

Four vertical bars of different colors, each containing a word in white, uppercase letters. From left to right: a dark teal bar with 'ENERGY', a dark purple bar with 'EMISSIONS', an orange bar with 'ECONOMY', and a light green bar with 'EQUITY'. The bars are of varying heights, with 'EMISSIONS' being the tallest and 'EQUITY' being the shortest. They are all set on a thin grey horizontal base.

ENERGY
EMISSIONS
ECONOMY
EQUITY

2019 ANNUAL PROGRESS REPORT
for VERMONT

Energy Action Network Members

Over 100 Network Members

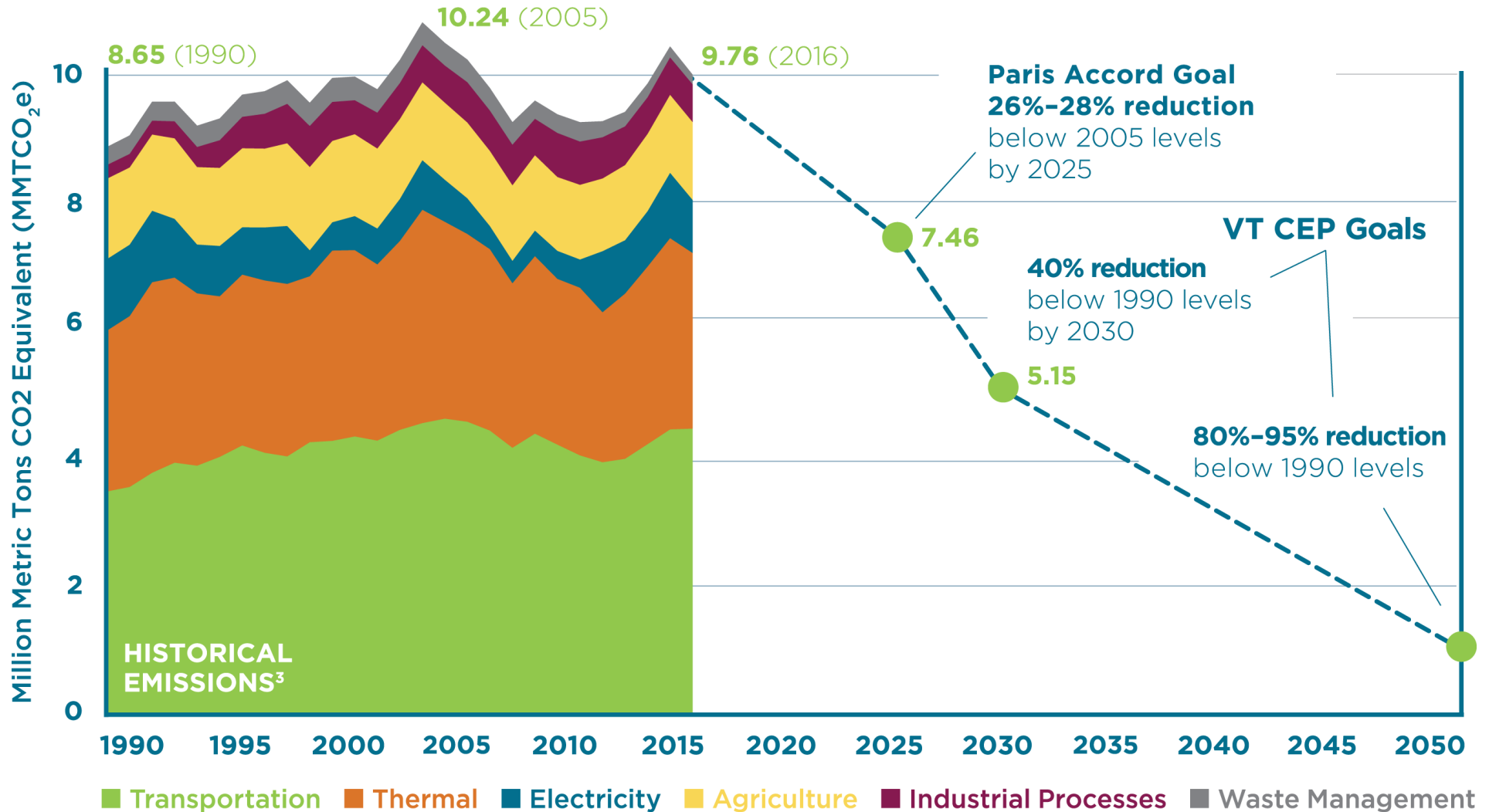


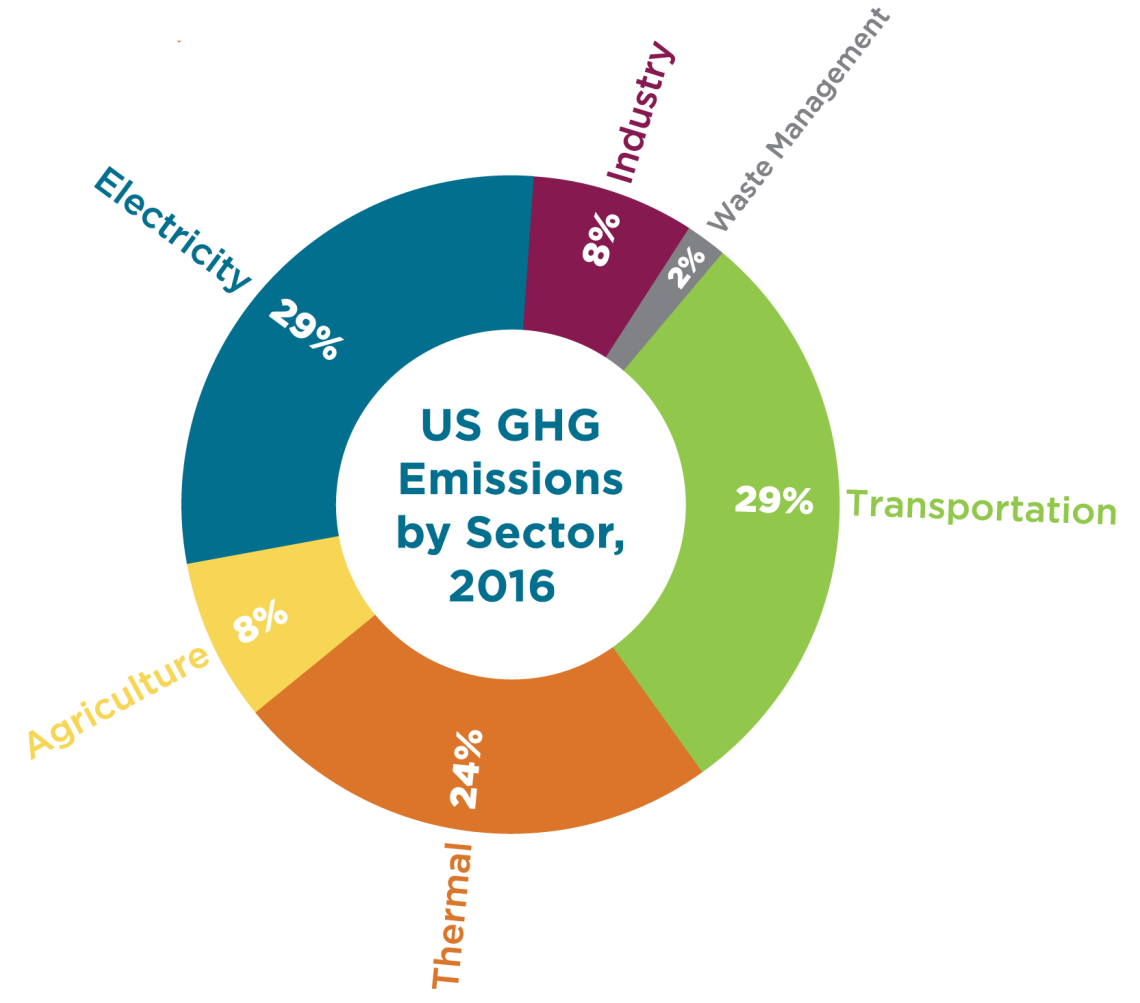
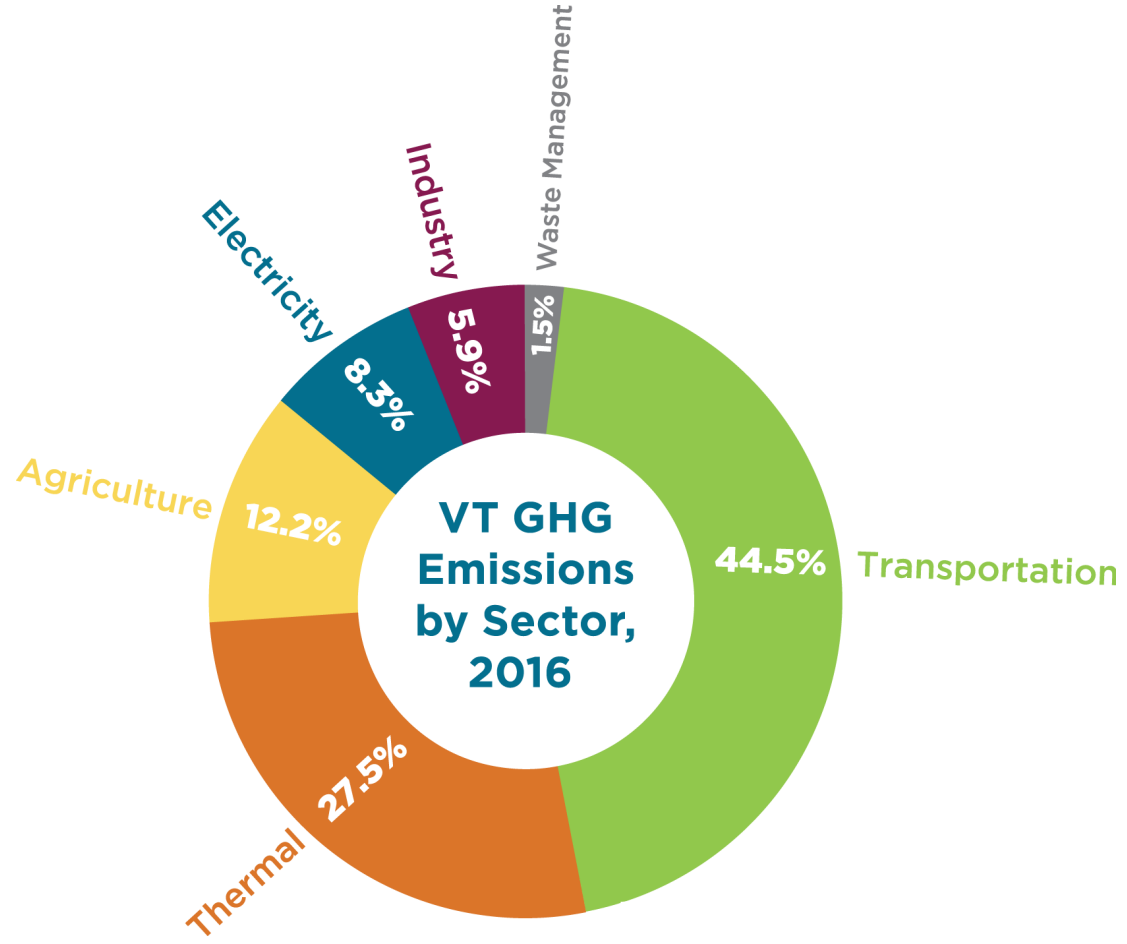
Energy Action Network Public Partners

