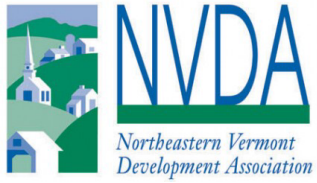

# 2019 ANNUAL PROGRESS REPORT
## for VERMONT

# Energy Action Network Members

## Over 100 Network Members

# Energy Action Network Public Partners

## Over 100 Public Partners











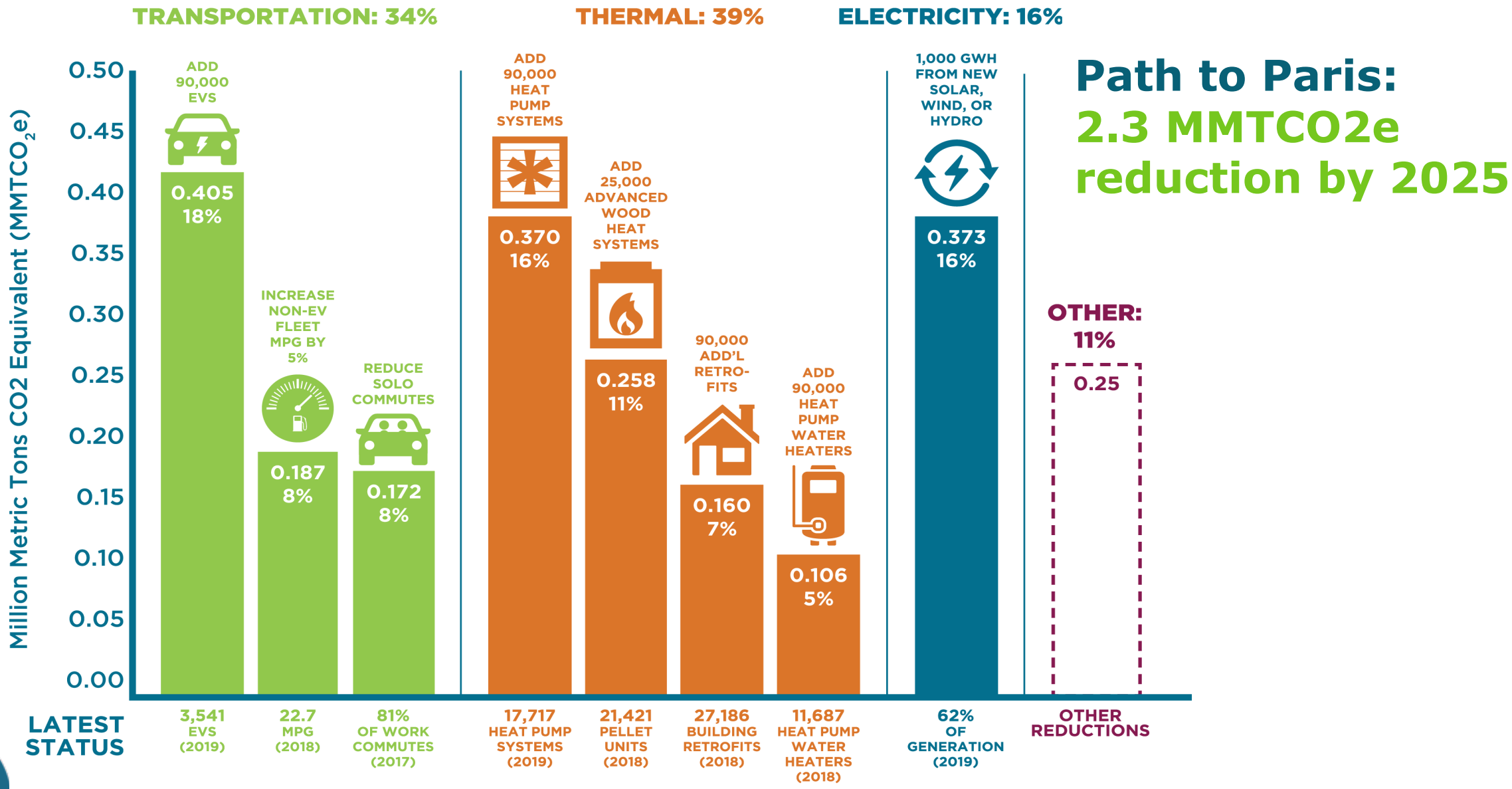






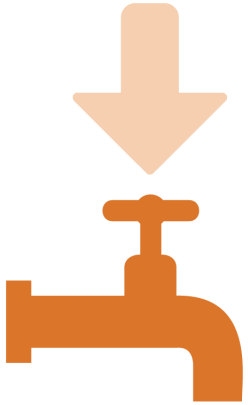



# 2019 ANNUAL PROGRESS REPORT
## for VERMONT




# Path to Paris:
# 2.3 MMTCO2e reduction by 2025

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



**DECREASE in out-of-state spending:**

**$1.115 billion**

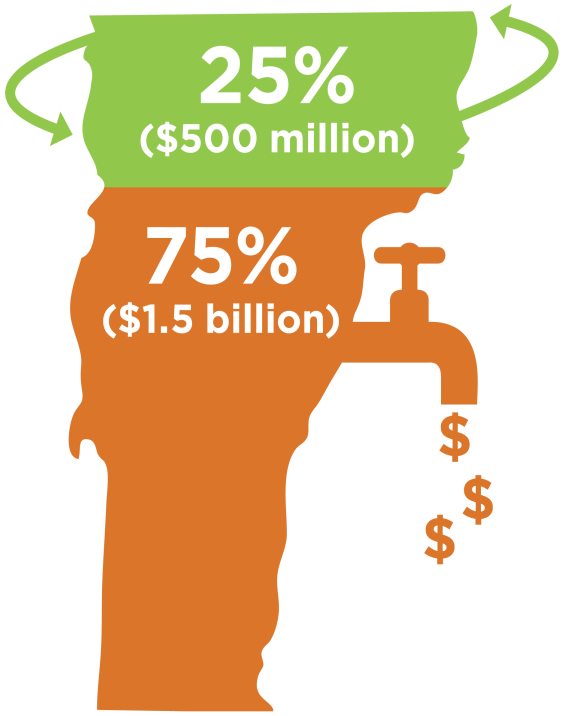
**INCREASE in in-state investment:**

**$323 million**

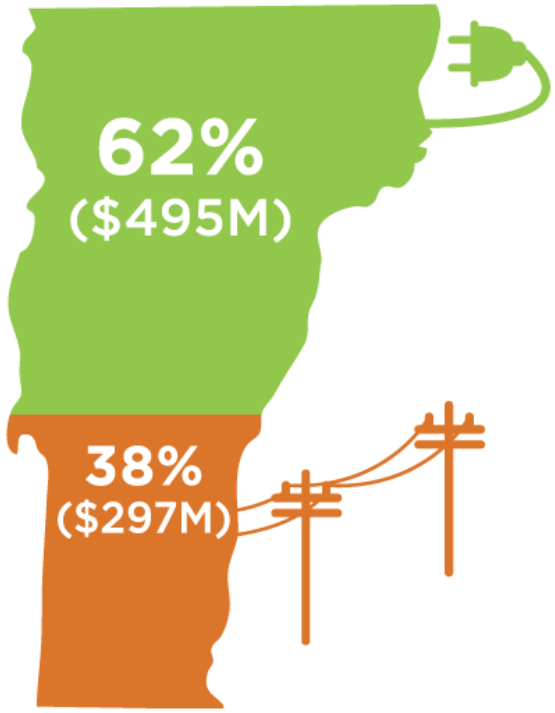
**Net consumer savings:**

**$792 million**

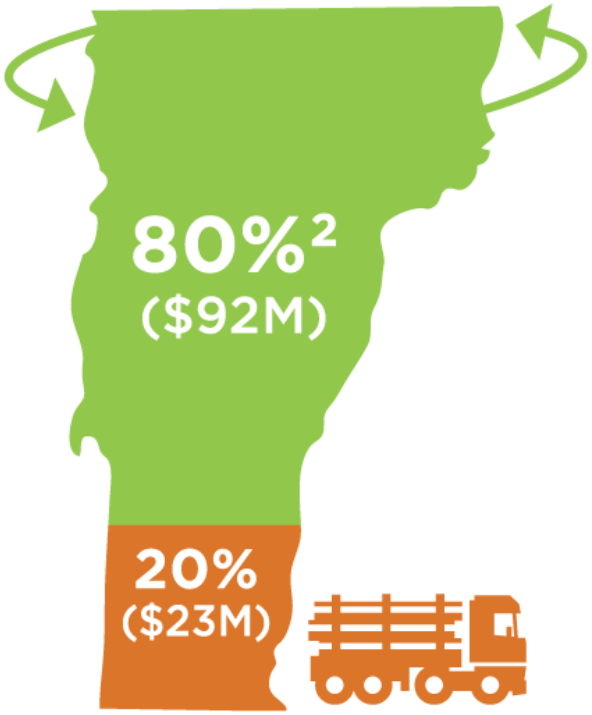
