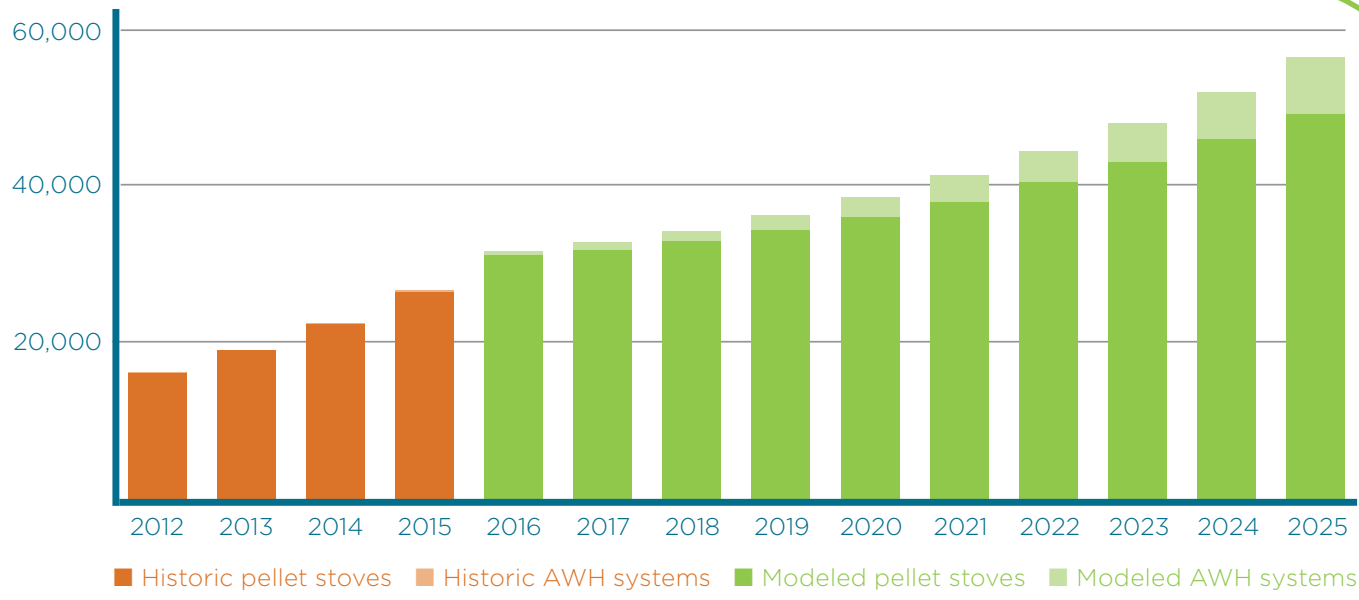


Thermal energy and weatherization in Vermont

Advanced wood heat (AWH) systems



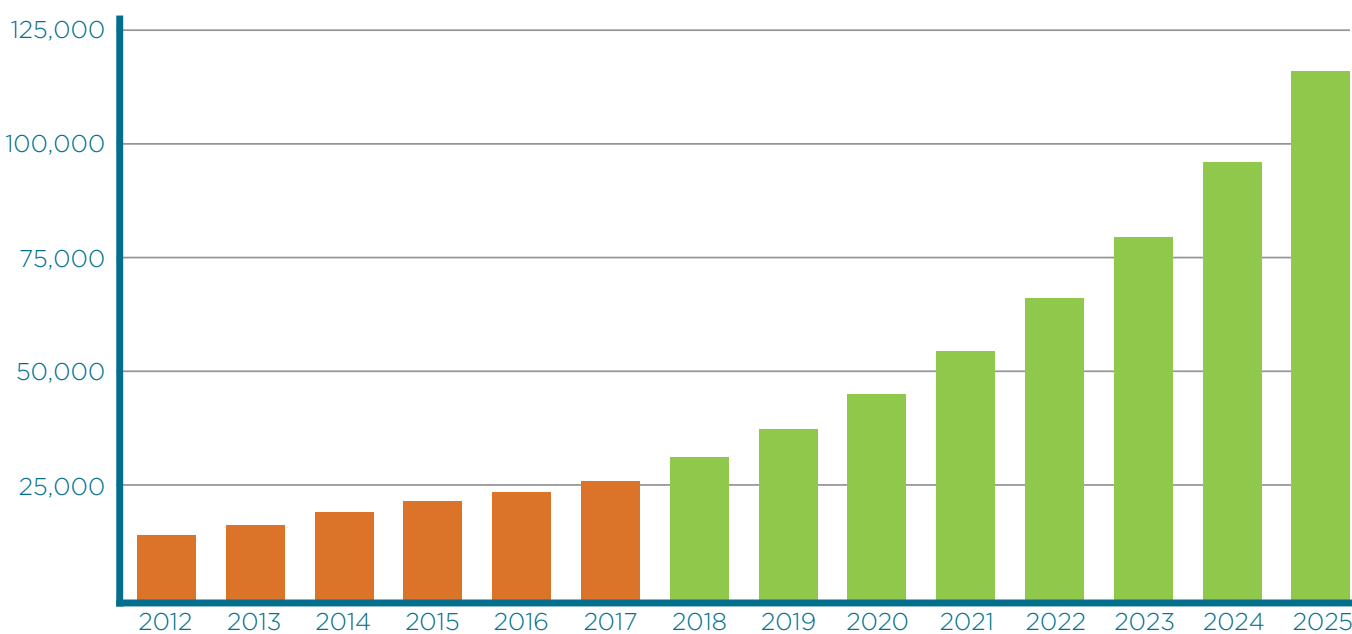
In order to achieve the numbers set forth in the 2025 “Path to Paris” analysis, we would need to convert about a third of Vermont’s 335,224 housing units¹ from fossil fuels to renewable heat by 2025. How are we doing so far?