Over 100 Public Partners

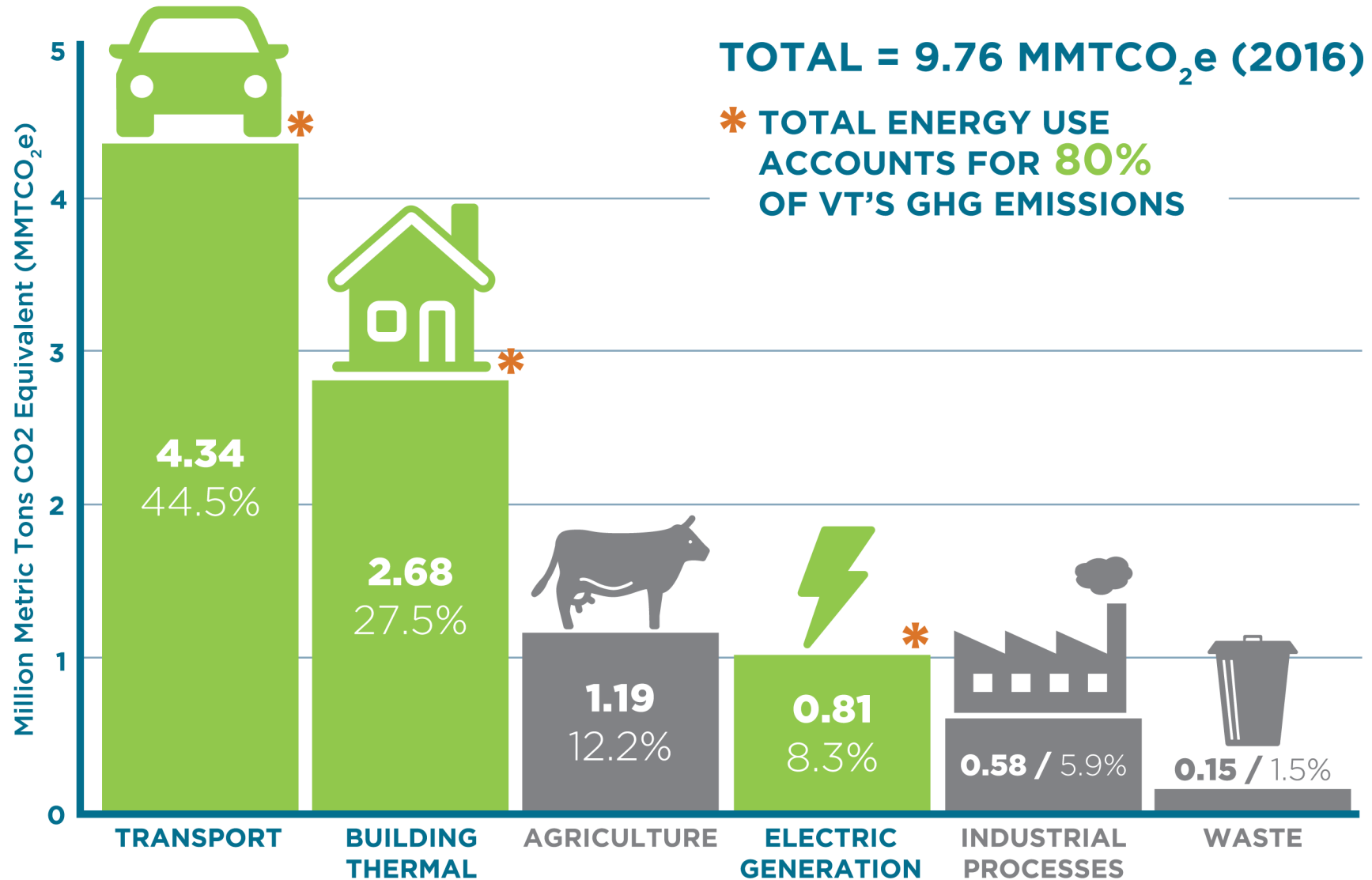


Now is the time for rapid emissions reductions beyond the electricity generation sector

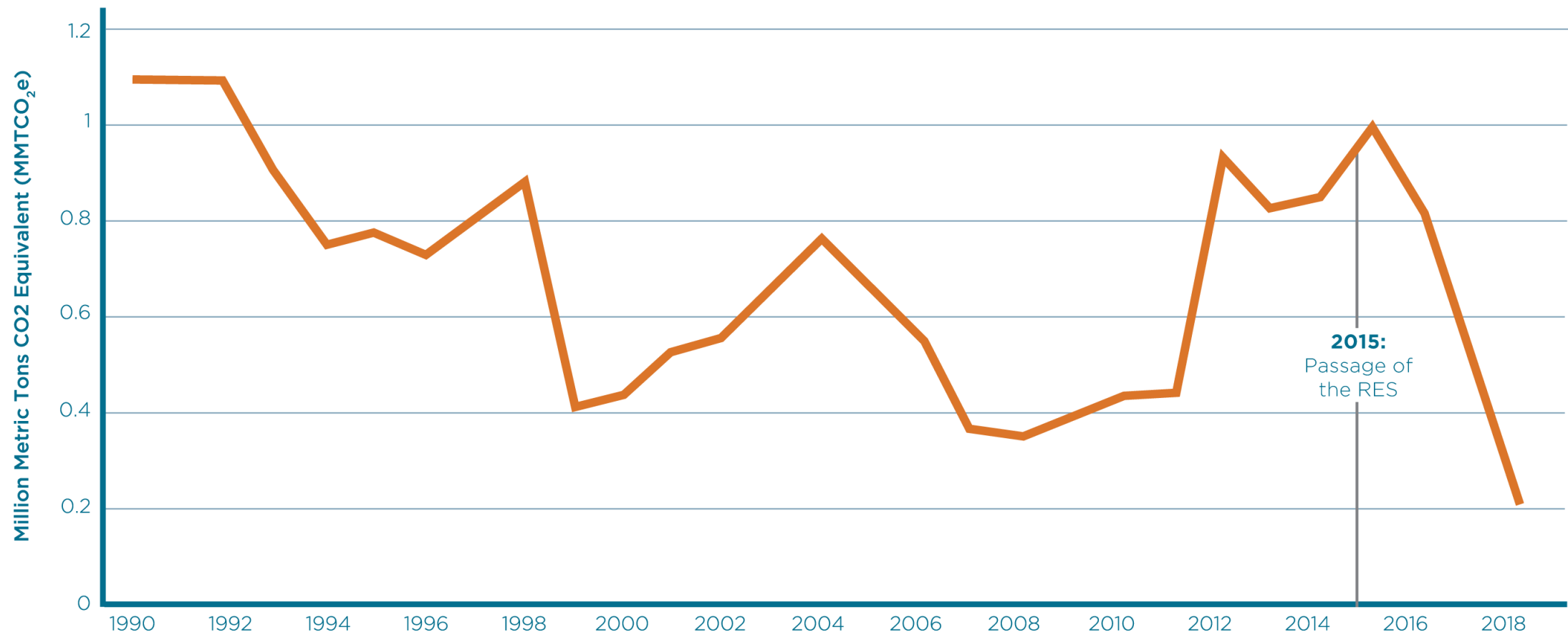




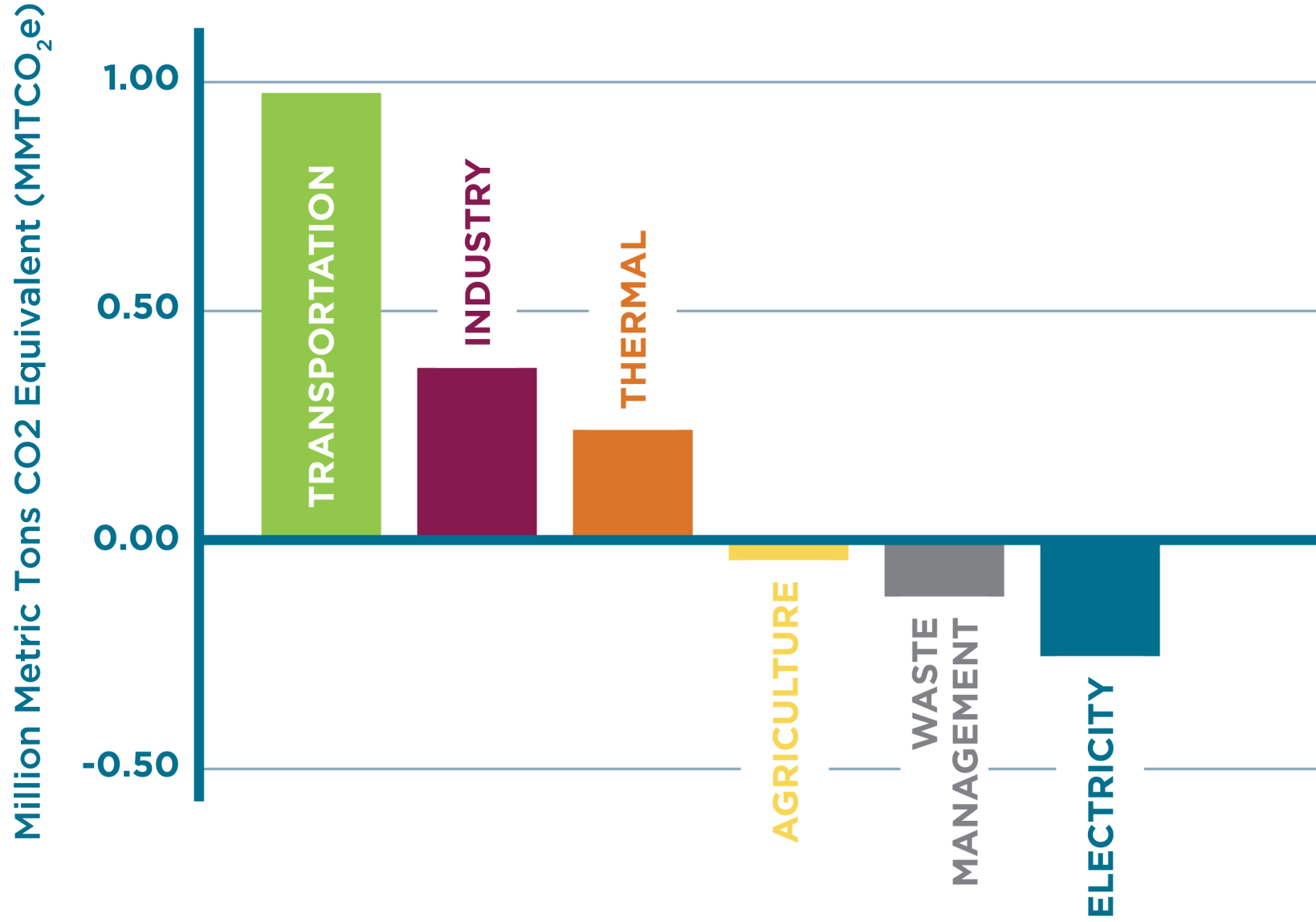
Vermont's GHG emissions by sector



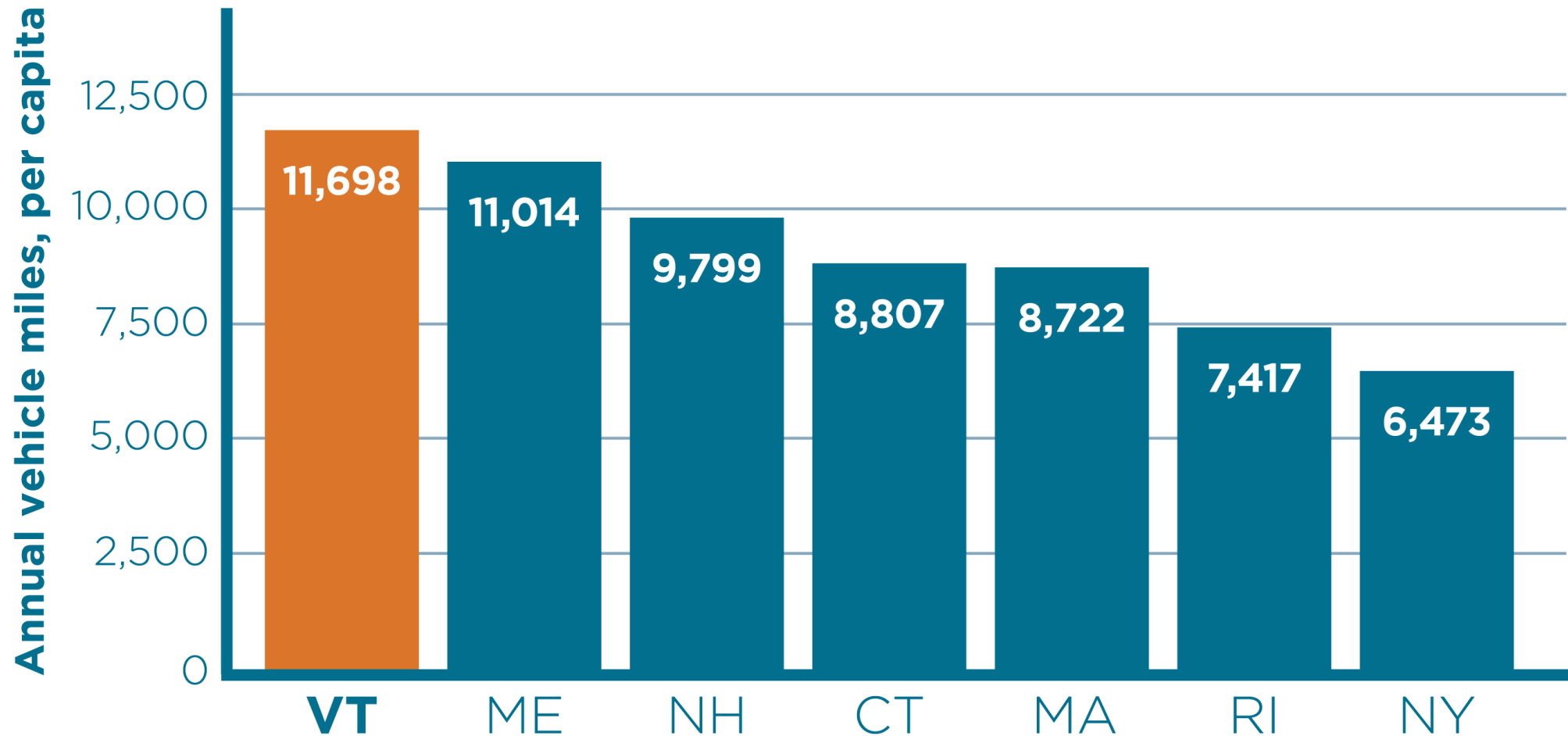
GHG emissions from the electricity sector, consumption based