## FOSSIL FUELS




## ELECTRICITY

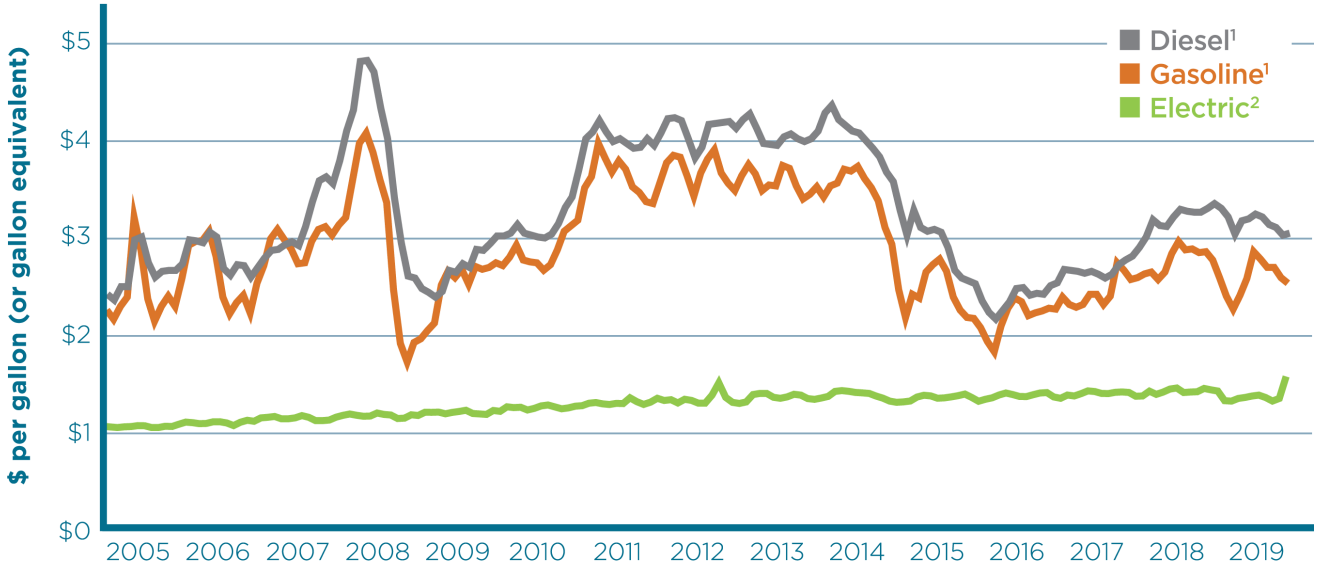



## WOOD



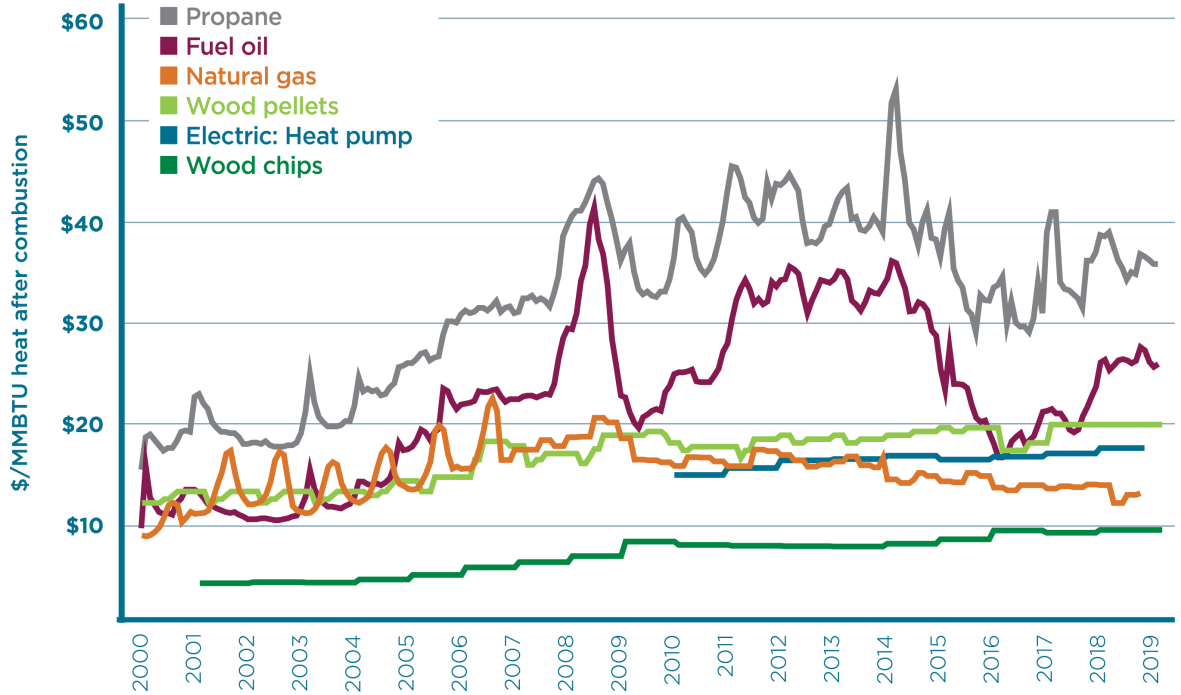

Recirculates in the VT economy

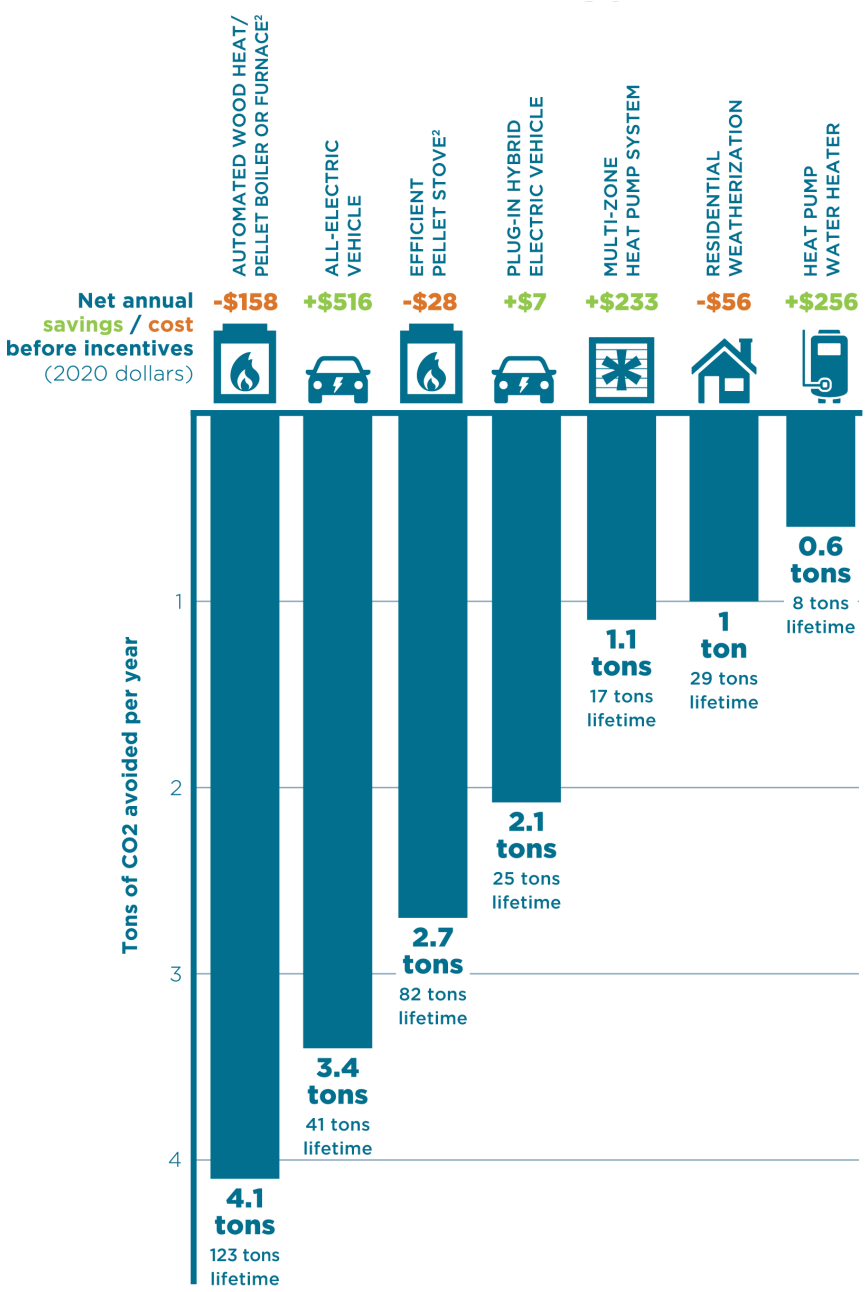
Leaves the VT economy




## Electric vehicles are less expensive to drive than gas vehicles

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





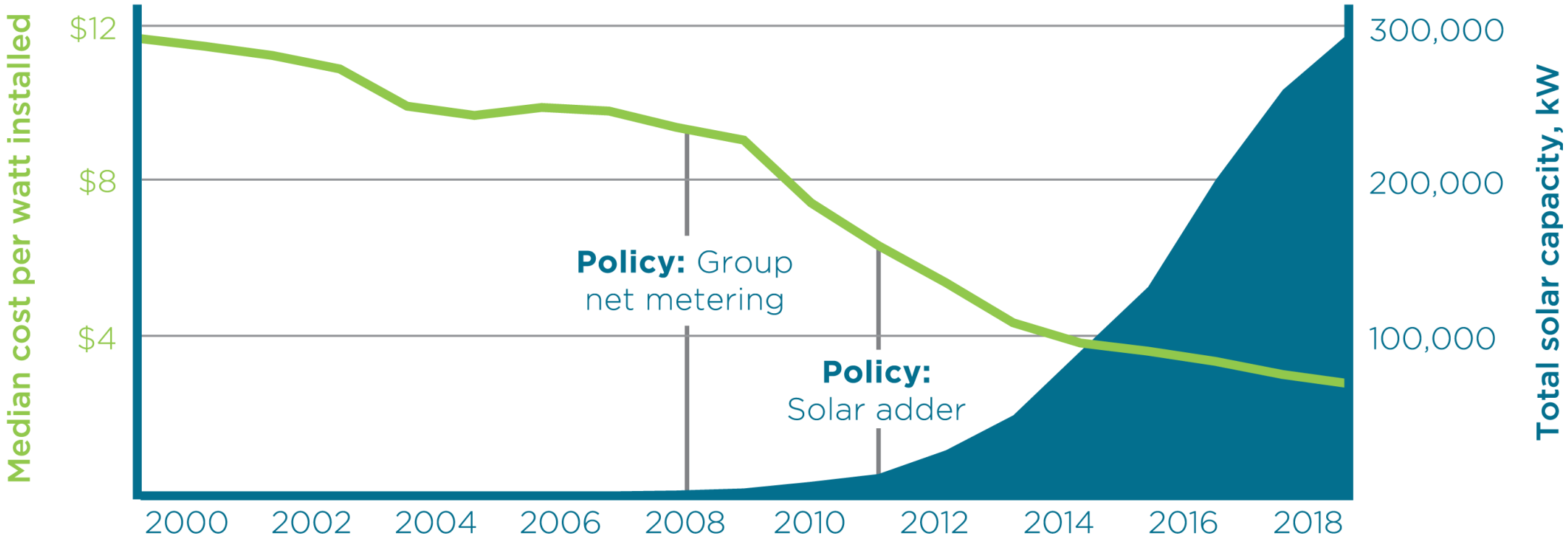

**Individual $ savings and GHG reductions from energy actions**

## Total savings for a VT household: Nearly

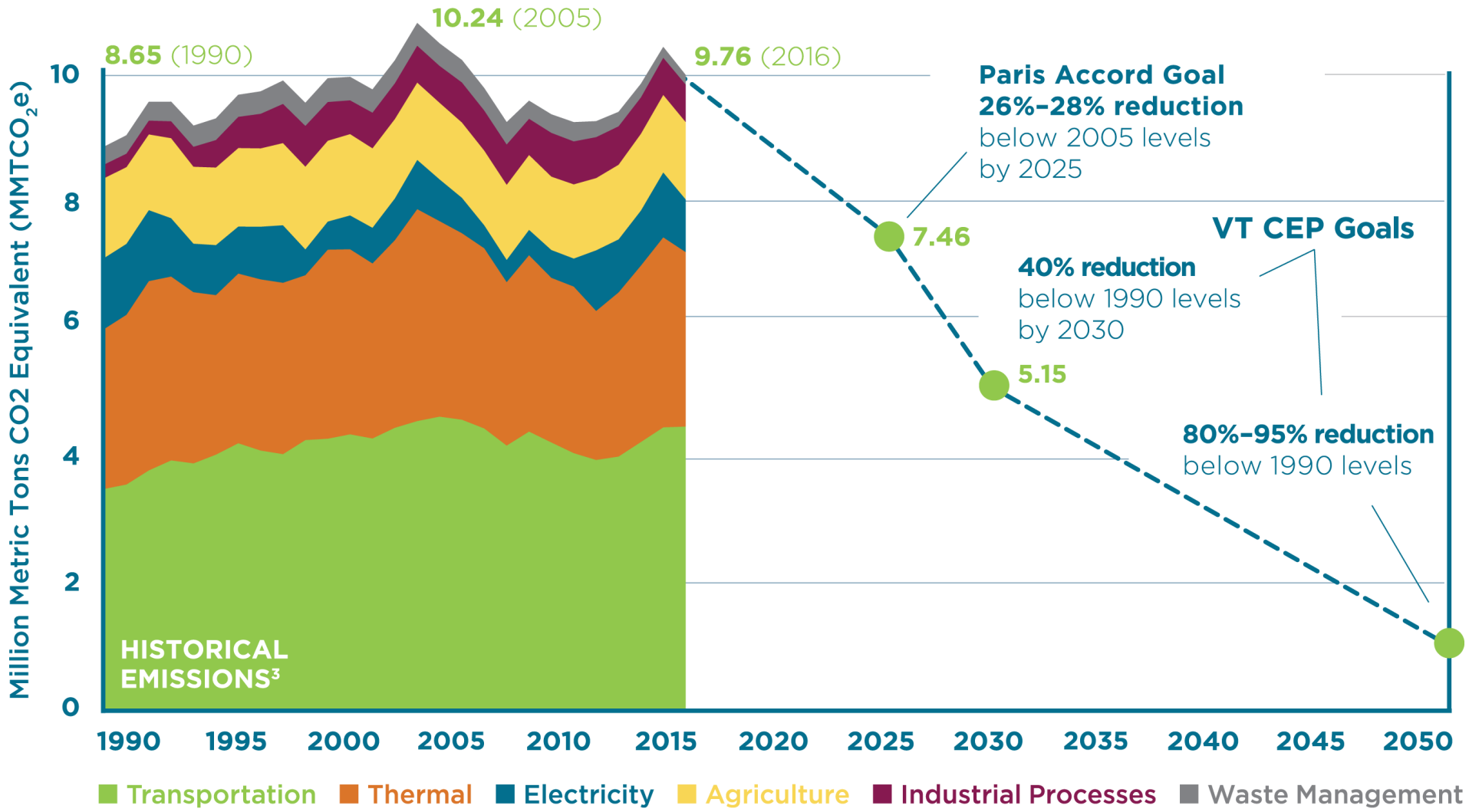
# $10,000

*over 15 years*

# Decreasing costs and new policy support rapid growth of solar in VT



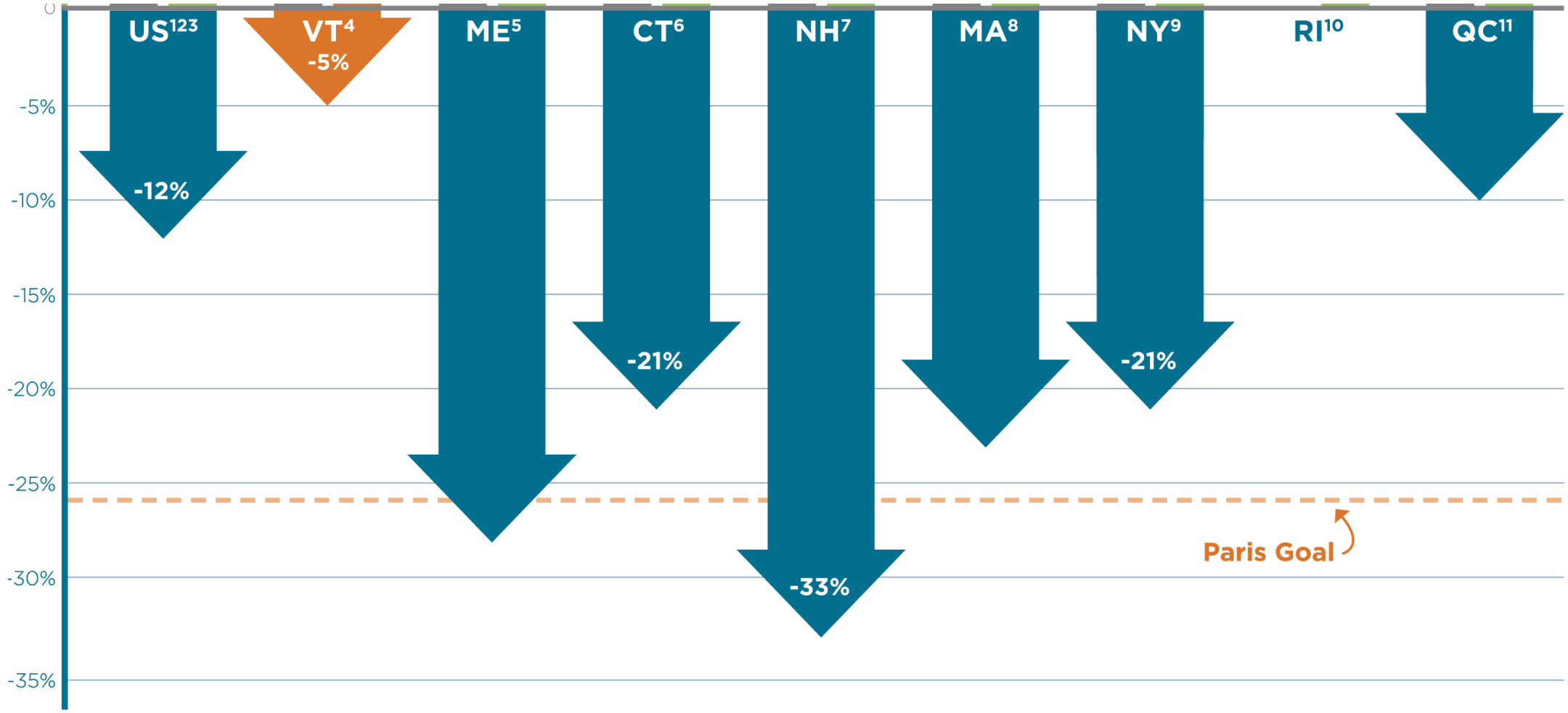
# Now is the time for rapid emissions reductions beyond the electricity generation sector

