,019	112,071,541	13,882	44,580,738
2020	138,113,813	96,992,594	13,043	41,511,478
2021	125,390,288	110,776,478	13,255	41,229,465
2022	121,538,893	114,116,456	13,463	41,216,983
2023	111,123,798	110,130,821	12,519	38,432,014
% change (2018–2023)	-22.16%	+4.25%	-8.95%	-12.01%

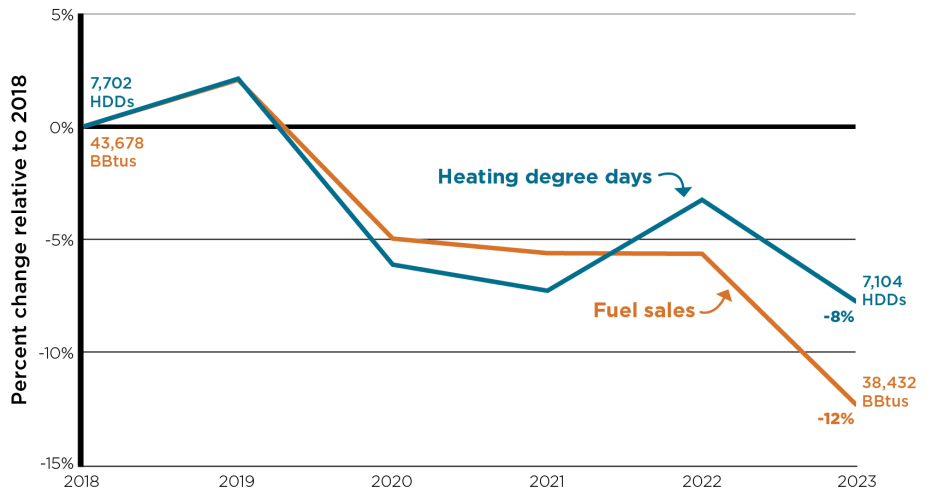
Sources: Fuel oil and propane: Vermont Department of Taxes; Fossil gas: VGS; Conversion factors for energy content: EIA.



Over this time, Vermont’s winters have been getting warmer, reducing demand for fossil fuels for space heating. Specifically, annual heating degree days in 2023 were nearly 8% lower than in 2018. Given that the majority of fuel oil, propane, and fossil gas consumption in Vermont is related to space heating, we estimate that warmer winter temperatures are the single largest factor contributing to the reduction in fuel sales over this time period, accounting for approximately half of the observed decline.

In addition to the effect of warmer winters, several other factors likely played a role, including increased adoption of electrification, efficiency, and other pollution reduction measures. Specifically, Vermont is beginning to see the results of increased adoption of high-efficiency electric heat pumps over the last several years, which we estimate may be responsible for nearly one-third of the observed decrease in fossil heating fuel sales. Additionally, improvements in the average efficiency of fossil fuel heating equipment, as well as increased adoption of heat pump water heaters and home weatherization, have likely played a role.

Percent change in fossil heating fuel sales and heating degree days in VT, relative to 2018



Sources: Heating fuel sales data: Vermont Department of Taxes, 2024; VGS, 2024. Fuel heat content conversion factors: U.S. Energy Information Administration, 2023. Heating degree days: NOAA Climate Prediction Center, 2023.



Recent reductions in fossil heating fuel use will help bring Vermont closer to meeting its legally-mandated emissions reduction targets, but the data show that much more progress is still needed. Vermont’s Global Warming Solutions Act (GWSA) established legal obligations for the state to reduce its GHG emissions by at least:

- 26% below 2005 levels by 2025,
- 40% below 1990 levels by 2030,
- and 80% below 1990 levels by 2050.

In order to meet the January 1, 2025 target for thermal sector emissions, Vermont would need to achieve a nearly 9% reduction in annual emissions from 2023 to 2024. Given insufficient adoption and utilization of cleaner heating measures to date, the possibility of meeting this sectoral target for 2024 will, at this point, likely depend on whether and to what degree the warming trend continues through the end of the 2024 heating season. Looking ahead to Vermont’s 2030 and 2050 emissions reduction obligations, confidently achieving the thermal sector GHG pollution reduction targets will require reducing dependence on fossil fuels via significantly increased heat pump adoption, weatherization, and other durable, non-weather dependent pollution reduction measures.