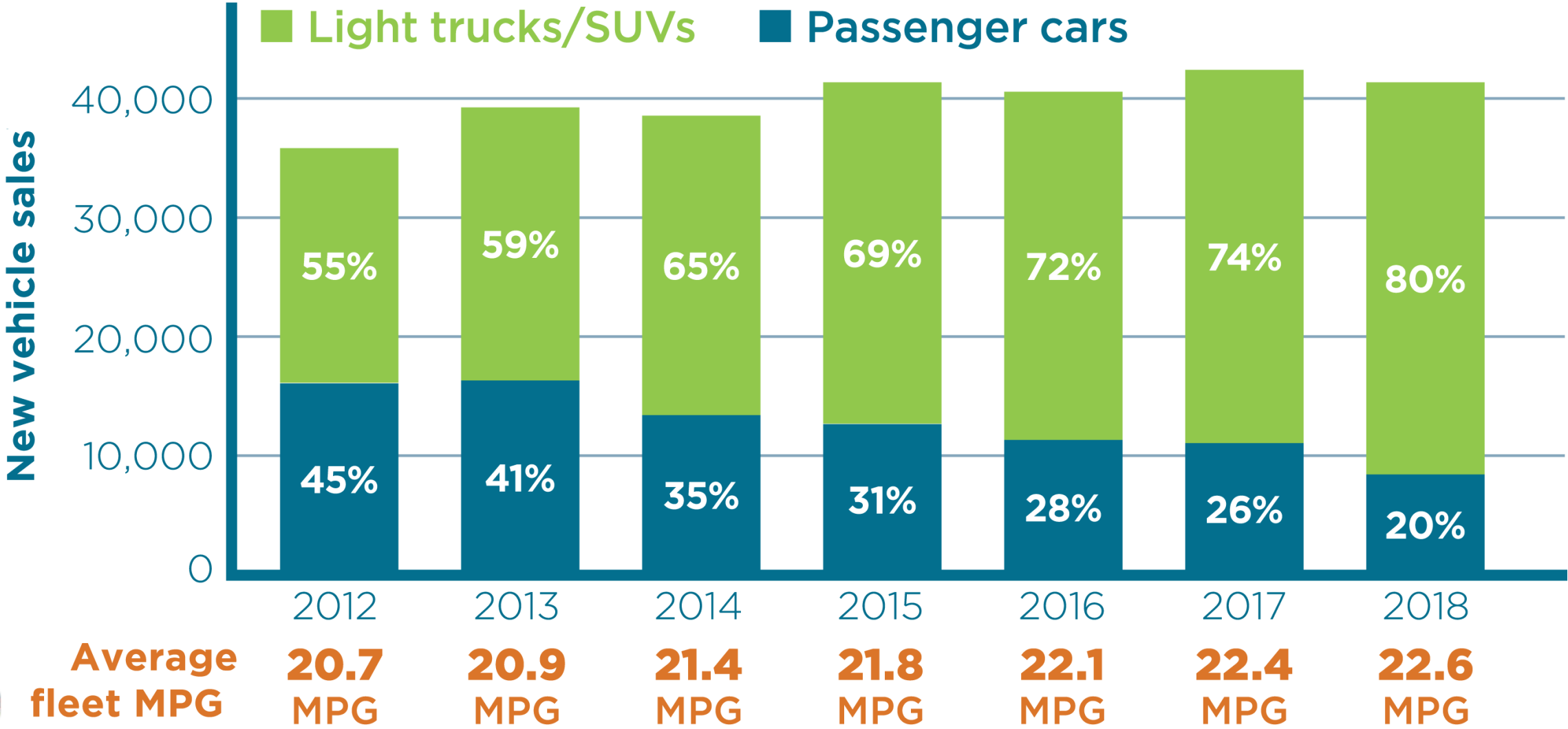
Total net change in VT GHG emissions, 1990 vs 2016: 1.11 MMTCO₂e