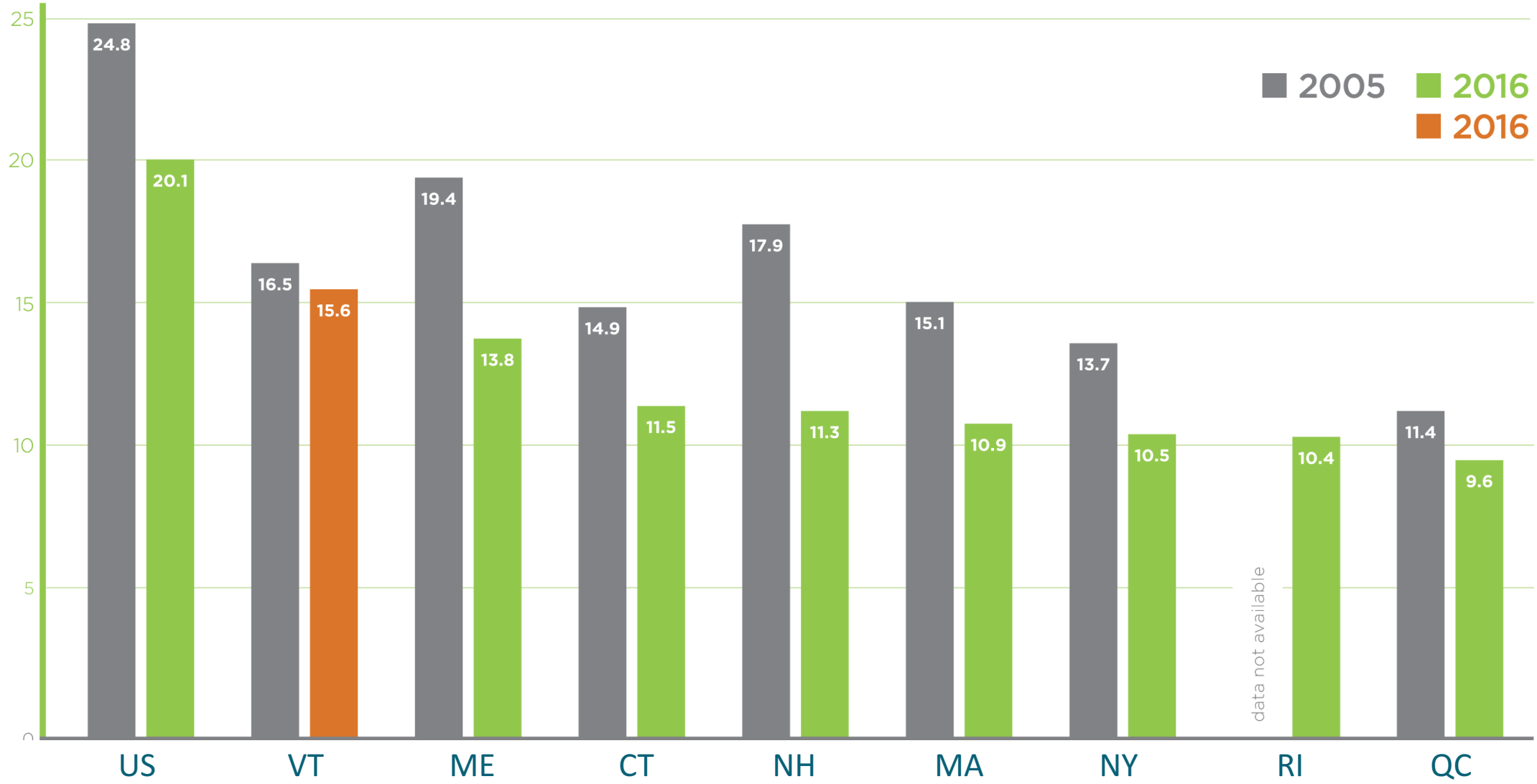


# Progress to Paris

## Percent decrease in overall GHG emissions

*(2016, compared to 2005 levels)*

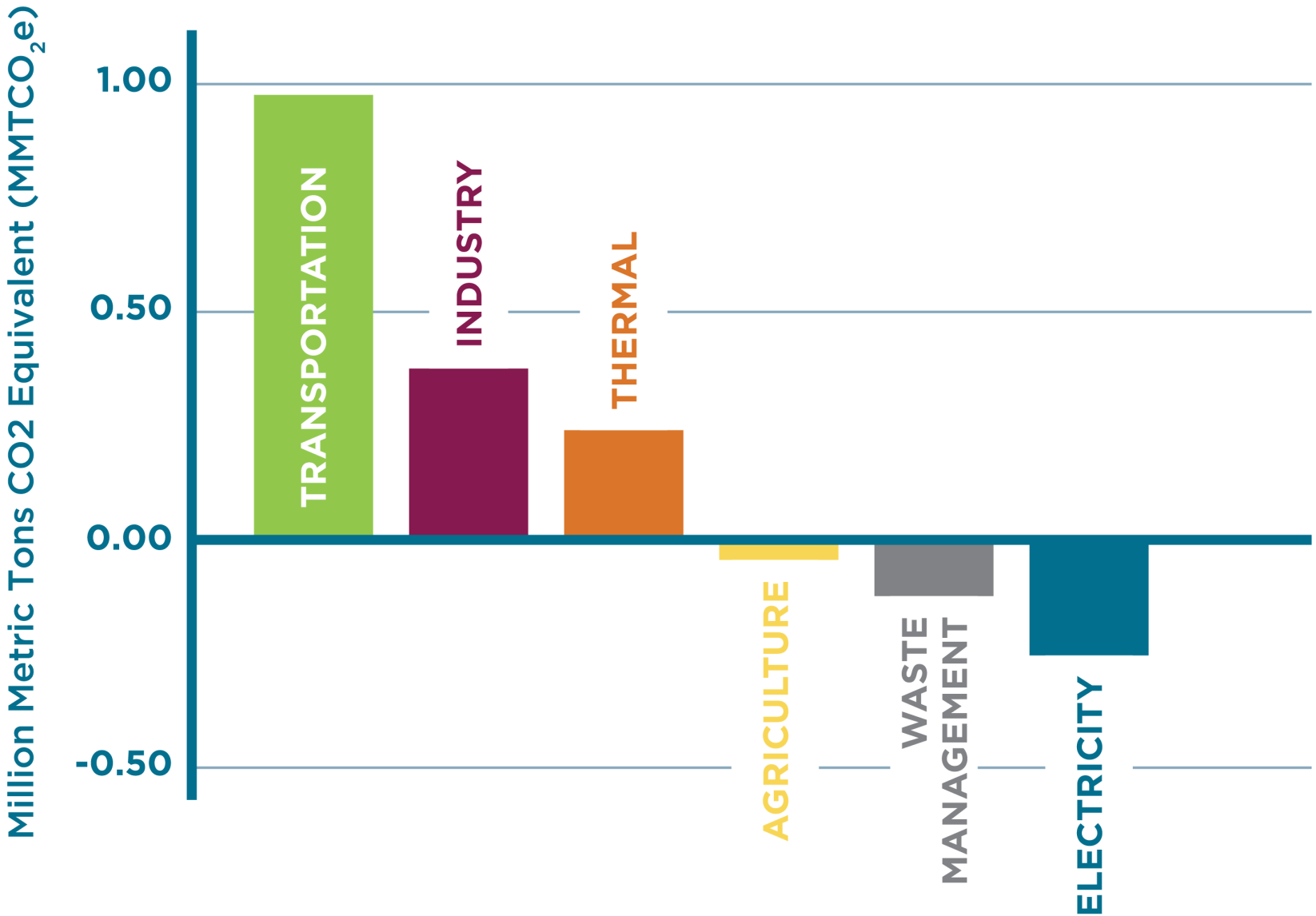




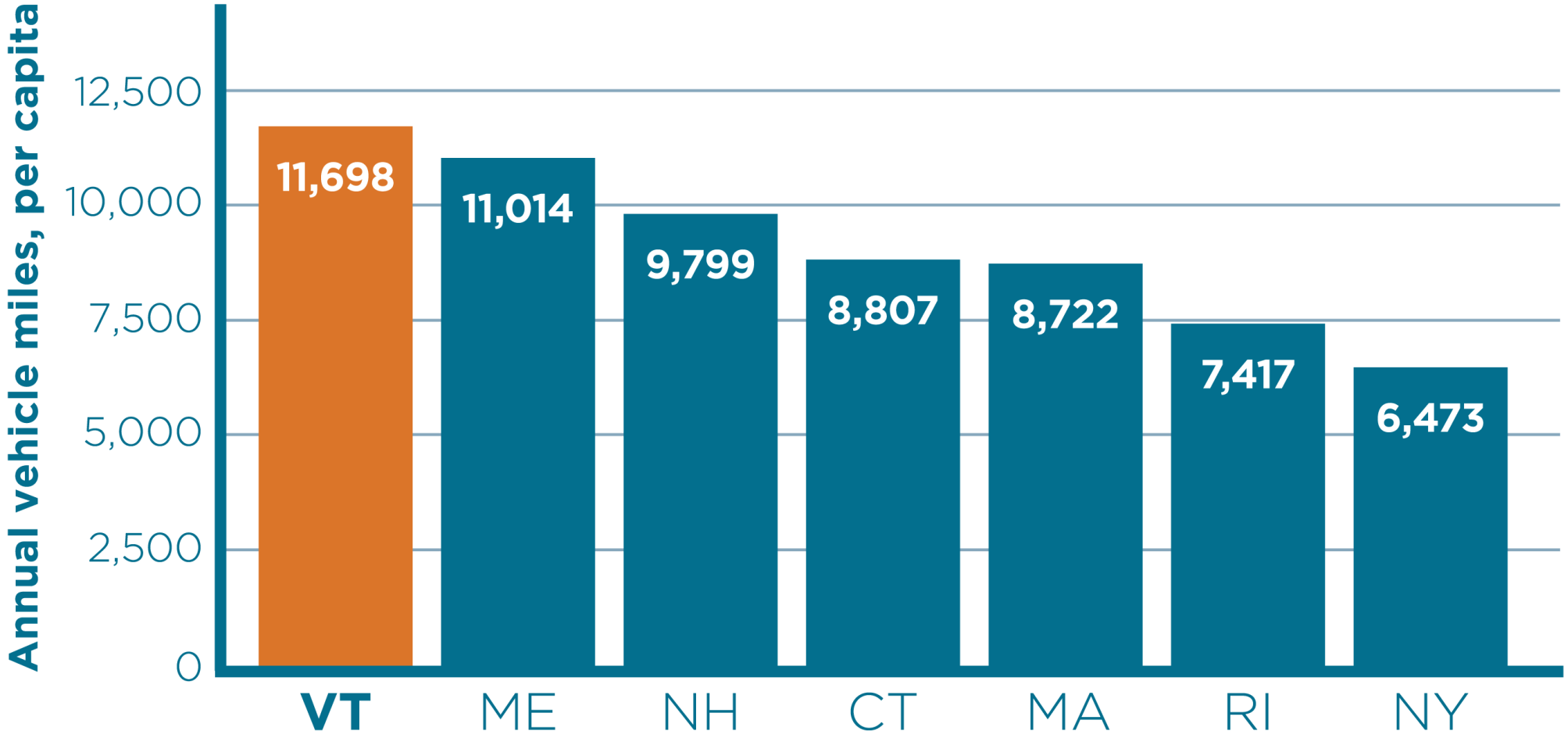

# Per capita emissions

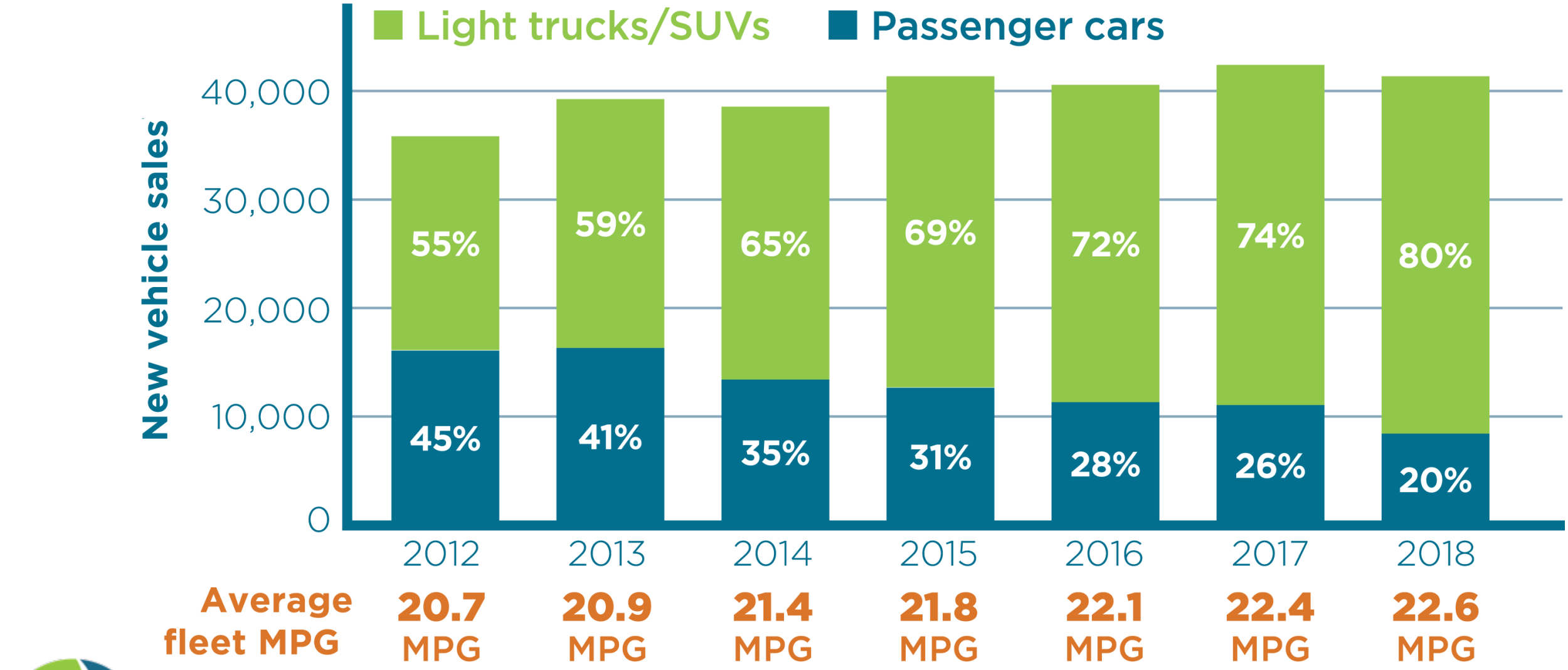
*(metric tons CO2e per person)*

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