Historically, nearly all of our growth in advanced wood heat has come from pellet stoves. Going forward, the Biomass Energy Resource Center (BERC) has modeled moderate growth in pellet stoves and significantly more growth in automated advanced wood heat systems to meet our state goals.²

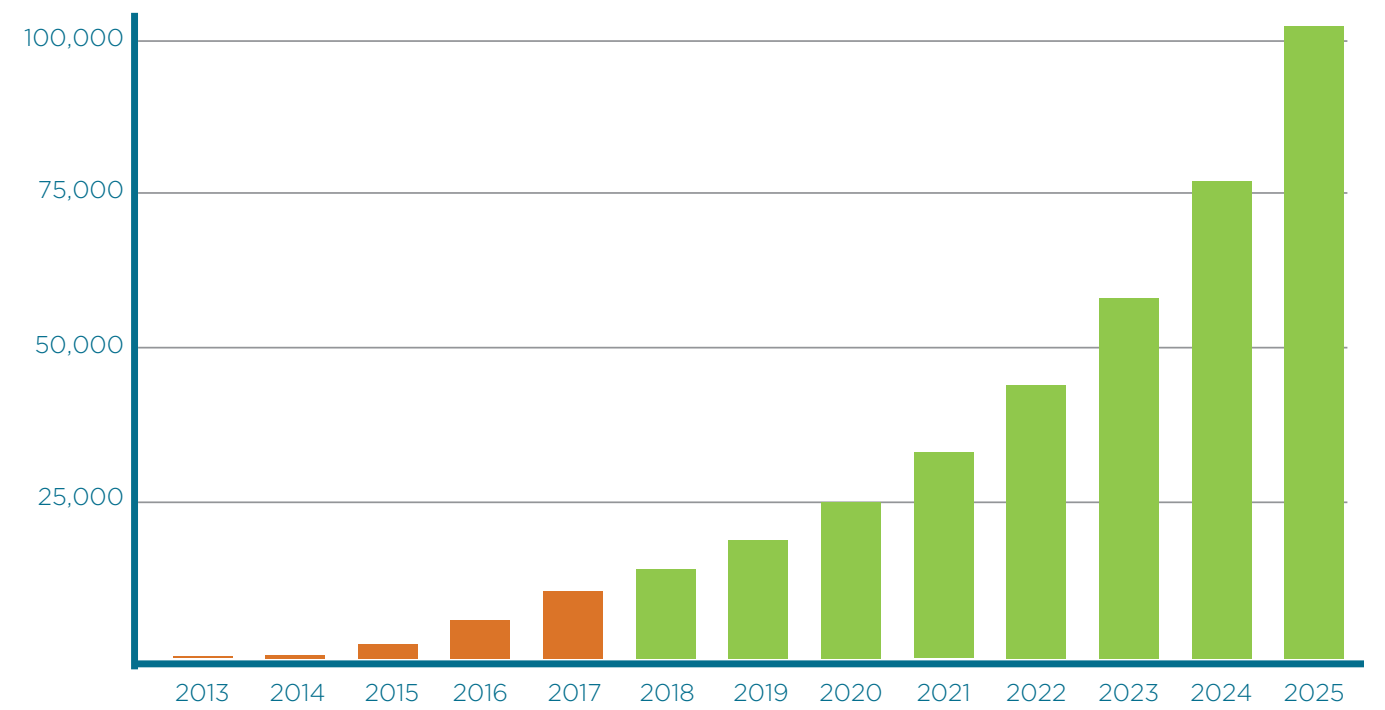
The Path to Paris models 90,000 additional heat pump systems by 2025. Historically, adoption has more than doubled each year, which is a good sign! Going forward, adoption would need to increase by 37% each year to reach 90,000 systems by 2025.³