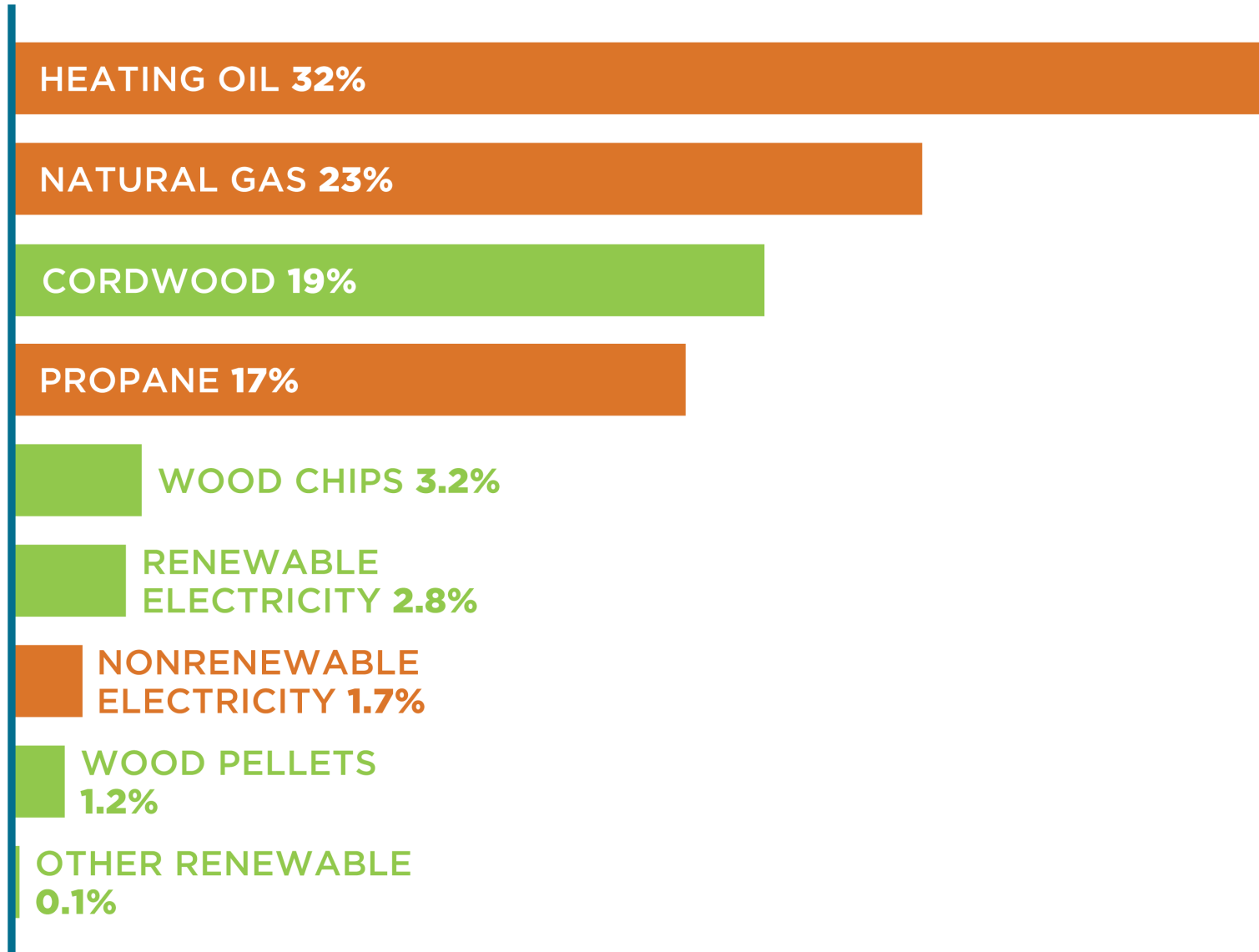
Vehicle miles traveled per capita, 2015



As cars get more efficient, we're buying bigger cars

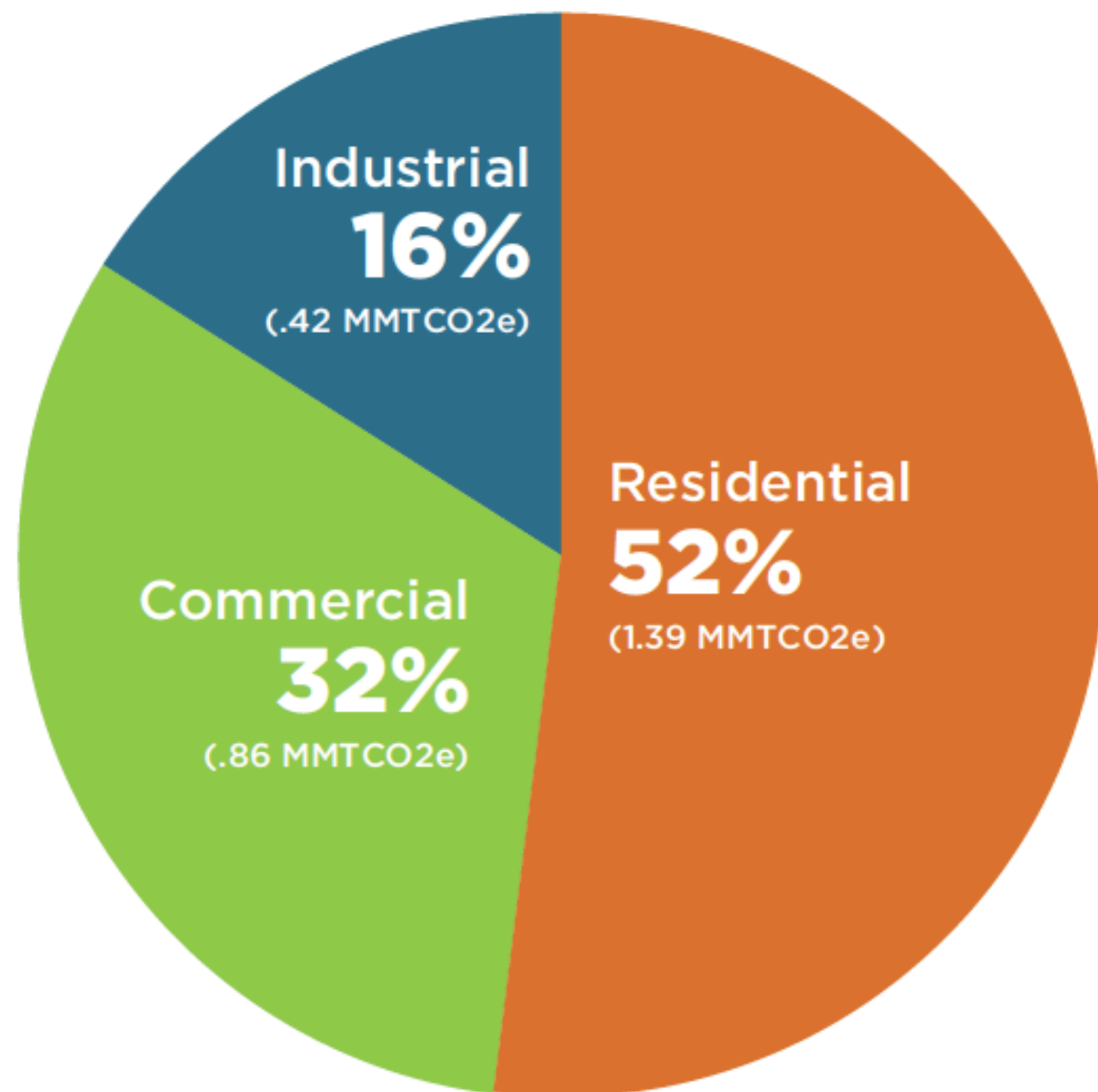


Vermont heating energy sources



GHG Emissions from Thermal Fuel Use In VT

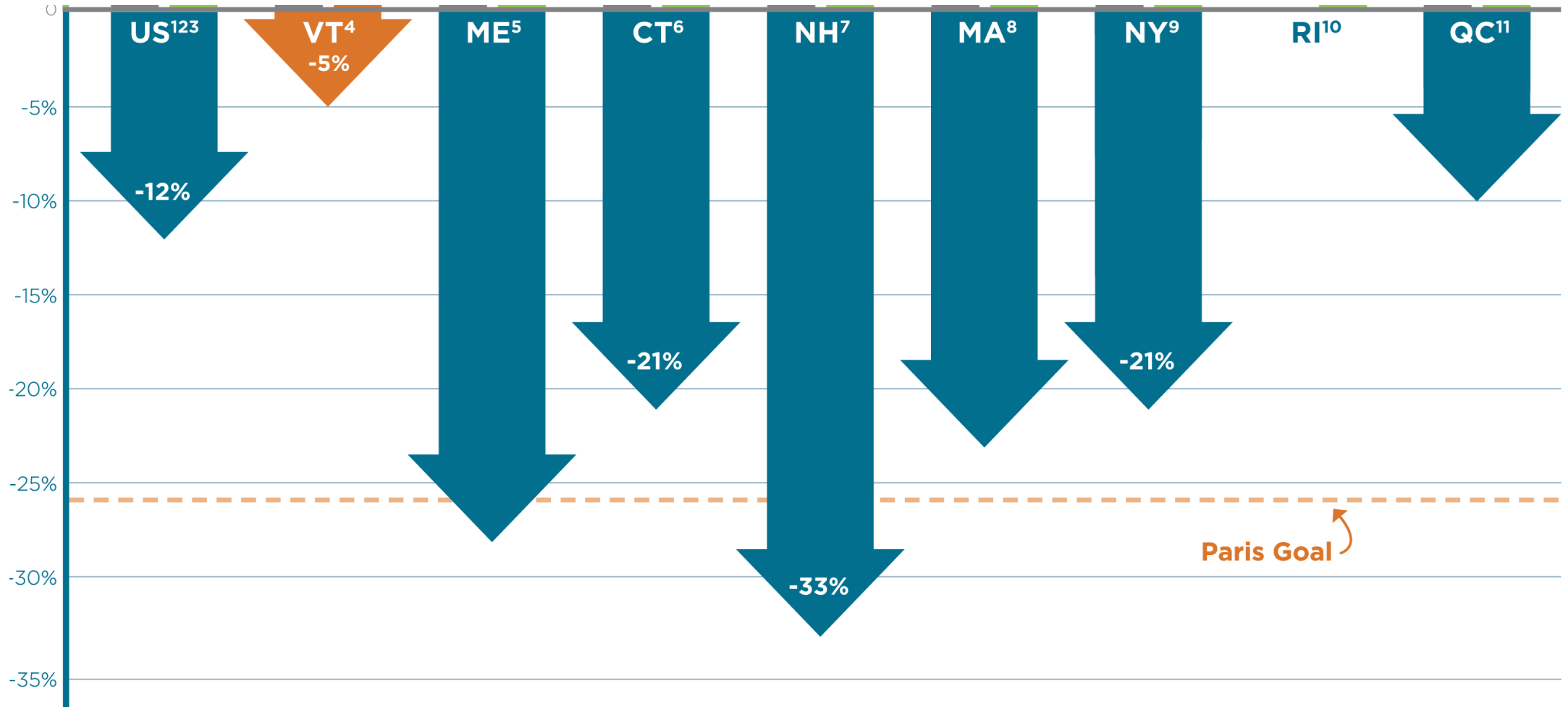
RCI Total: 2.68 MMTCO₂e

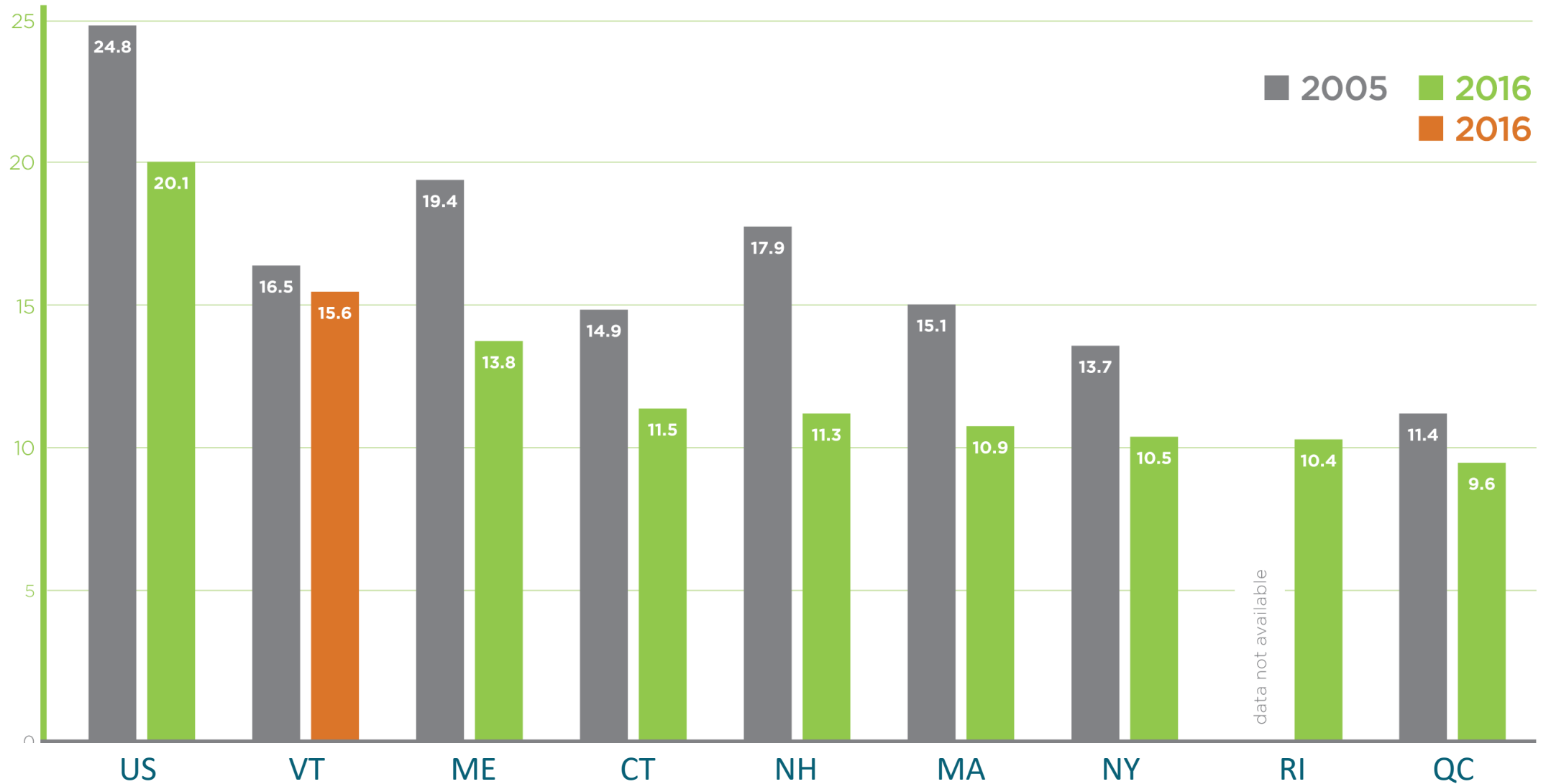


Source: Vermont Department of Environmental Conservation, 2019
Greenhouse Gas Emissions Inventory Brief (1990-2016)

Progress to Paris

Percent decrease in overall GHG emissions
(2016, compared to 2005 levels)





Per capita emissions

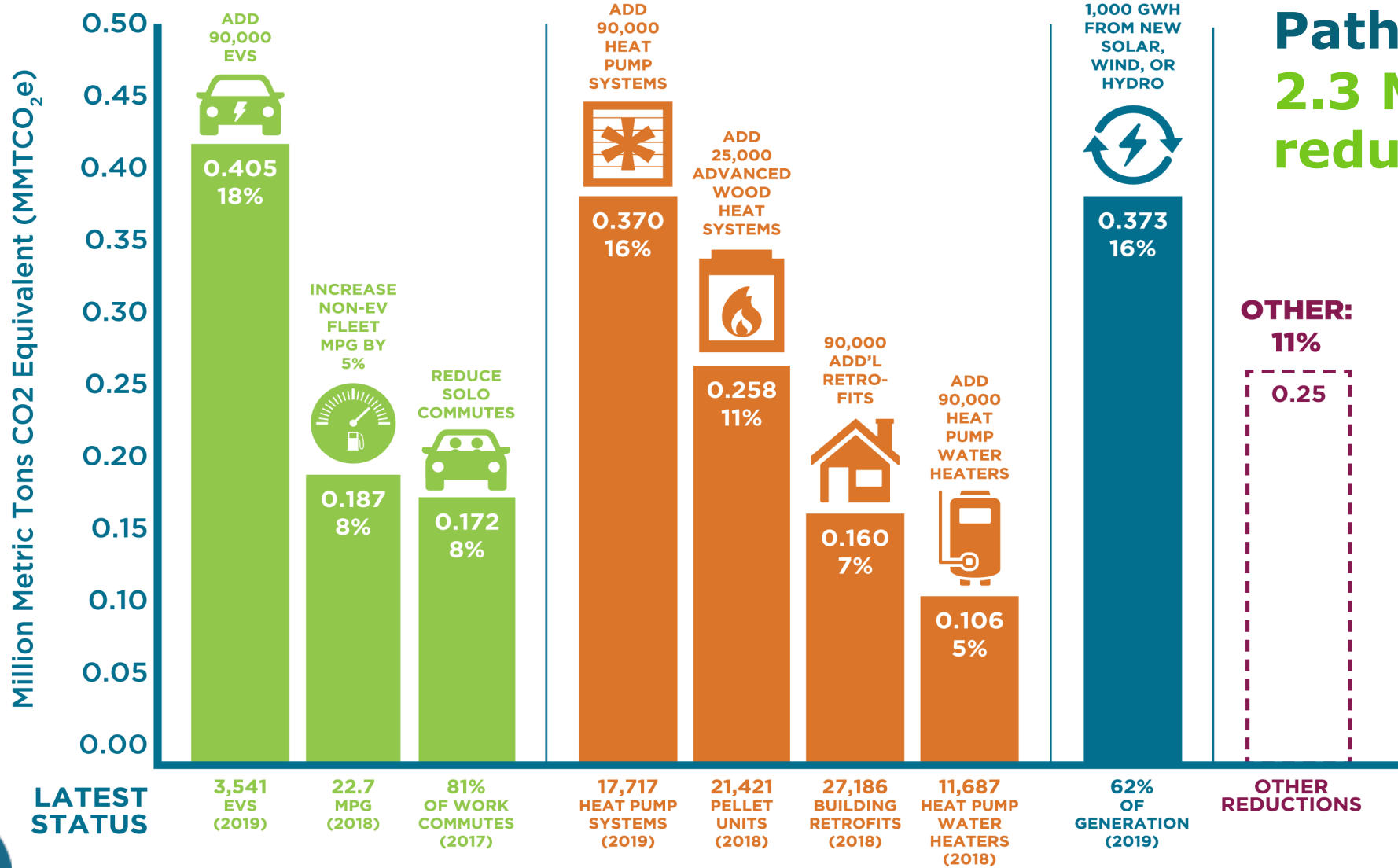
(metric tons CO2e per person)



TRANSPORTATION: 34%

THERMAL: 39%

ELECTRICITY: 16%



**Path to Paris:
2.3 MMTCo2e
reduction by 2025**

LATEST STATUS

3,541 EVS (2019)

22.7 MPG (2018)

81% OF WORK COMMUTES (2017)

17,717 HEAT PUMP SYSTEMS (2019)

21,421 PELLET UNITS (2018)

27,186 BUILDING RETROFITS (2018)

11,687 HEAT PUMP WATER HEATERS (2018)

62% OF GENERATION (2019)

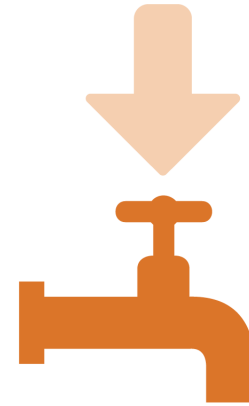
OTHER REDUCTIONS



Economic impacts of EAN's Path to Paris: 2020 - 2035



INCREASE in
in-state investment:
**\$323
million**



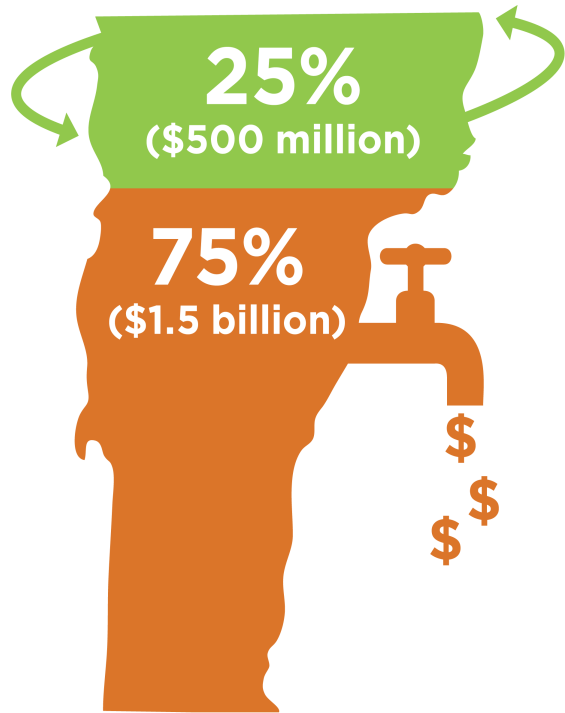
DECREASE in
out-of-state spending:
**\$1.115
billion**