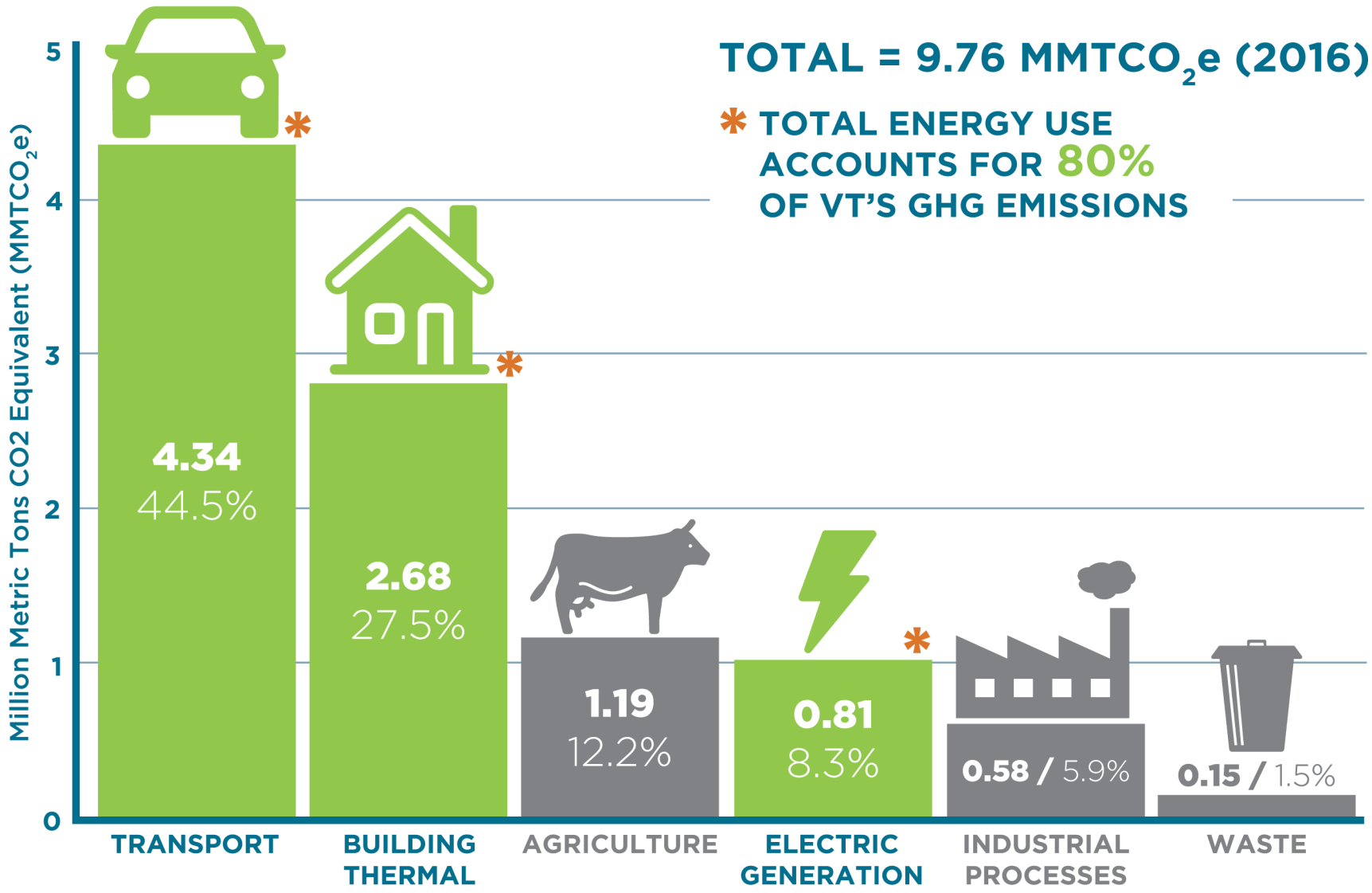


# Vehicle miles traveled per capita, 2015

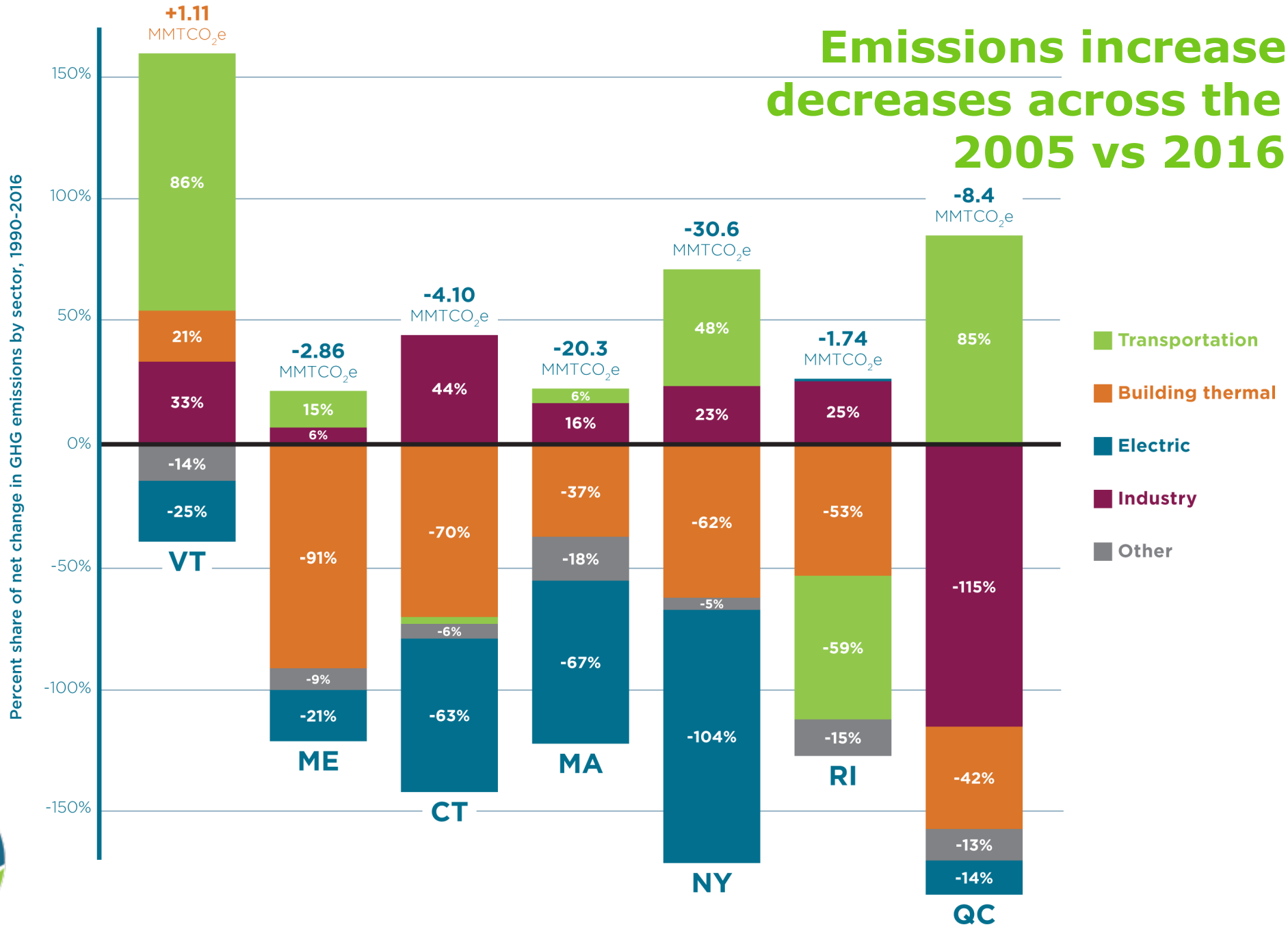



Light trucks/SUVs
Passenger cars
New vehicle sales
40,000
30,000
20,000
10,000
0
55%
59%
65%
69%
72%
74%
80%
45%
41%
35%
31%
28%
26%
20%
2012
2013
2014
2015
2016
2017
2018
Average fleet MPG
20.7 MPG
20.9 MPG
21.4 MPG
21.8 MPG
22.1 MPG
22.4 MPG
22.6 MPG