The Path to Paris models retrofitting an additional 80,000 buildings, achieving 25% savings in thermal energy use per building. At a flat rate of growth, that would mean weatherizing 11,250 homes per year. Currently we are only weatherizing approximately 2000 homes per year, and falling slightly short of 25% savings per home.⁴

Weatherization



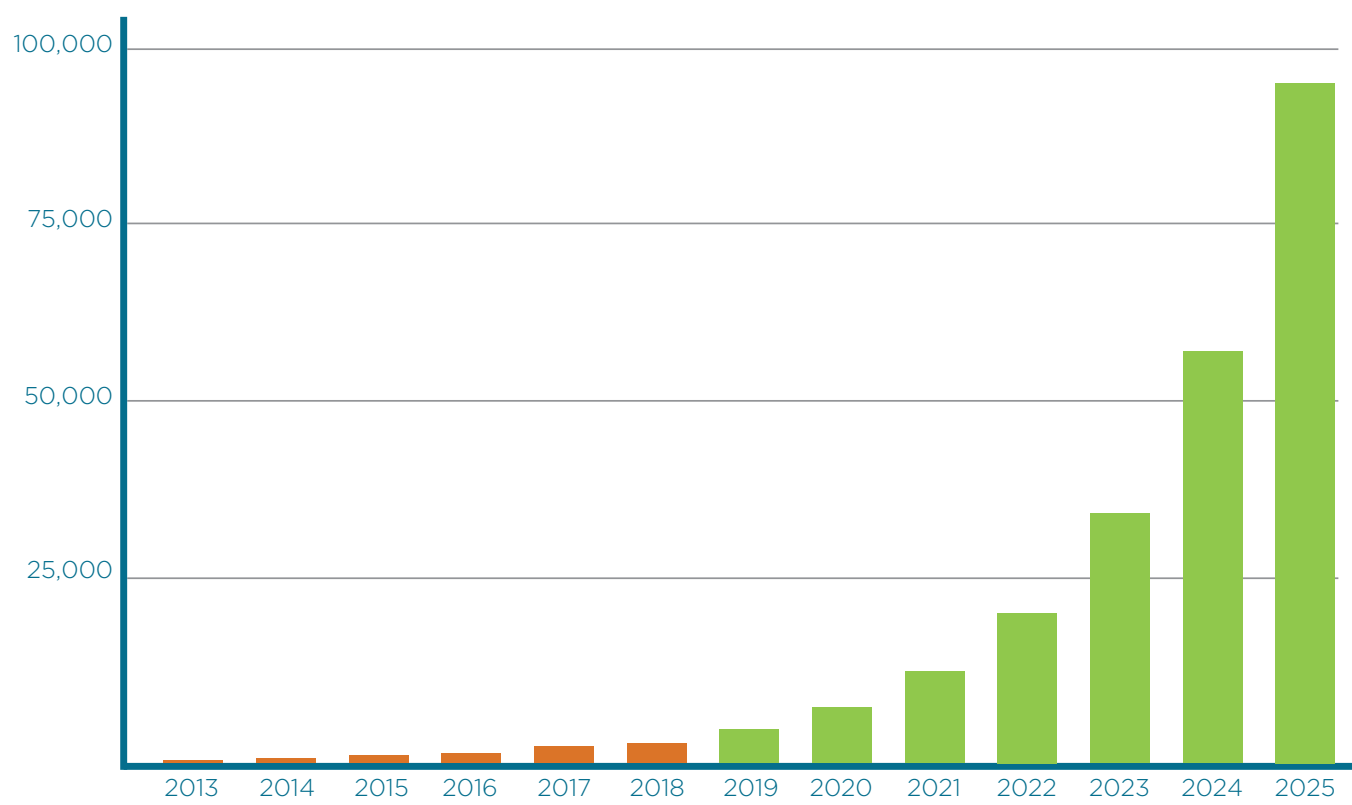
Heat pump systems



1. United States Census Bureau. 2. Historic heat pump data extrapolated from Efficiency Vermont rebate data and assumes rebates capture 75% of statewide installations. 3. Historic and modeled data from the Biomass Energy Resource Center (BERC). 4. Department of Public Service, 2018 Building Energy Report.