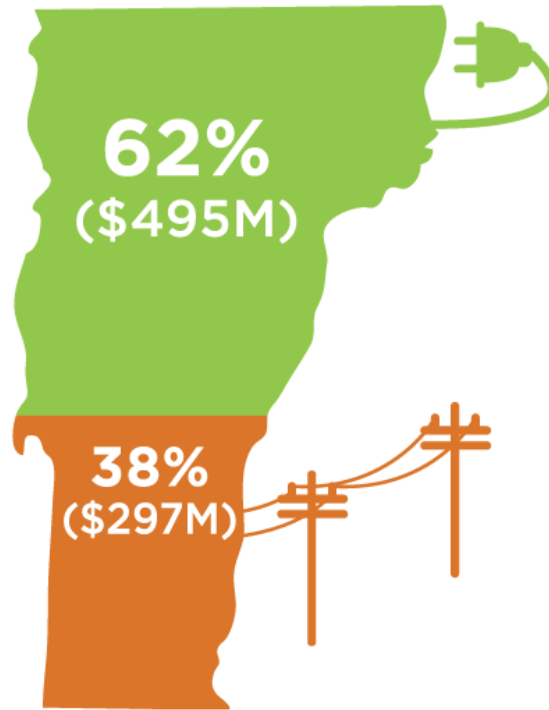
Net consumer savings:
**\$792
million**



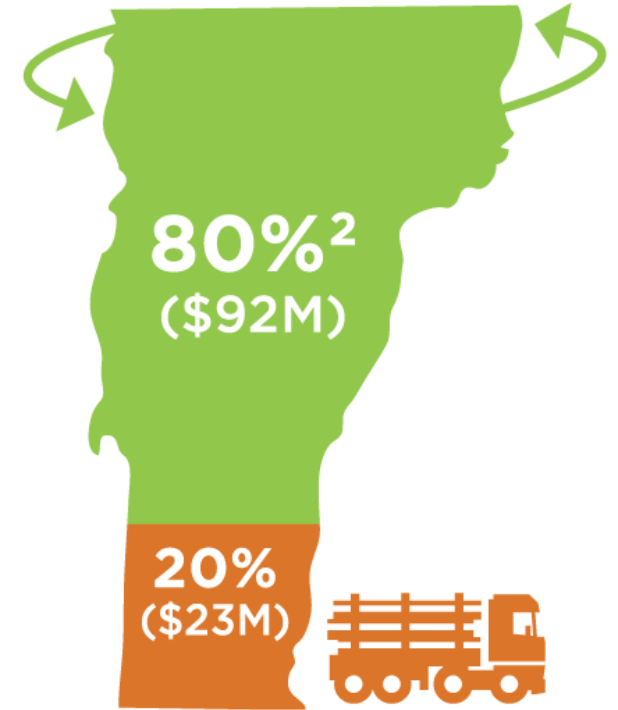
FOSSIL FUELS



ELECTRICITY

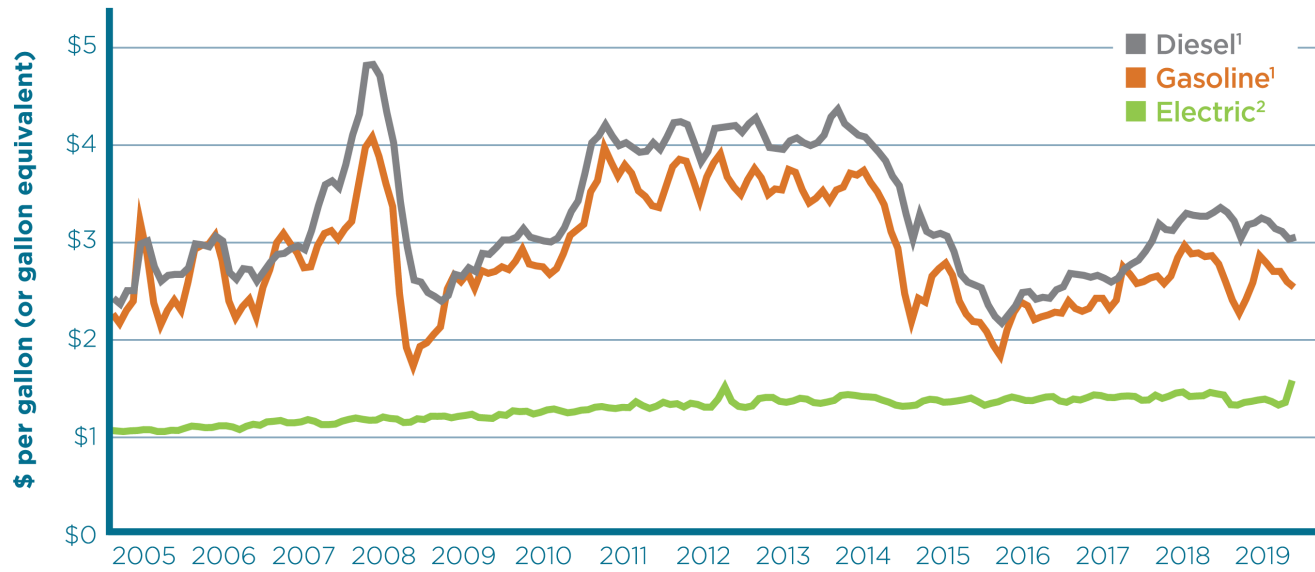


WOOD



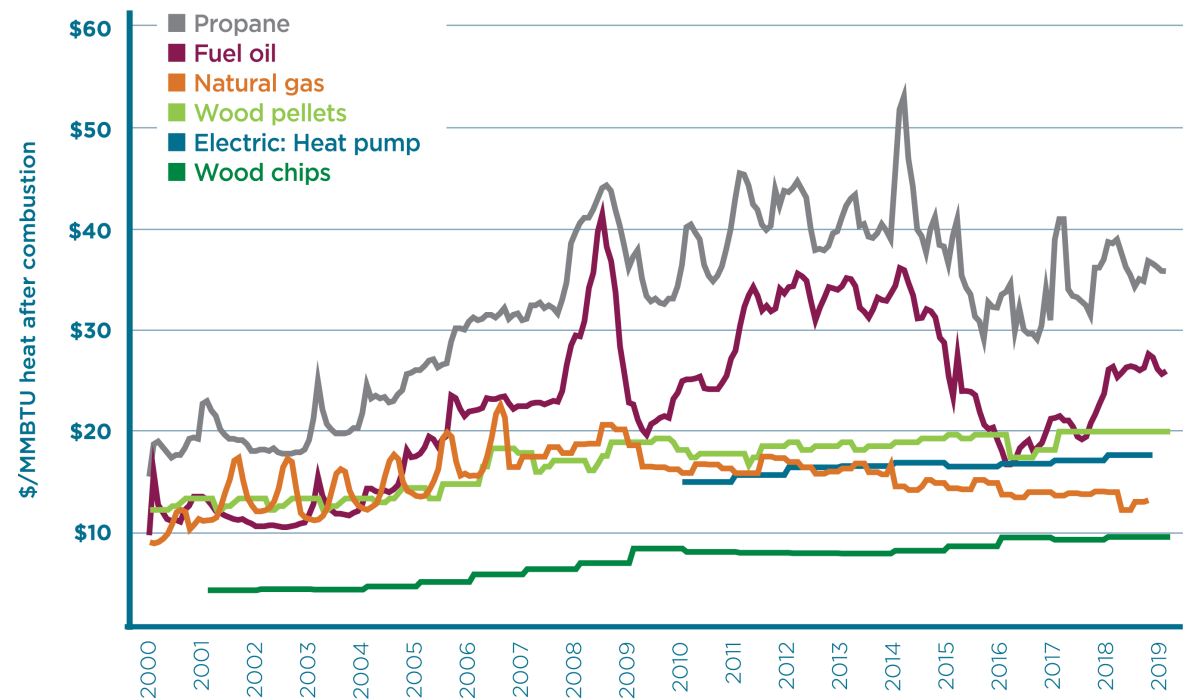
 Recirculates in the VT economy
 Leaves the VT economy



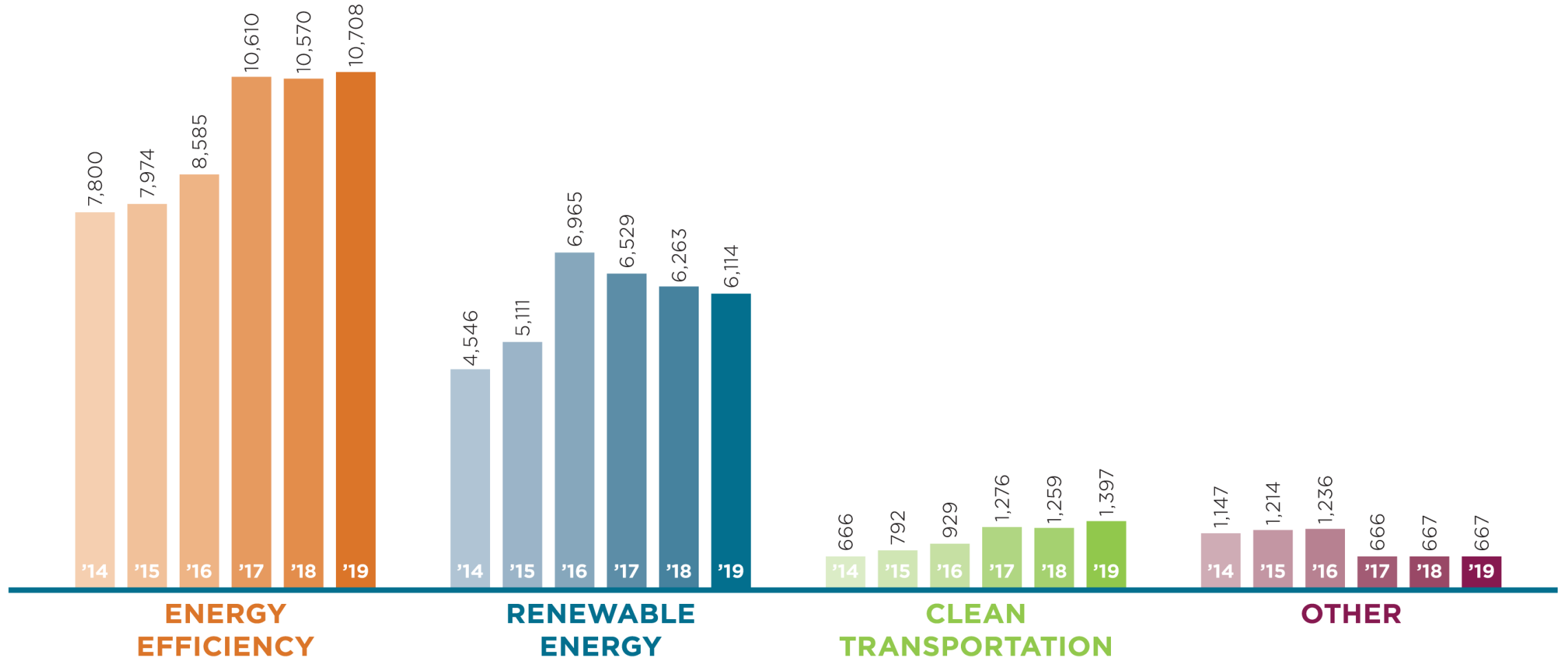


Electric vehicles are less expensive to drive than gas vehicles

Renewable heating options are lower cost and more stable than fossil fuel options



Vermont clean employment growth by technology, 2014-2019



Vermont median hourly wages for clean energy jobs

	RENEWABLE ENERGY			ENERGY EFFICIENCY		
	Entry	Mid	High	Entry	Mid	High
Electricians	\$13.57	\$19.43	\$28.89	\$18.91	\$25.47	\$32.95
HVAC workers	\$13.10	\$20.77	\$32.66	\$18.43	\$25.15	\$35.05
Installation, maintenance, and repair technicians	\$13.10	\$20.77	\$32.66	\$14.84	\$20.72	\$30.23
Sales representatives	\$17.60	\$28.71	\$56.74	\$30.55	\$39.57	\$68.70
Engineers	\$24.99	\$37.21	\$56.61	\$23.78	\$39.38	\$57.98





Energy Equity: A Working Definition

Energy equity is based on the principle that **all people should have access to reliable, safe, and affordable sources of energy; protection from a disproportionate share of negative impacts or externalities associated with building and operating our energy supply and distribution systems; and equitable distribution of and access to benefits from these systems.**

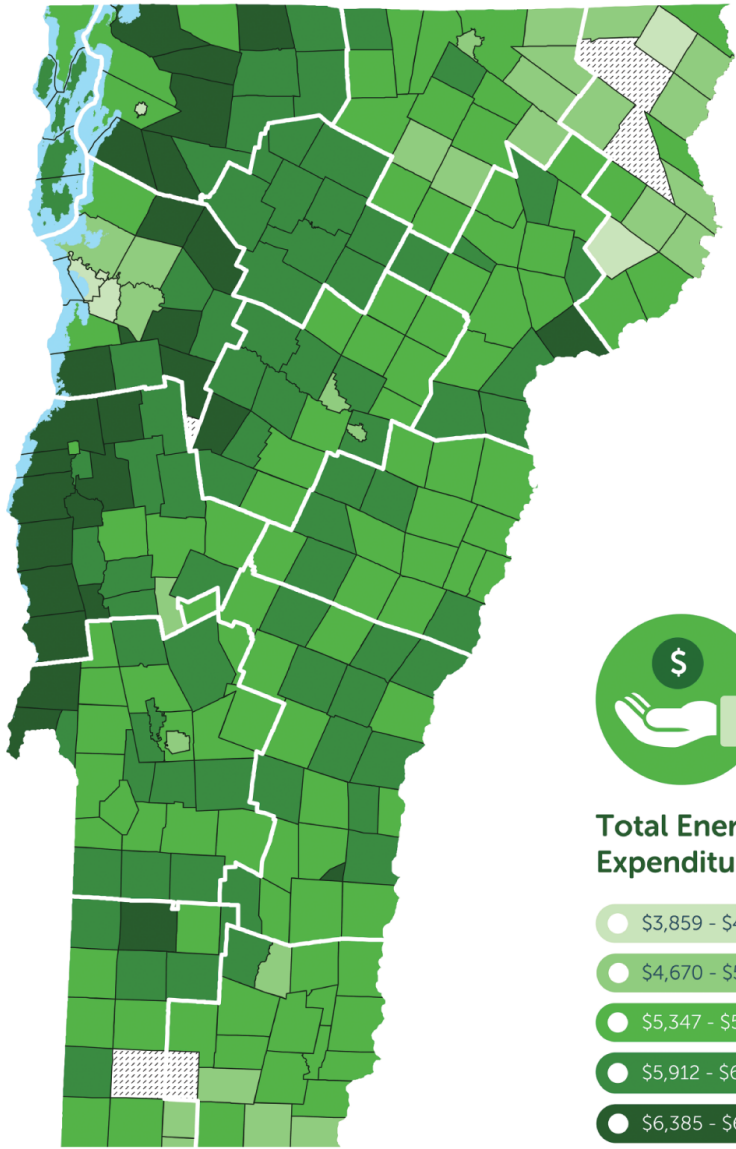


What is Energy Burden?