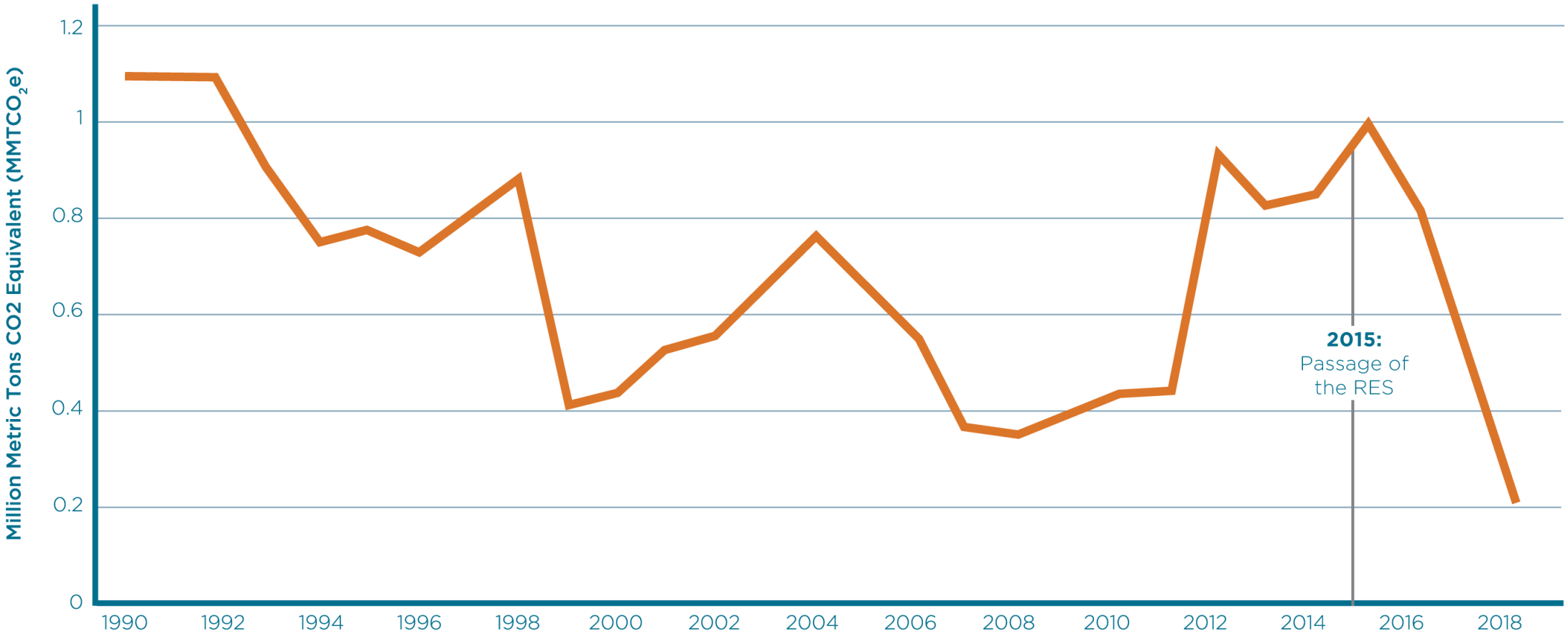
# Vermont's GHG emissions by sector



# Emissions increases and decreases across the region: 2005 vs 2016

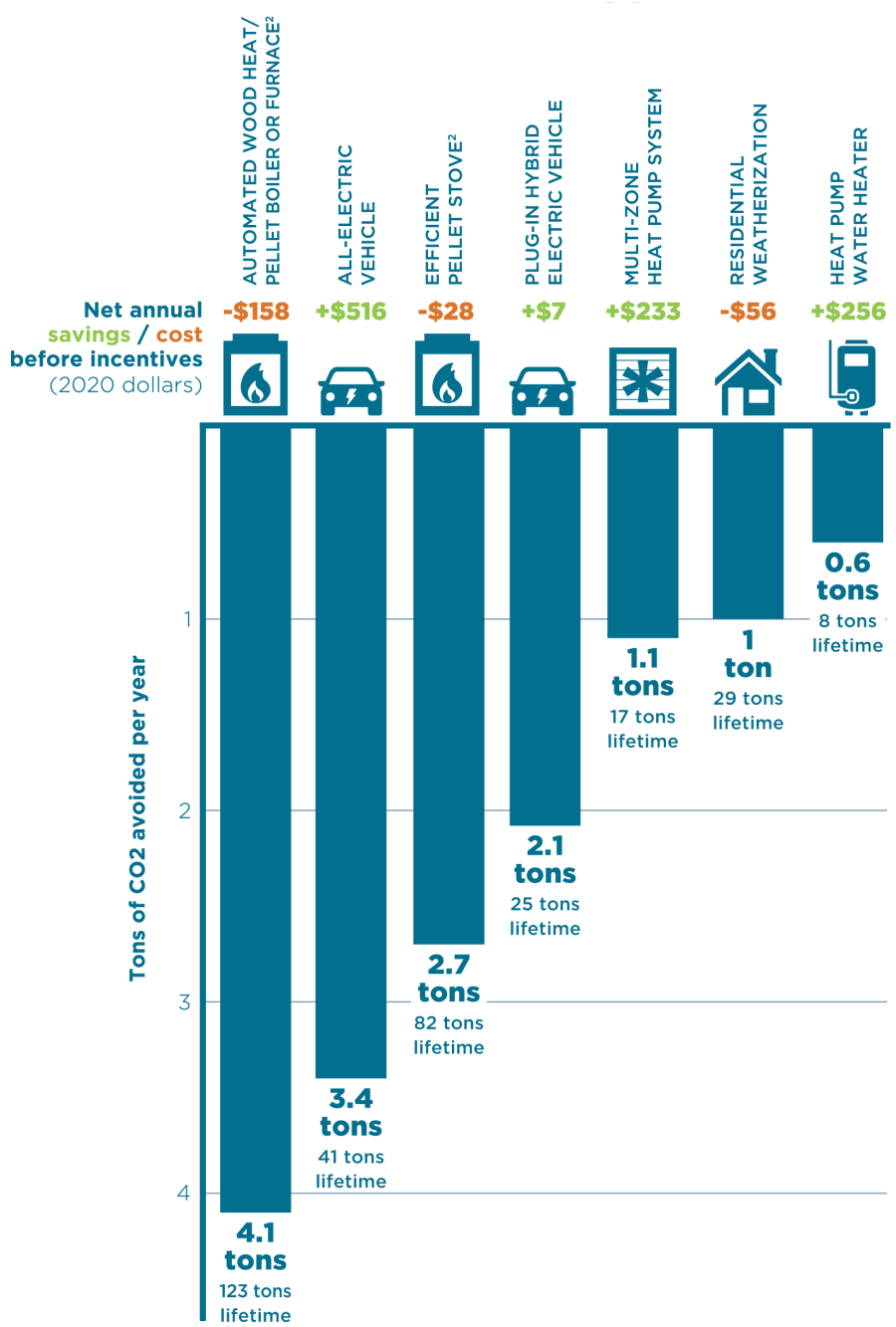


# GHG emissions from the electricity sector, consumption based



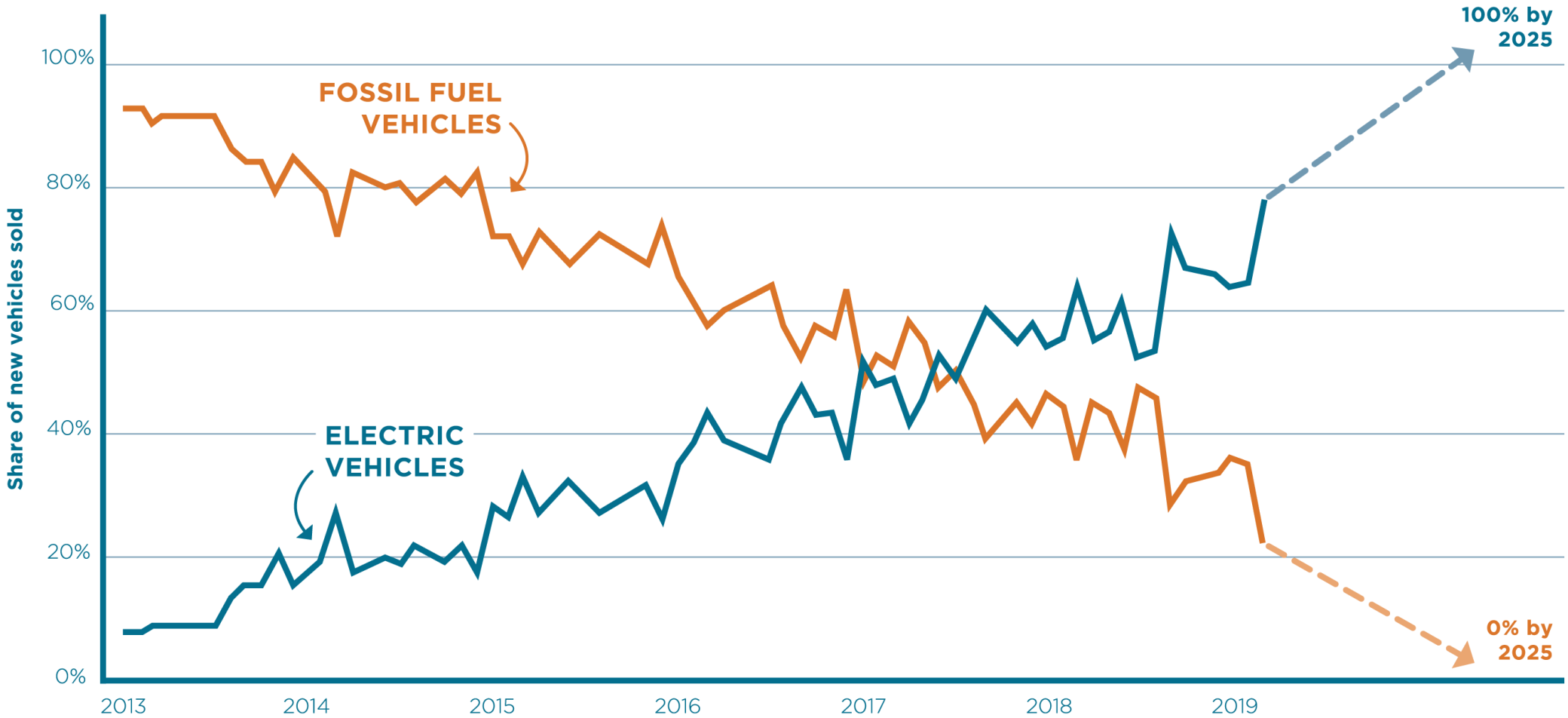

**Average annual Vermont emissions, per capita:**

**15.6 tons CO2e**

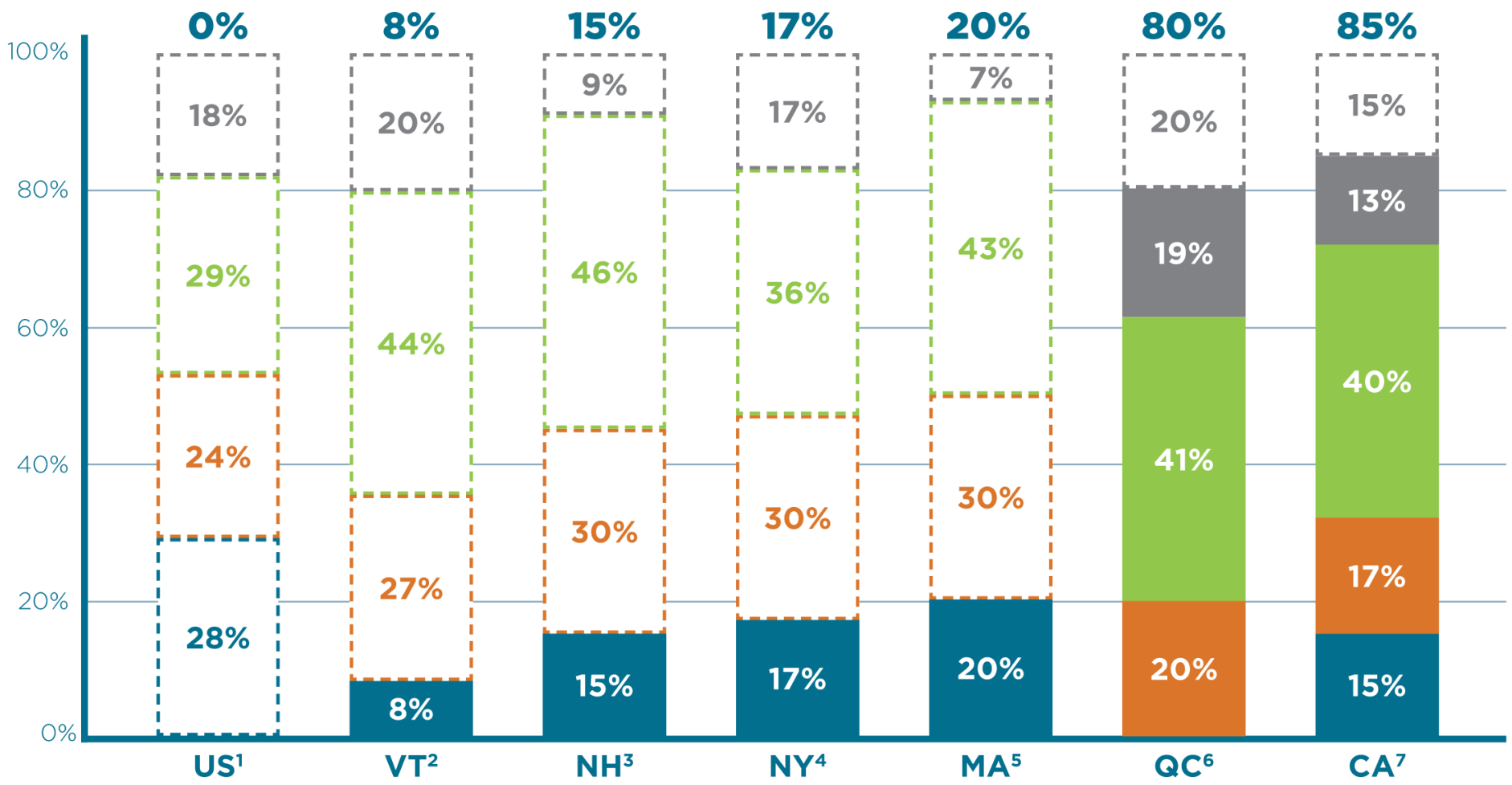