Is Vermont moving fast enough on electric vehicles?

Electric Vehicles



While electric vehicle (EV) adoption has been growing, in order to reach the Path to Paris model of **90,000 additional EVs by 2025**, adoption would need to grow about 65% each year, which is significantly faster than it has been to date.¹

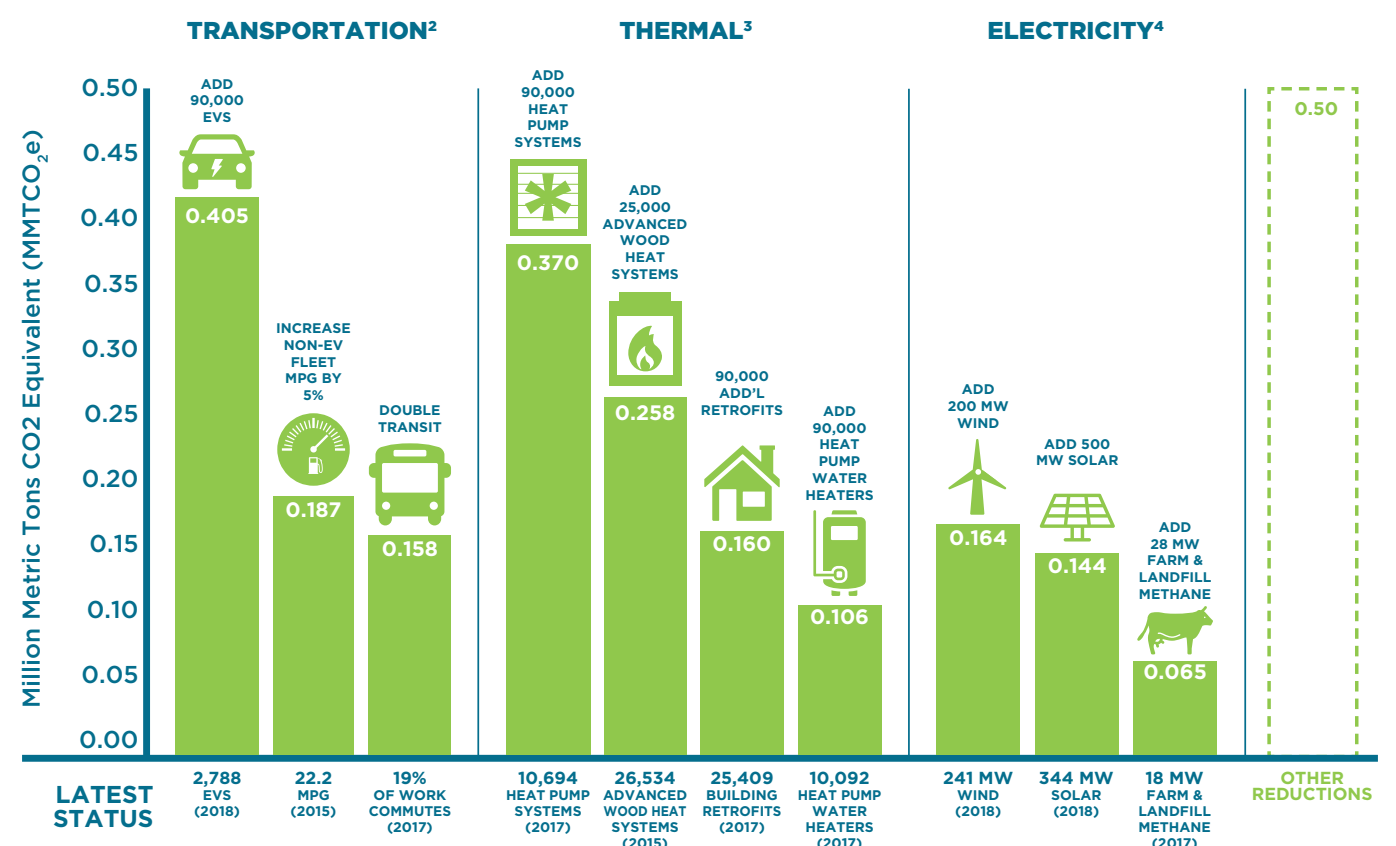
For context, an estimated 264,000 new vehicles will be sold in VT by 2025, which means EVs would have to make up roughly a third of all new vehicle sales from 2019-2025.²