Quantity of energy consumed
× price of energy = Spending on energy

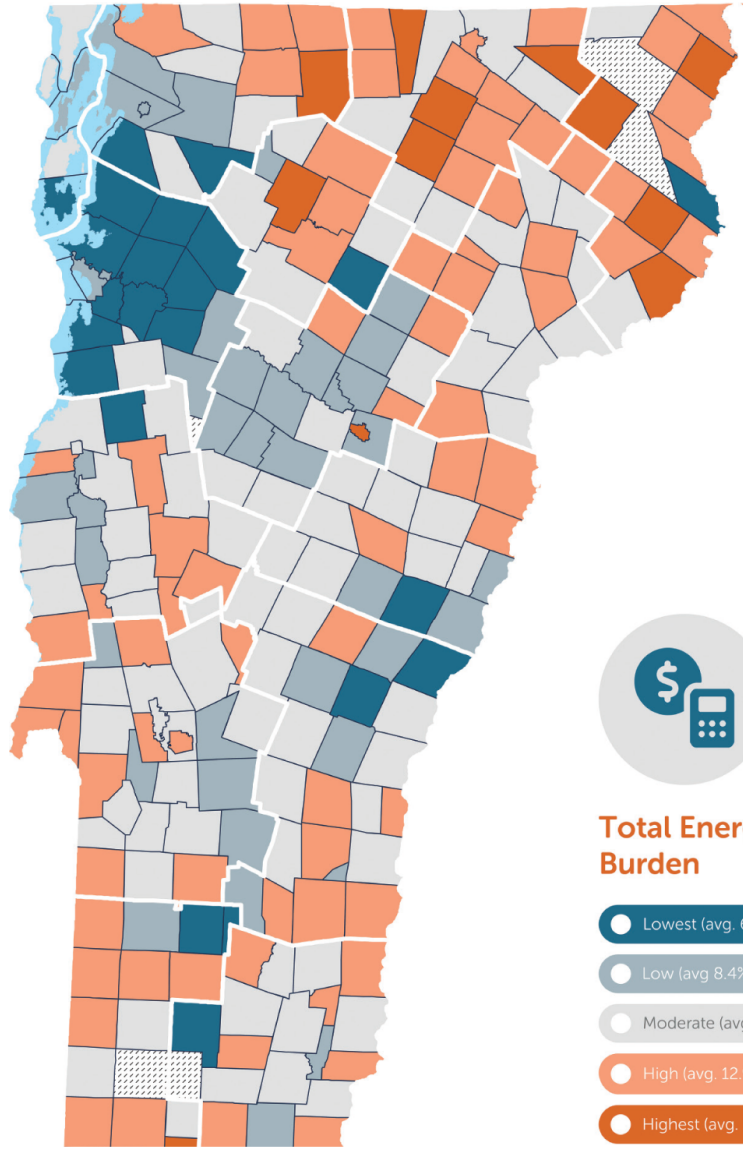
$\frac{\text{Spending on energy}}{\text{Income}}$ = Energy burden

Energy burden measures the percent of income used for energy spending. This measurement allows us to acknowledge that energy spending does not affect everyone equally.



Total Energy Expenditure

- \$3,859 - \$4,669
- \$4,670 - \$5,346
- \$5,347 - \$5,911
- \$5,912 - \$6,384
- \$6,385 - \$6,949



Total Energy Burden

- Lowest (avg. 6.7%)
- Low (avg. 8.4%)
- Moderate (avg. 10.1%)
- High (avg. 12.9%)
- Highest (avg. 17.4%)

Source: Efficiency Vermont

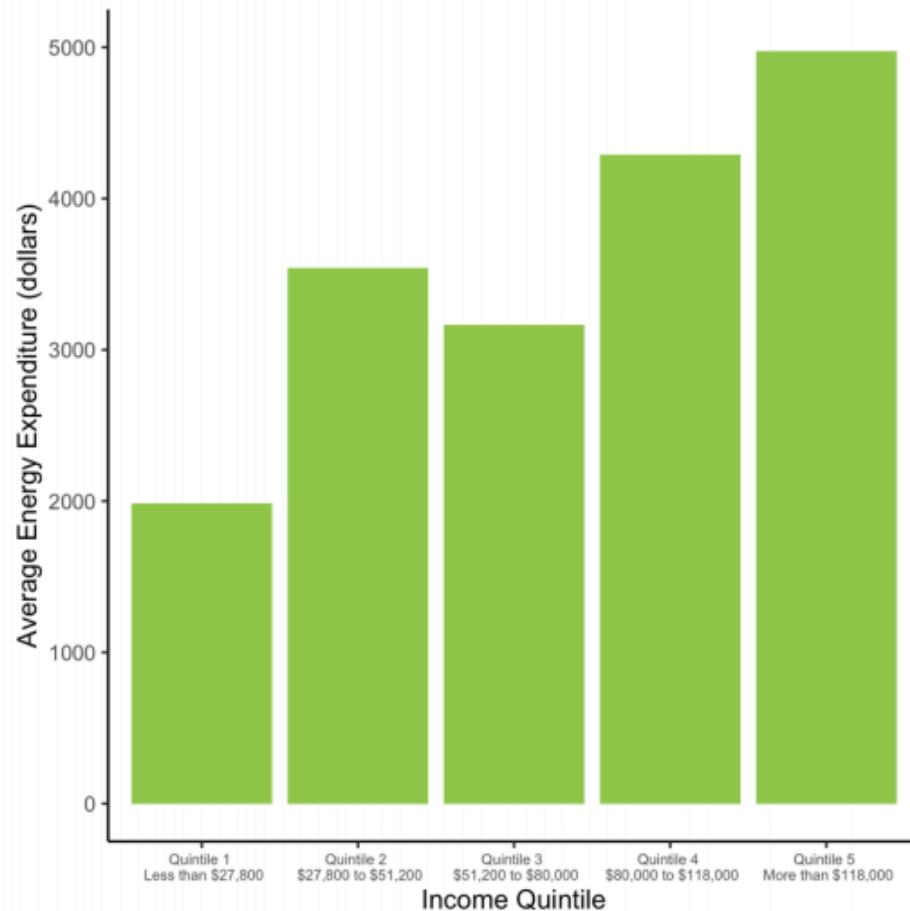




Energy Burden and Income

**Total Yearly Energy Expenditure in Vermont
by Income Quintile**

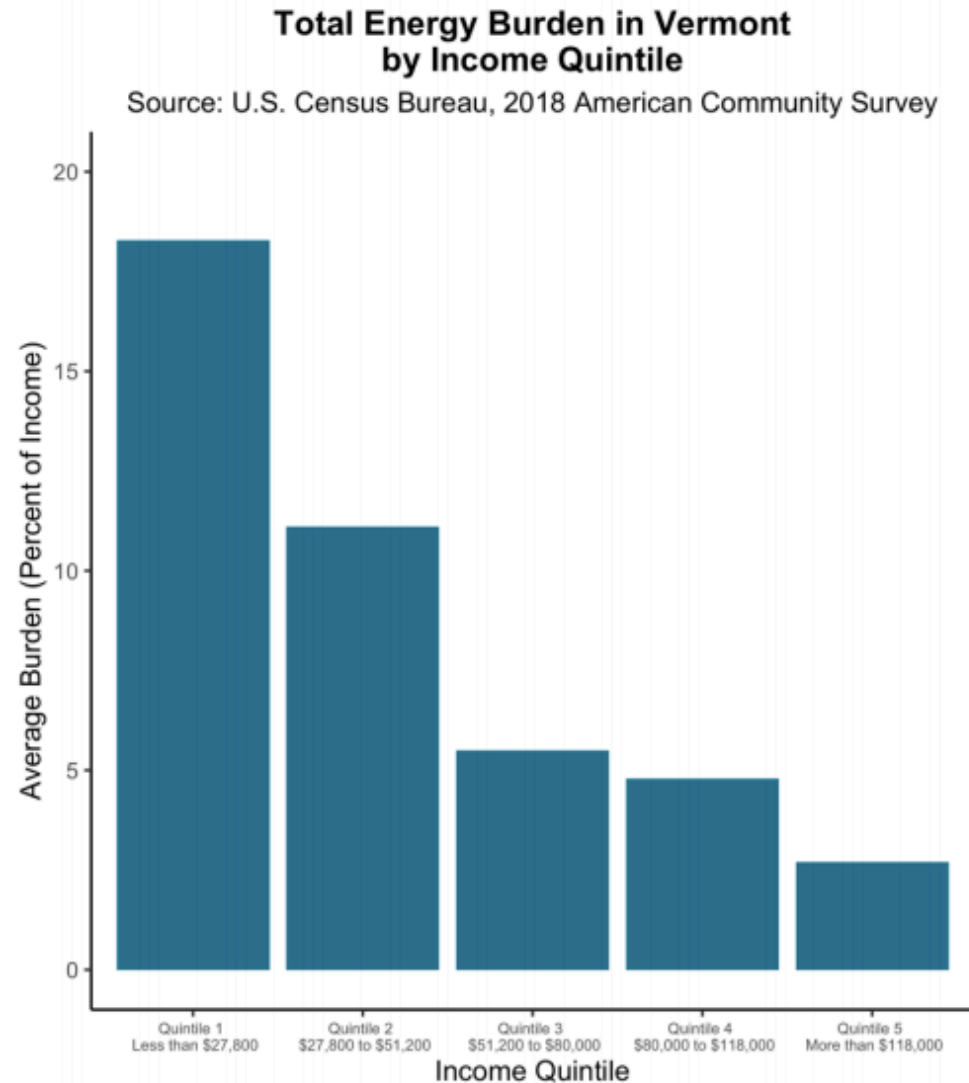
Source: U.S. Census Bureau, 2018 American Community Survey



**Lower-income
Vermonters
purchase much less
energy than upper
income
Vermonters...**



Energy Burden and Income

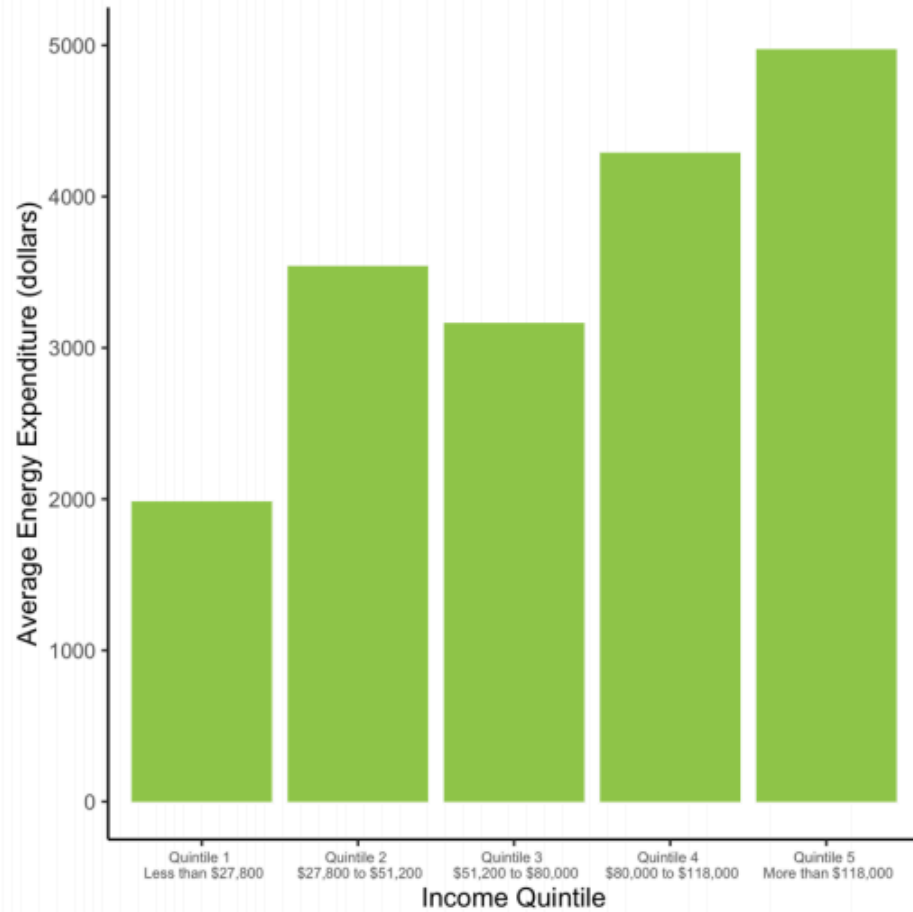


... but spend a far greater proportion of their income on energy than do upper income Vermonters