**Individual $ savings and GHG reductions from energy actions**

# EVs now the majority of new vehicles sold in Norway



# Percent of GHG emissions capped by policy, 2016

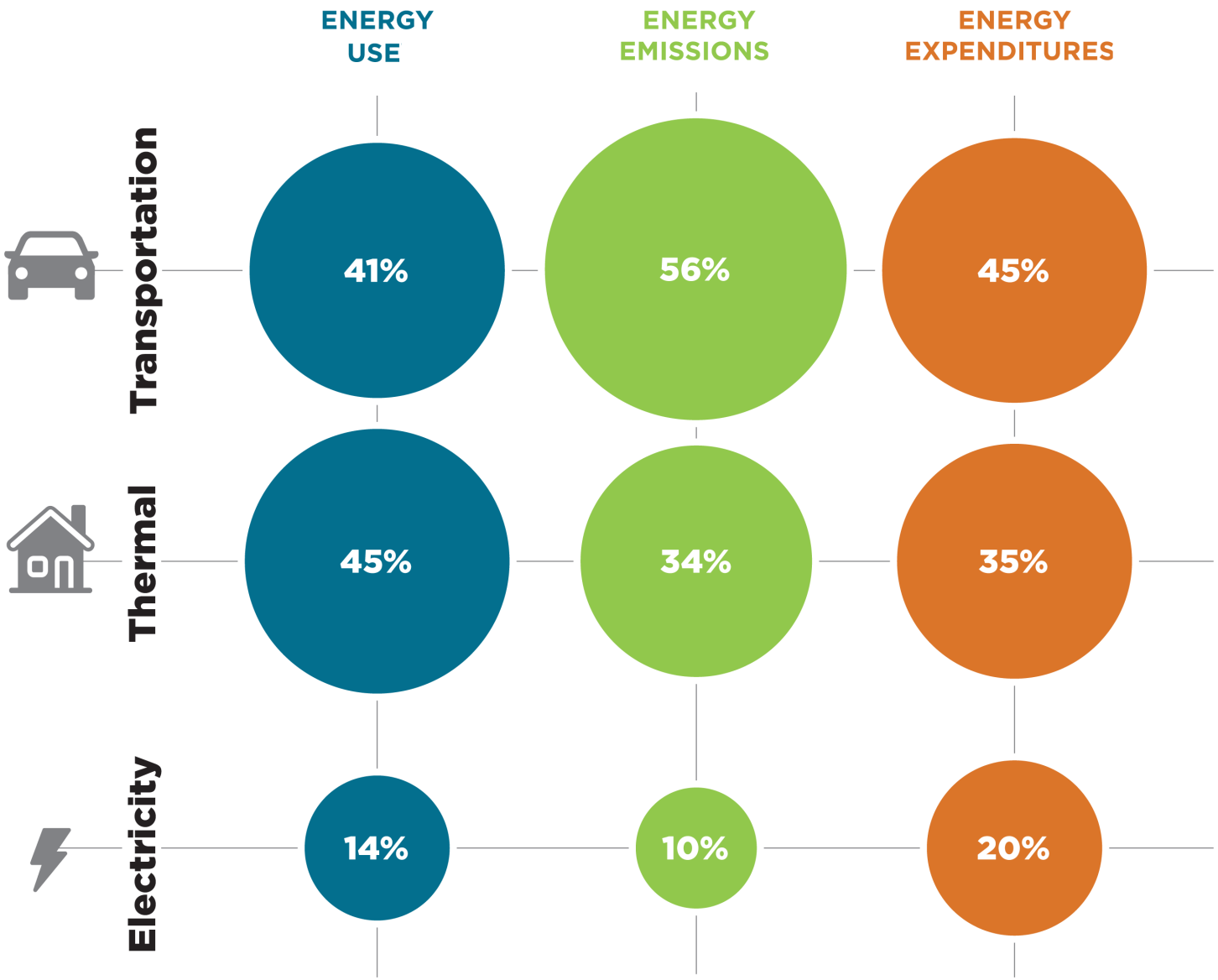



**Download a copy: eanvt.org**

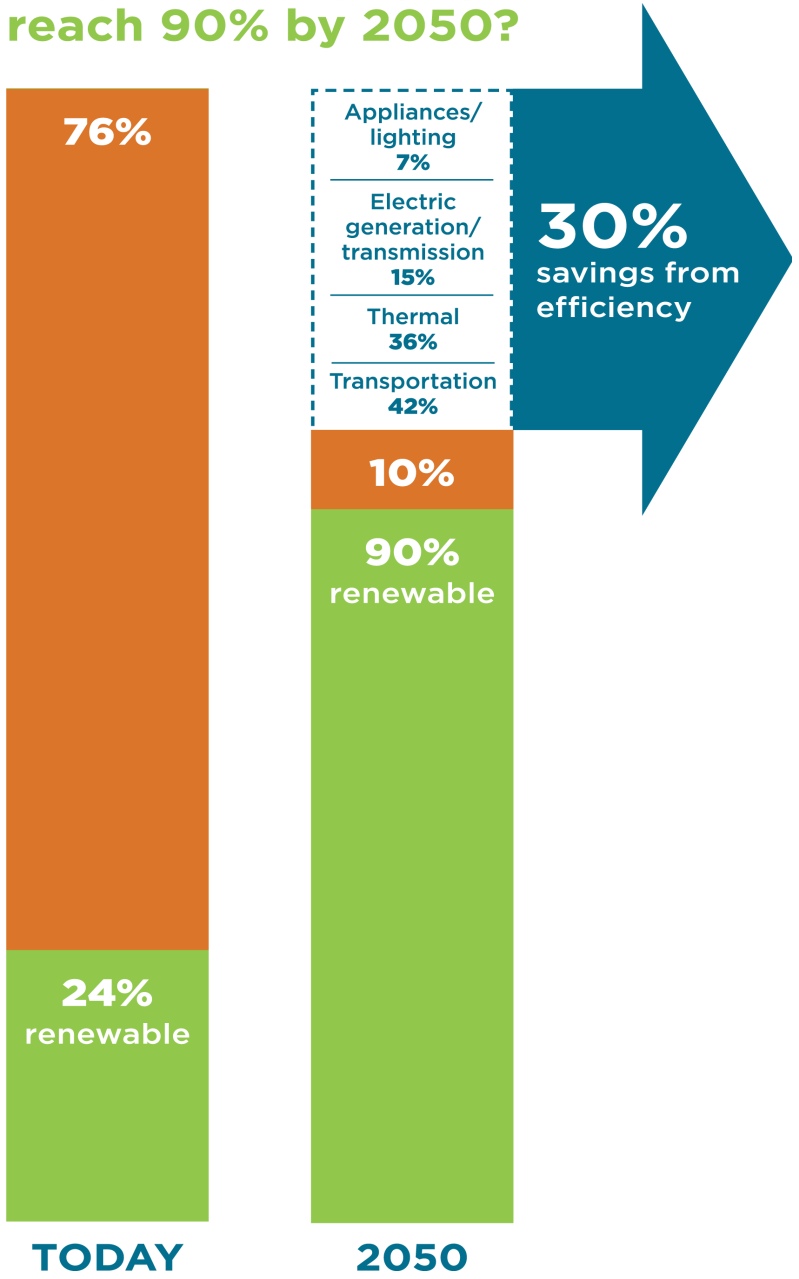
**Request printed copies:**
**cwesley@eanvt.org**