1. Historic data from Drive Electric Vermont. 2. Extrapolated from Auto Alliance Vermont State Facts.

An energy poster (to keep the facts handy)

What will it take to meet Vermont’s Paris Climate Agreement commitment? Here’s one path:

Path to Paris: 2.53 MmtCO₂e reduction by 2025 is required to meet the Paris Agreement¹



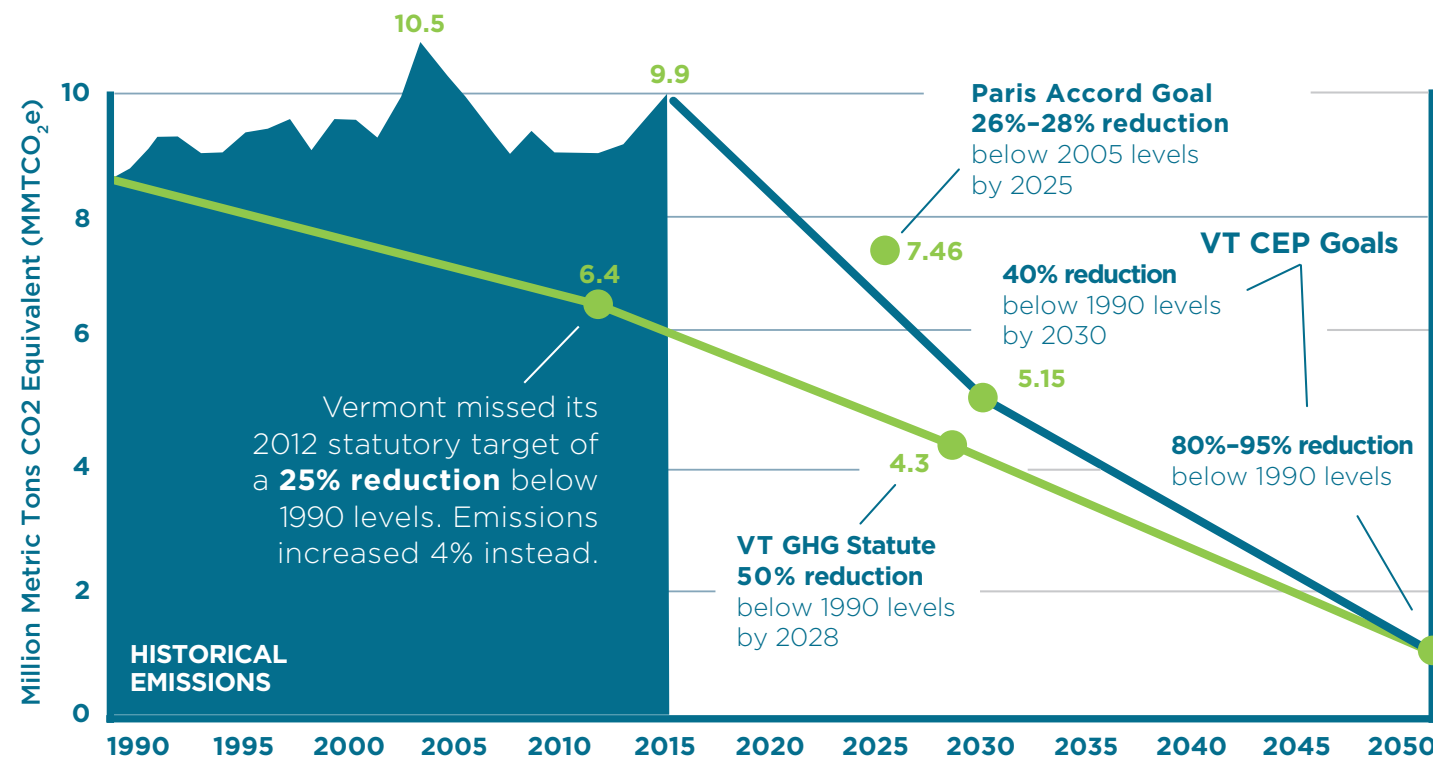
1. EAN calculations based on relative emissions reductions in MMTCo₂e based on 2018 Greenhouse Gas Emissions Inventory Brief (1990-2015), VT Agency of Natural Resources. 2. EVs assumes 50% AEV and 50% PHEV. Transit includes direct reduction of single occupancy vehicle commutes through buses, trains, rideshare, vanpool, etc. 3. Heat pumps and heat pump water heaters assume switching from oil or propane heaters to 75% renewable electricity. Advanced wood heat includes automated, central wood heat systems and pellet stoves. Weatherization assumes project results in 25% reduction in energy use (the statutory goal). 4. Wind includes imported wind, since there are no plans to build wind in Vermont prior to 2025.