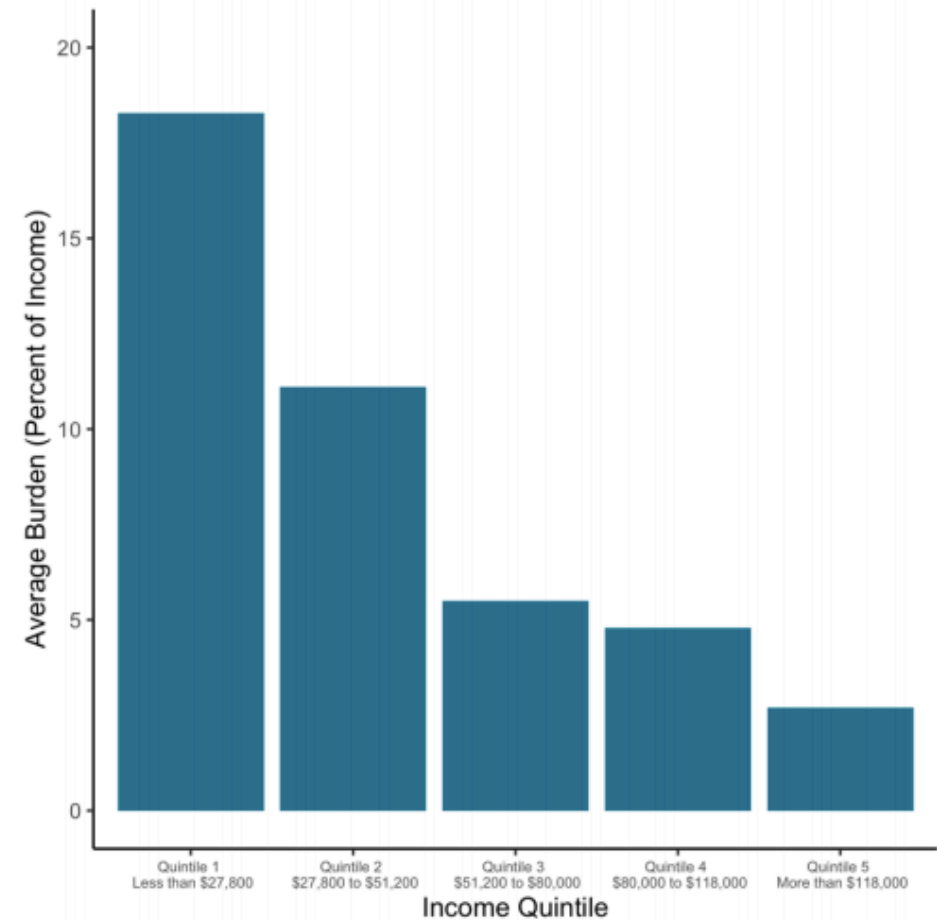
Total Yearly Energy Expenditure in Vermont by Income Quintile

Source: U.S. Census Bureau, 2018 American Community Survey



Total Energy Burden in Vermont by Income Quintile

Source: U.S. Census Bureau, 2018 American Community Survey

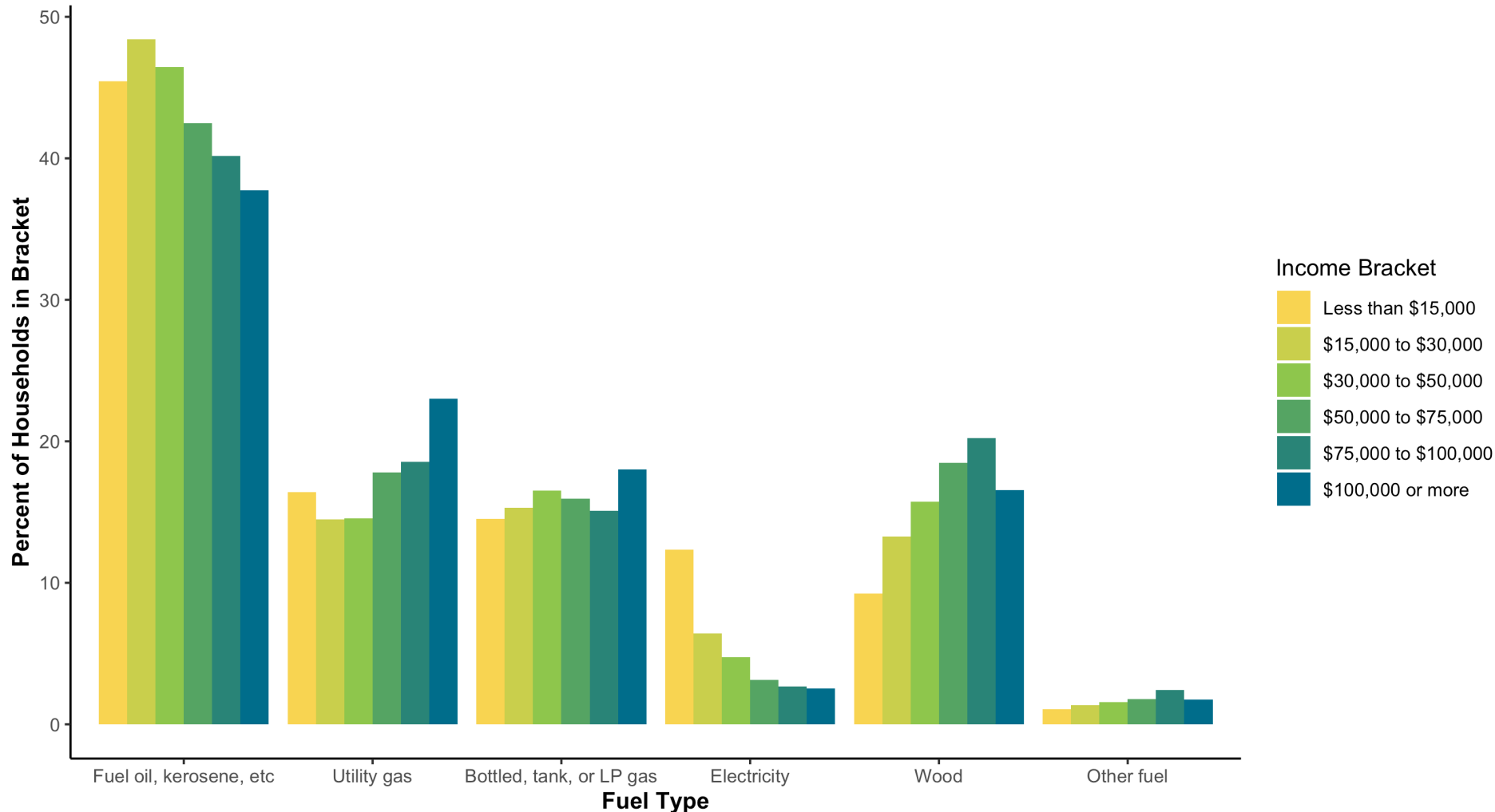




Income-Based Thermal Fuel Use Inequities

Vermont Thermal Fuel Use by Income

Source: U.S. Census Bureau, 2013-2017 American Community Survey



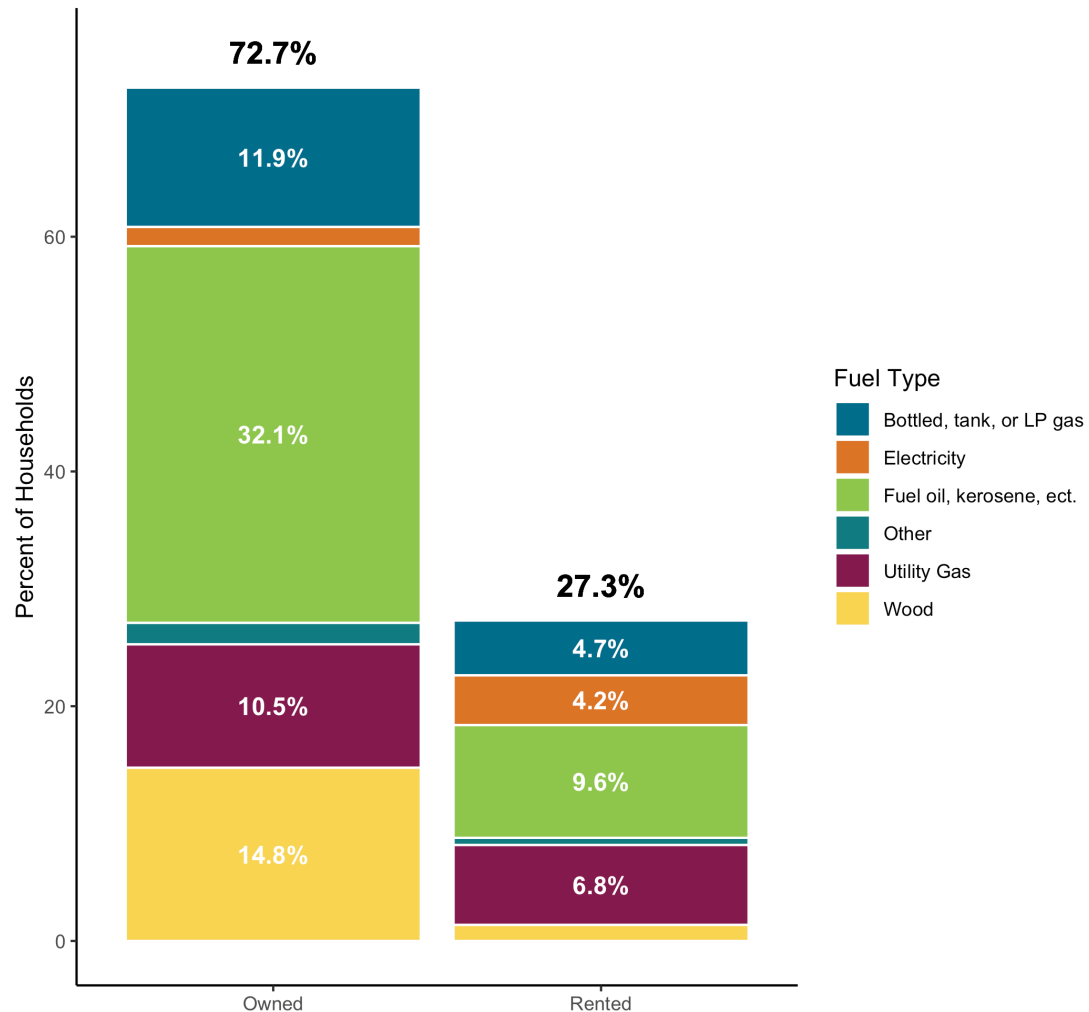
Lower-income households use fuel oil and electricity disproportionately more frequently and utility gas and wood disproportionately less frequently than higher-income households.