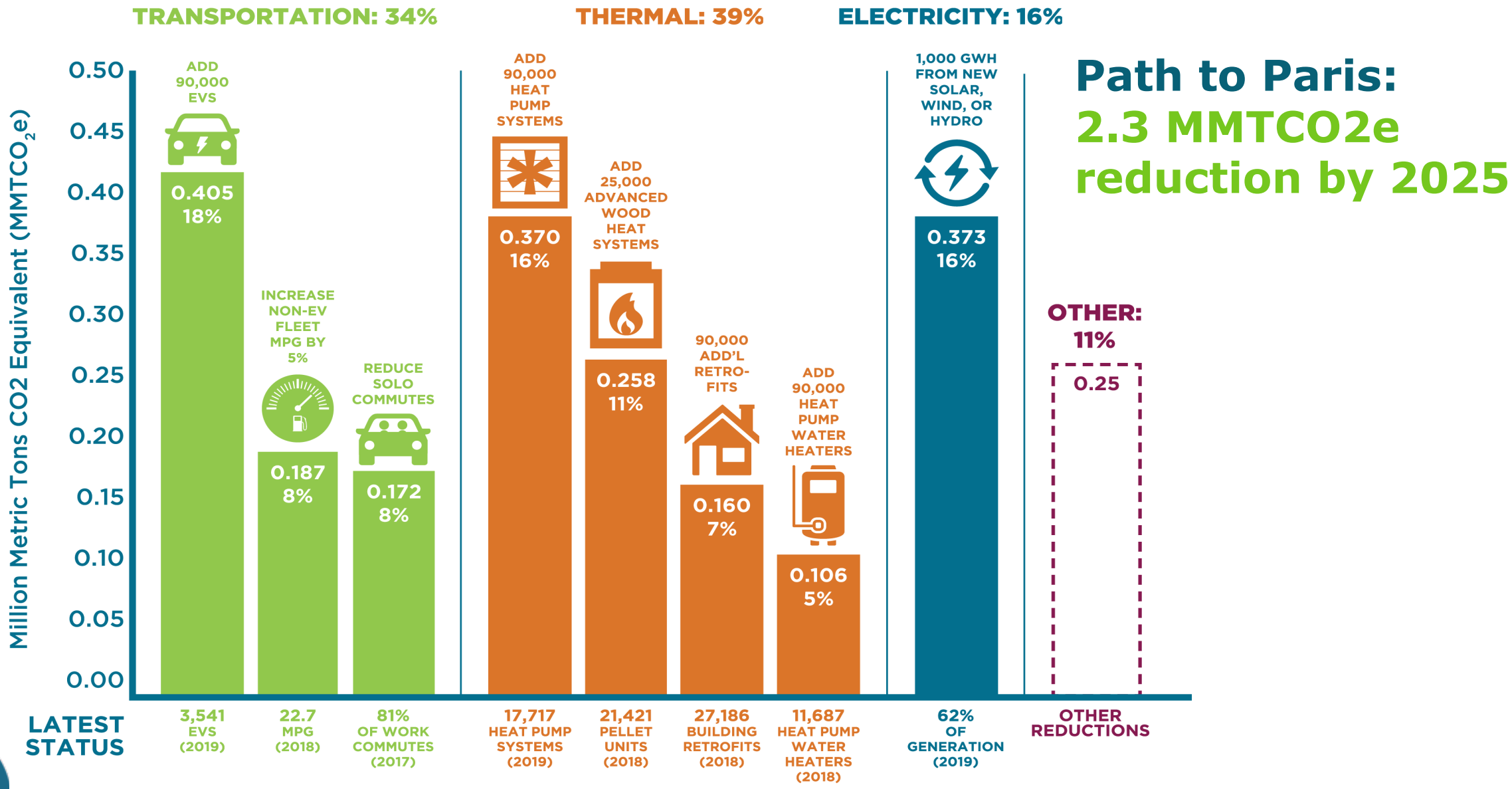
**Questions:**
**jduval@eanvt.org**

# What do we mean by ‘total energy’?



## What will it take to reach 90% by 2050?





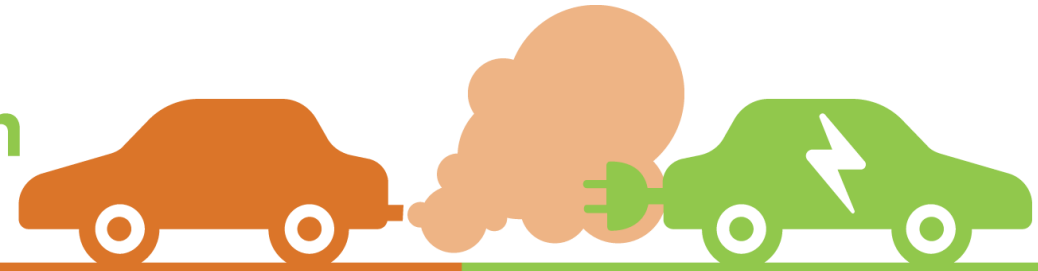

# Path to Paris:
# 2.3 MMTCO2e reduction by 2025


**Download a copy: eanvt.org**

**Request printed copies:**
**cwesley@eanvt.org**

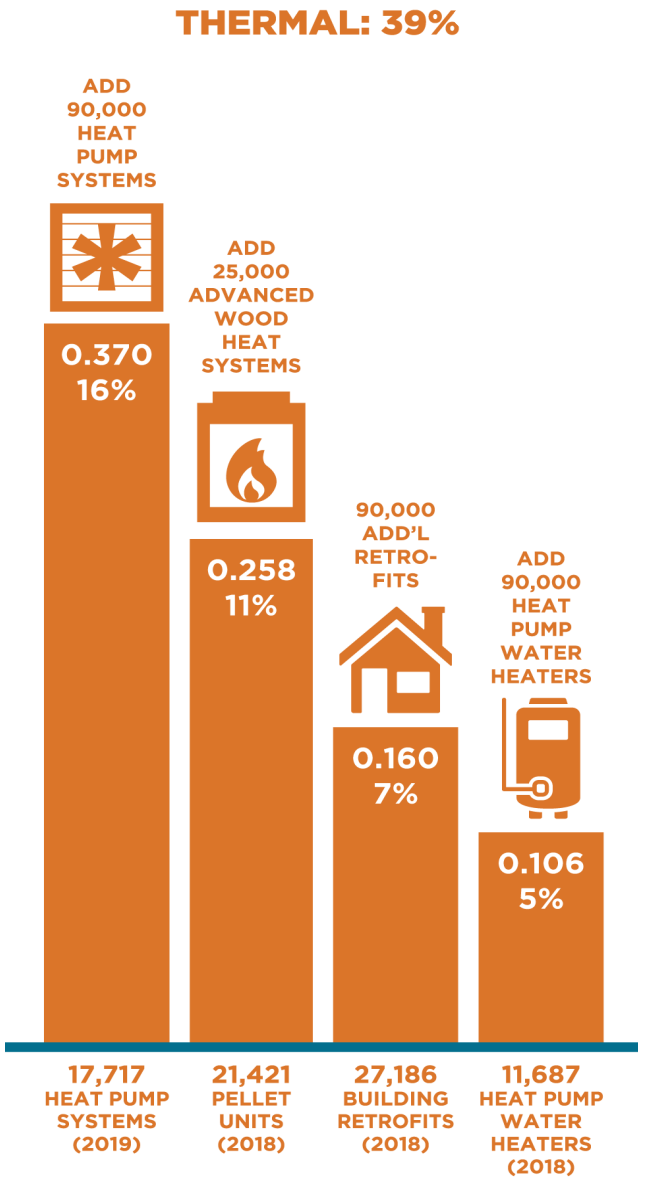
**Questions:**
**jduval@eanvt.org**

# Gas vs. EV cost comparison over 150,000 miles



| | GAS VEHICLE | ELECTRIC VEHICLE |
|---|---|---|
| **Fuel** | $17,585 | $9,164 |
| **Oil Changes & Filter Replacement** | $900 | None |
| **Tire Changes** | $600 | $600 |
| **Engine Air Filter Replacements** | $207 | None |
| **Cabin Air Filter Replacements** | $273 | $273 |
| **Spark Plug Replacements** | $439 | None |
| **Coolant Flush and Replacement** | $110 | $110 |