17 State Street, Suite 205, Montpelier, VT 05602

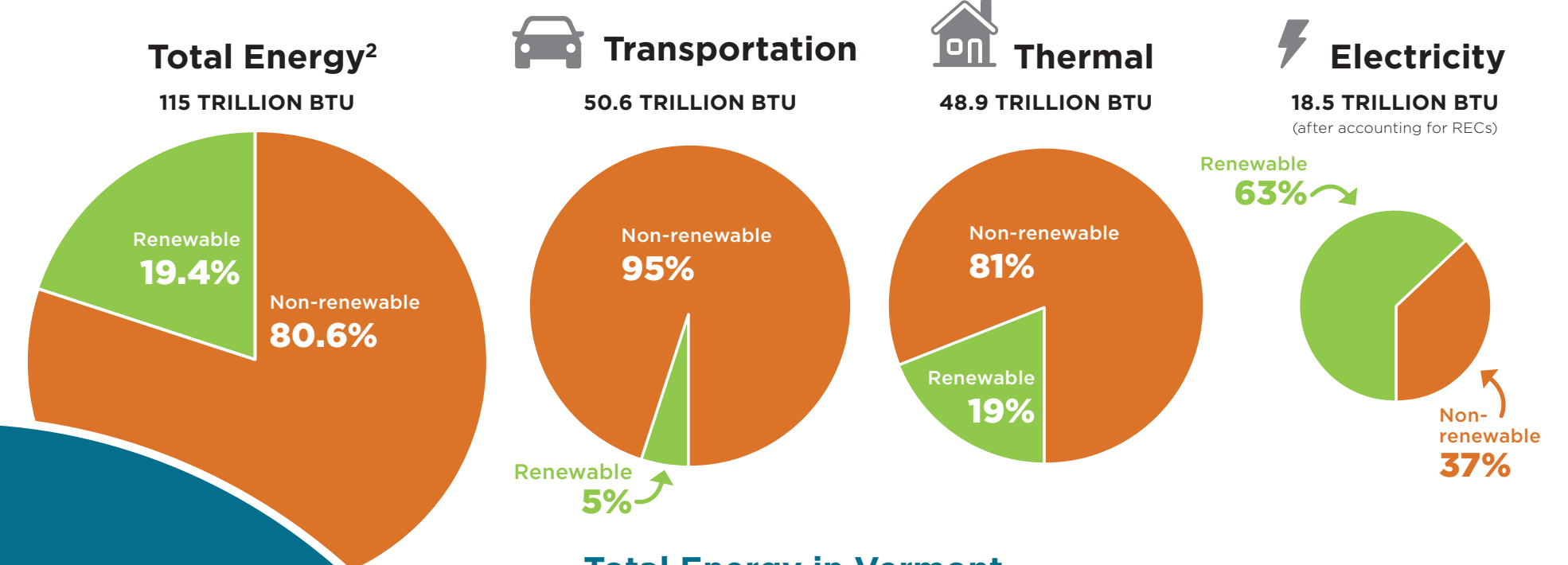
EANVT.ORG | VTENERGYDASHBOARD.ORG

What will it take to meet our emissions commitments?



Greenhouse gas (GHG) emissions are on the rise statewide. We are now **16% above 1990 levels, and just 2% below peak 2005 levels.** Between 2013-2015, emissions from transportation and thermal fuel together accounted for nearly 80% of Vermont's overall emissions increase.¹

How renewable is Vermont today?