Renting as a Barrier to Affordable Fuel

Vermont Thermal Fuel Use by Housing Tenure

Source: U.S. Census Bureau, 2018 American Community Survey



- **Split incentives discourage energy upgrades in low-income households**
- **Renters use wood disproportionately less than homeowners**
- **Renters use electricity (resistance) disproportionately more than homeowners**

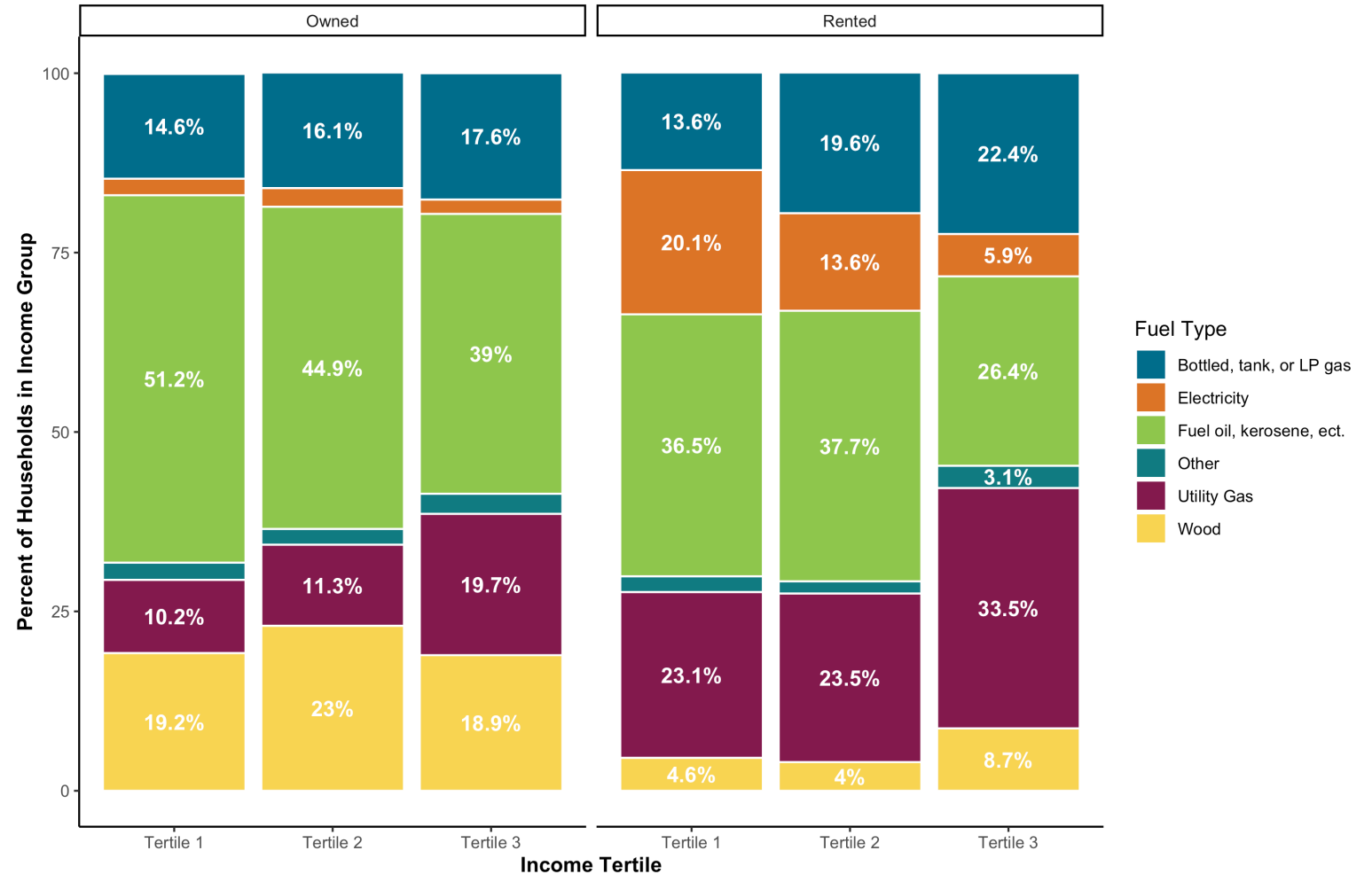


Renting as a Barrier to Affordable Fuel

Vermont Thermal Fuel Use by Housing Tenure and Income Tertile

Source: U.S. Census Bureau, 2018 American Community Survey

Tertile 1: Less than \$39,560
Tertile 2: \$39,560 to \$85,000
Tertile 3: More than \$85,000





Low-income households purchase the least amount of energy, have the highest energy burden, and suffer the most intensely from energy burden.



Key Takeaways

- Vermont has a **moral obligation** and is **legally required** to meet our emissions reduction commitments.
- To succeed, we need to focus on moving beyond fossil fueled **transportation and heating** – with personal action *and* government action
- Doing so is a generational opportunity to **strengthen the Vermont economy, create good-paying jobs, save Vermonters money, and improve equity.**

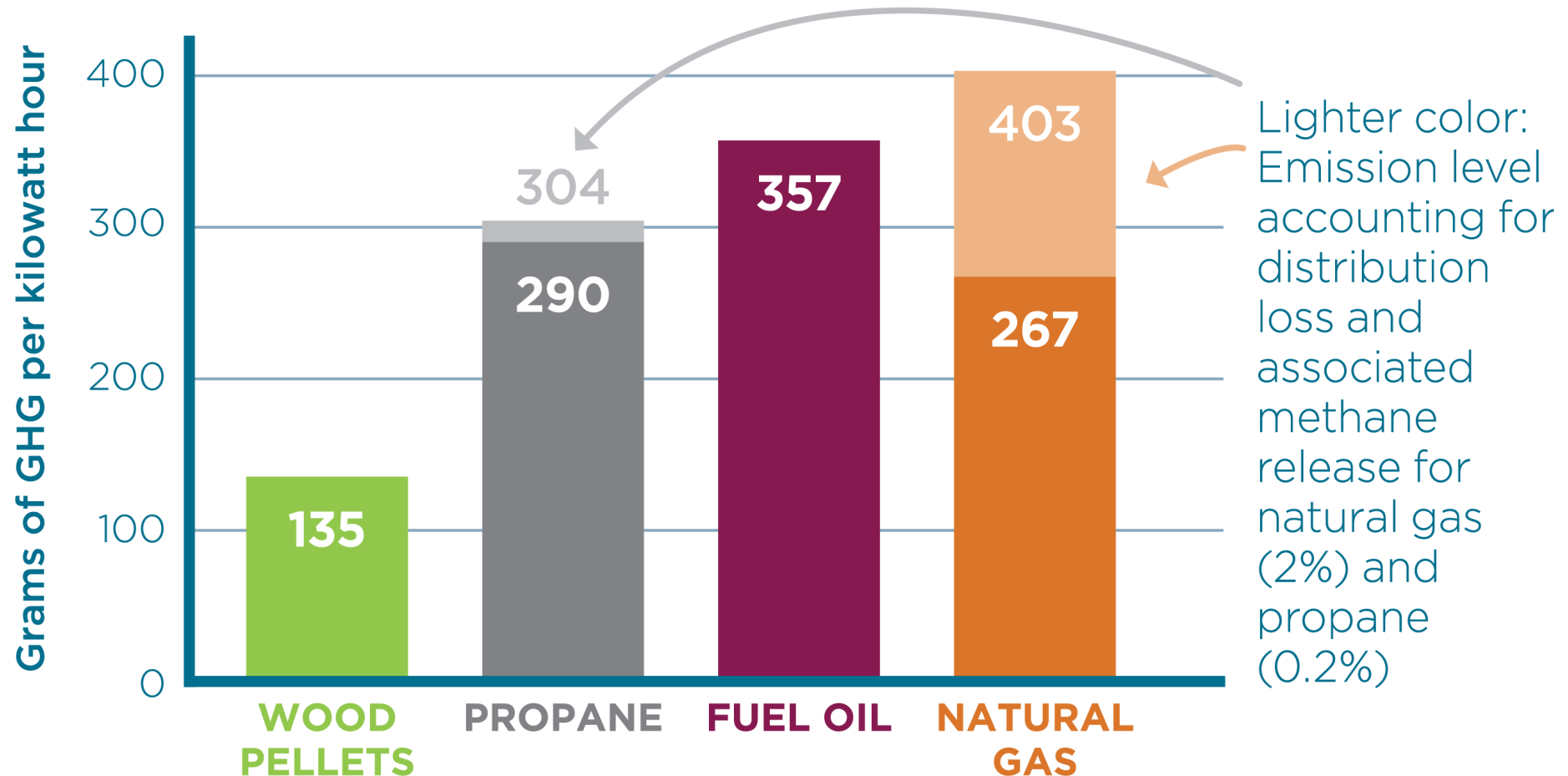


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jduval@eanvt.org

Wood pellets from Northeast cut GHG emissions vs. fossil fuel heating

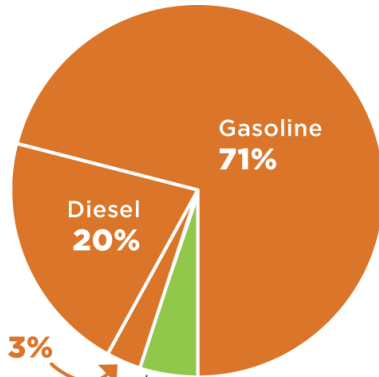




Transportation

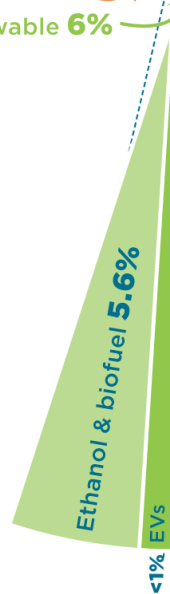
48.2 TRILLION BTU

Total site energy
119 TRILLION BTU



Other fuel 3%
Renewable 6%

SITE ENERGY
Renewable sources



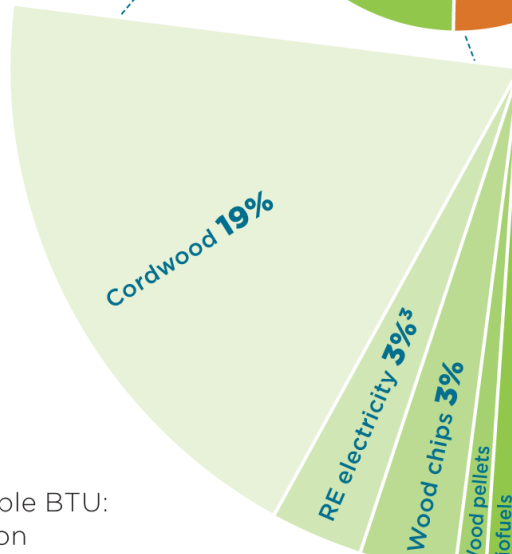
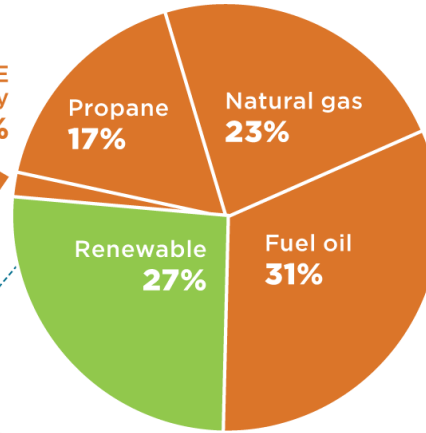
Total renewable BTU:
2.7 trillion



Thermal

54.3 TRILLION BTU

Non-RE electricity 2%



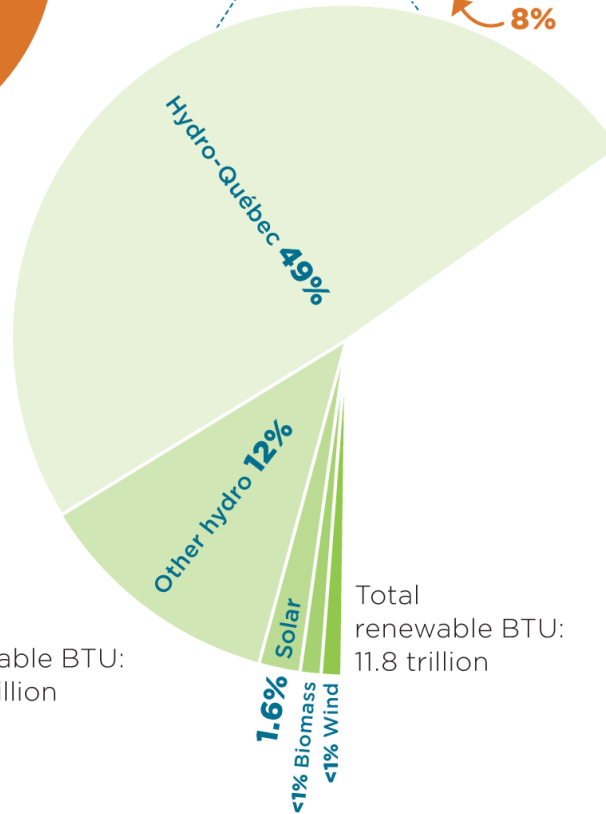
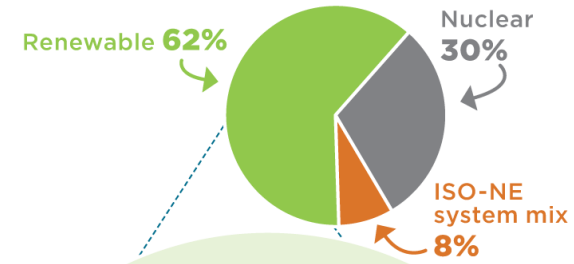
Total renewable BTU:
14.8 trillion



Electricity

16.4 TRILLION BTU

(after accounting for RECs)



Total renewable BTU:
11.8 trillion



What do we mean by 'total energy'?