Total Energy in Vermont

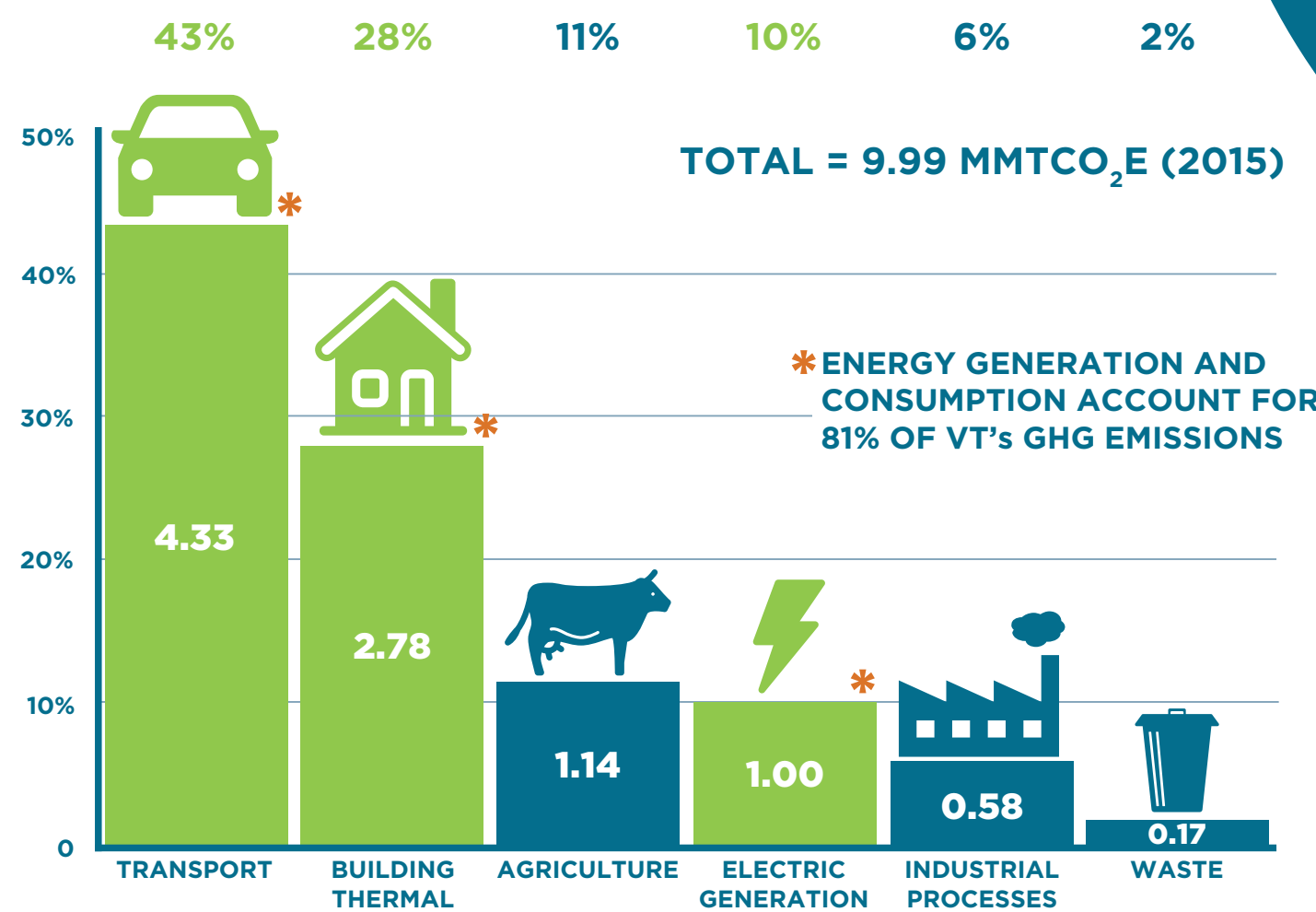
In total, Vermont has reached almost 20% renewable across transportation, thermal, and electric energy. That puts our 25% renewable by 2025 Comprehensive Energy Plan target within reach. But it's clear that the majority of this progress has come from the electric sector, with transportation and thermal significantly further behind. Given the relative energy use of those two sectors, much more work will need to happen in thermal and transportation, even to reach 25% renewable.

Vermont is at an energy crossroads.

We have made strong progress on renewable energy adoption in the electric sector, but our emissions have been rising and focus is needed in the thermal and transportation sectors to reduce emissions and protect vulnerable Vermonters.

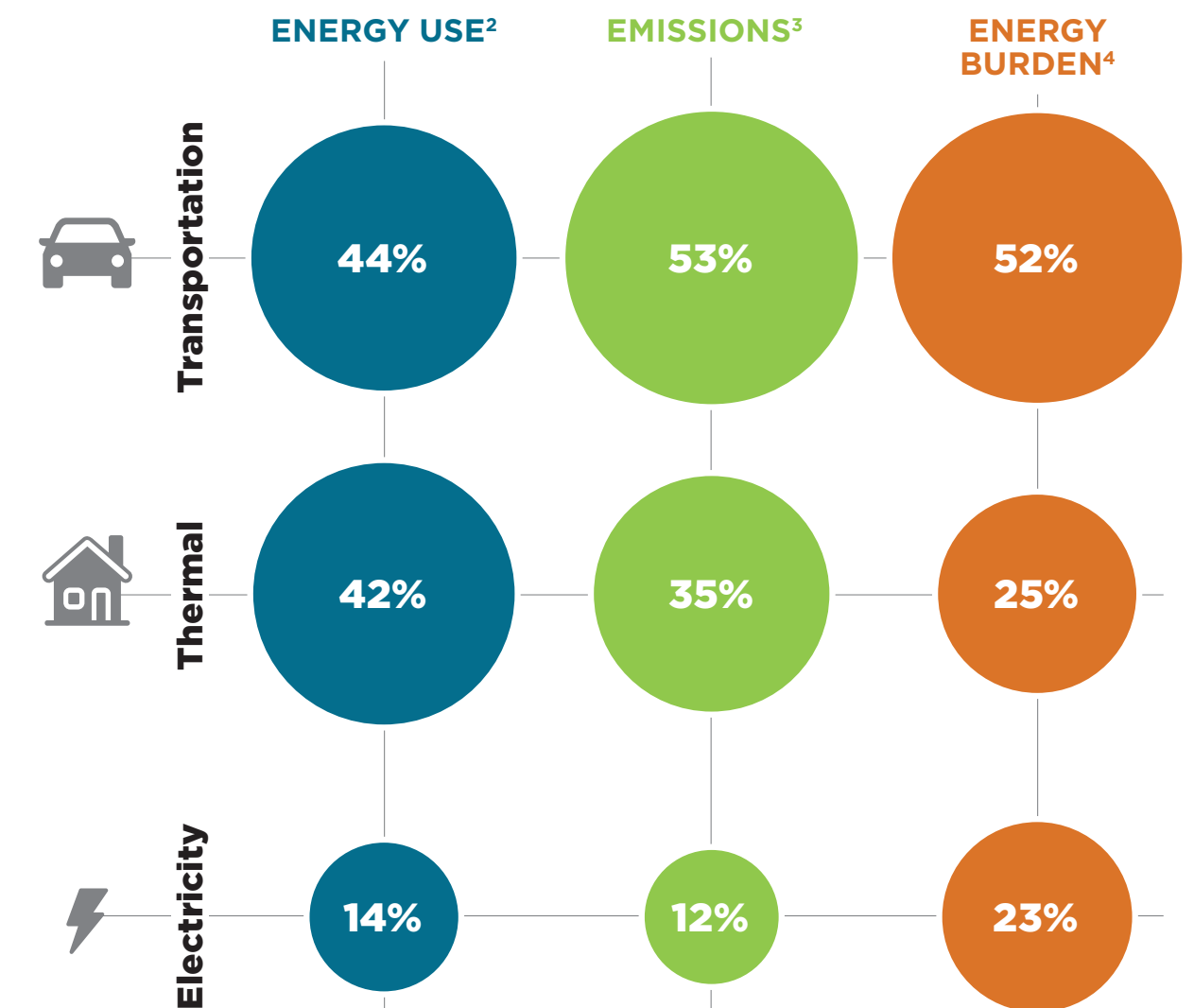


Vermont GHG emissions by sector



From 2013-2015 (the most recent year for which data is available) energy emissions were responsible for **98% of the GHG increase statewide** (46% from transportation, 33% from thermal, and 19% from electricity).¹

The energy conversation is a climate — and an equity — conversation



Though some may talk about transportation, thermal, and electricity as equal parts of Total Energy, each energy sector is unique in Vermont when it comes to relative energy use, emissions produced, and the energy burden (share of total energy costs for Vermonters) each creates. On all counts, transportation is the biggest challenge.