**2020-2025:**
**72,500 heating systems replaced**
*(12,500 per year)*

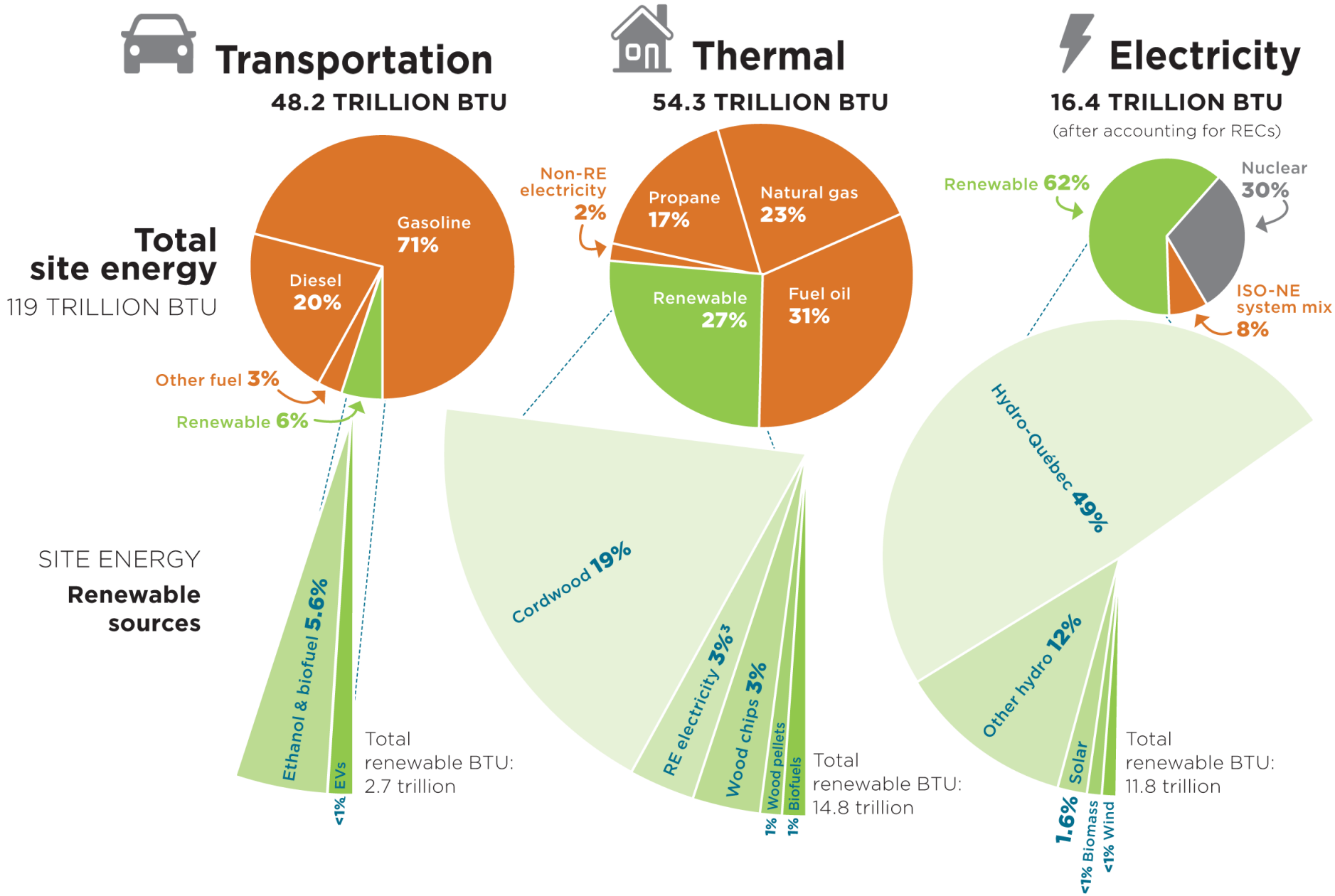



**Path to Paris:**

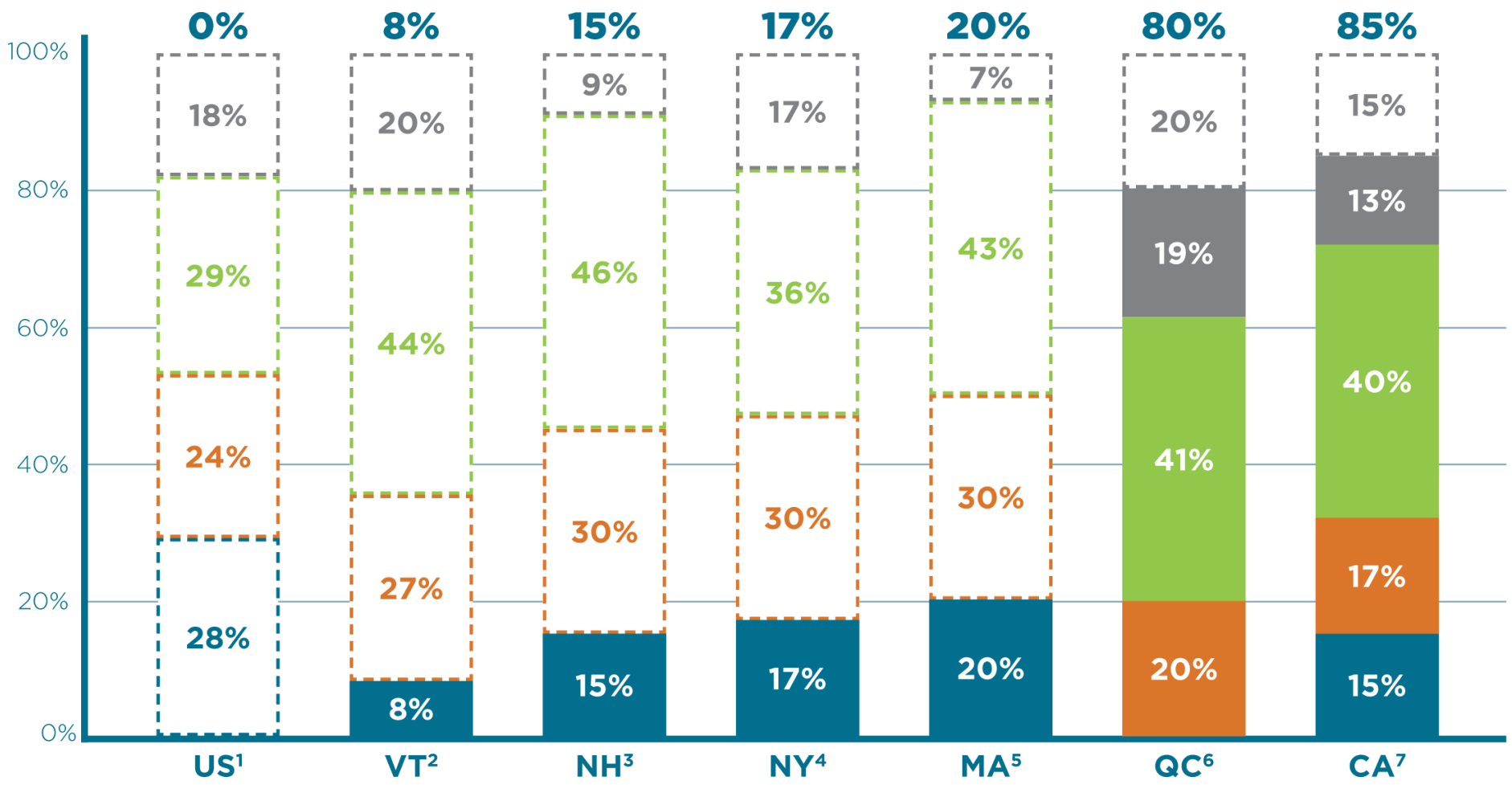
**90,000 cold climate heat pumps**

**9,000 efficient pellet stoves**

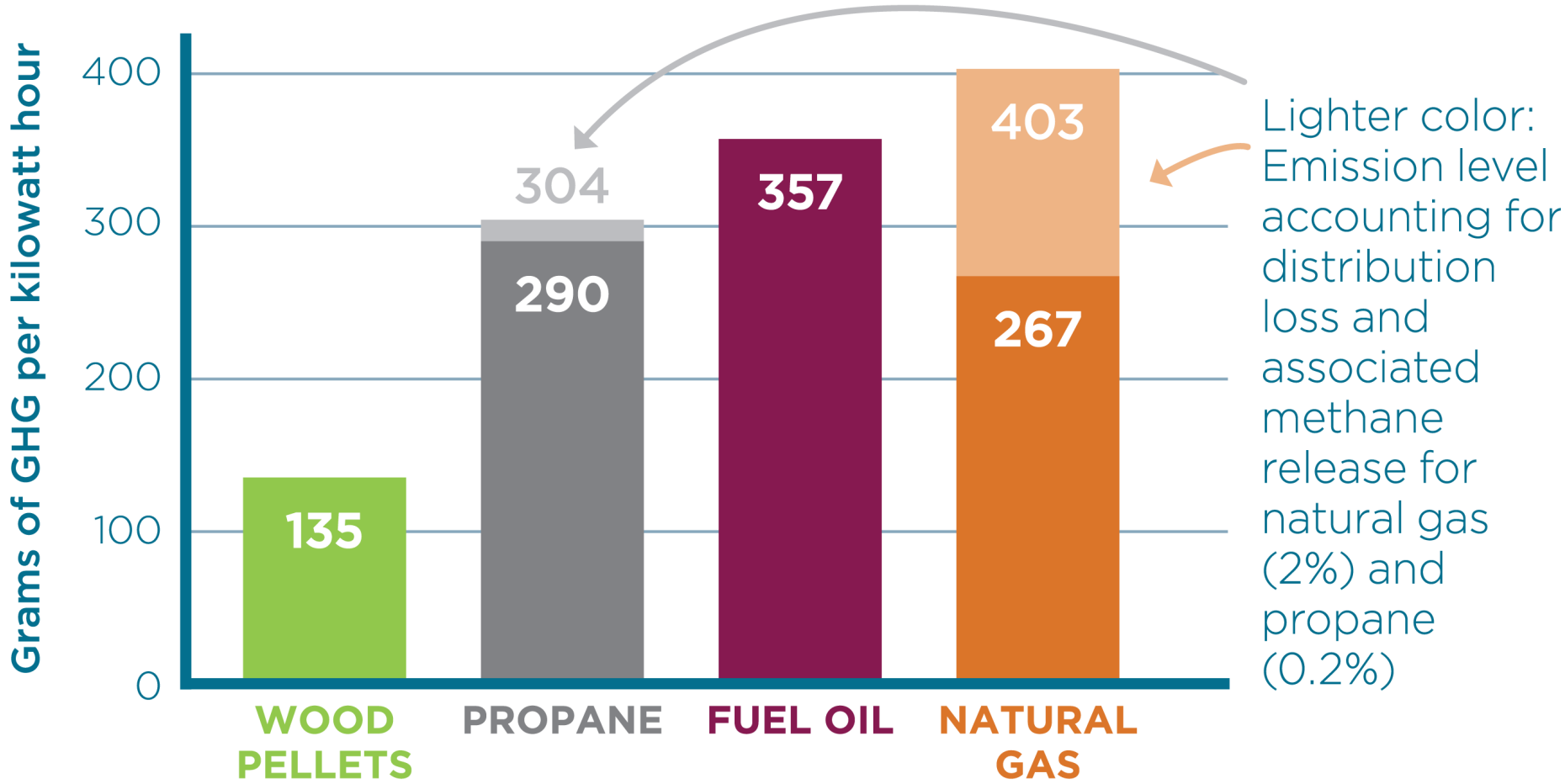
**6,000 automated pellet boilers**


Transportation
48.2 TRILLION BTU
Thermal
54.3 TRILLION BTU
Electricity
16.4 TRILLION BTU
(after accounting for RECs)
Total site energy
119 TRILLION BTU
Gasoline 71%
Diesel 20%
Other fuel 3%
Renewable 6%
Non-RE electricity 2%
Propane 17%
Natural gas 23%
Renewable 27%
Fuel oil 31%
Renewable 62%
Nuclear 30%
ISO-NE system mix 8%
SITE ENERGY
Renewable sources
Ethanol & biofuel 5.6%
EVs <1%
Total renewable BTU: 2.7 trillion
Cordwood 19%
RE electricity 3%[3]
Wood chips 3%
Wood pellets 1%
Biofuels 1%
Total renewable BTU: 14.8 trillion
Hydro-Québec 49%
Other hydro 12%
Solar 1.6%
Biomass <1%
Wind <1%
Total renewable BTU: 11.8 trillion

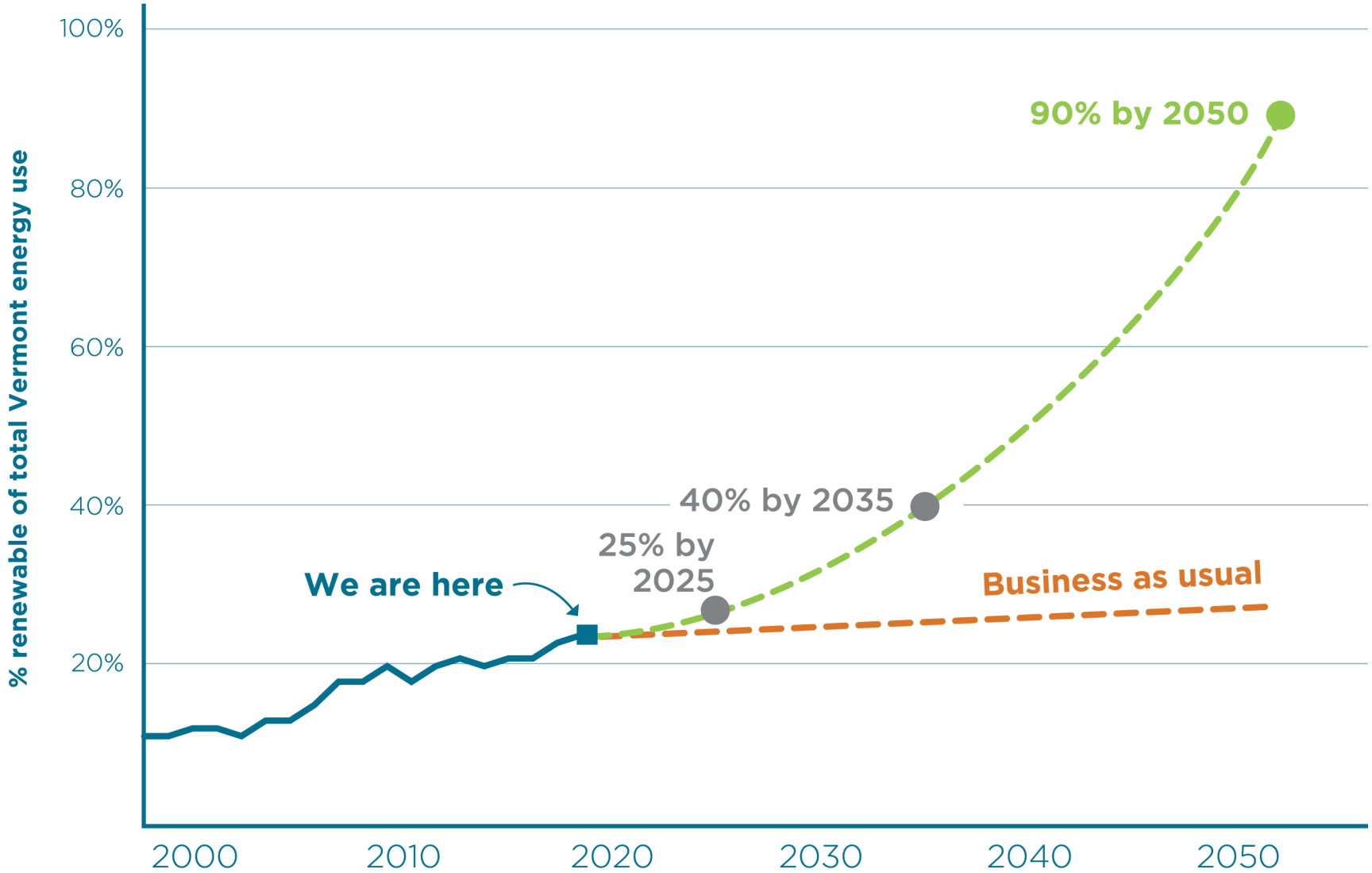
# Percent of GHG emissions capped by policy, 2016



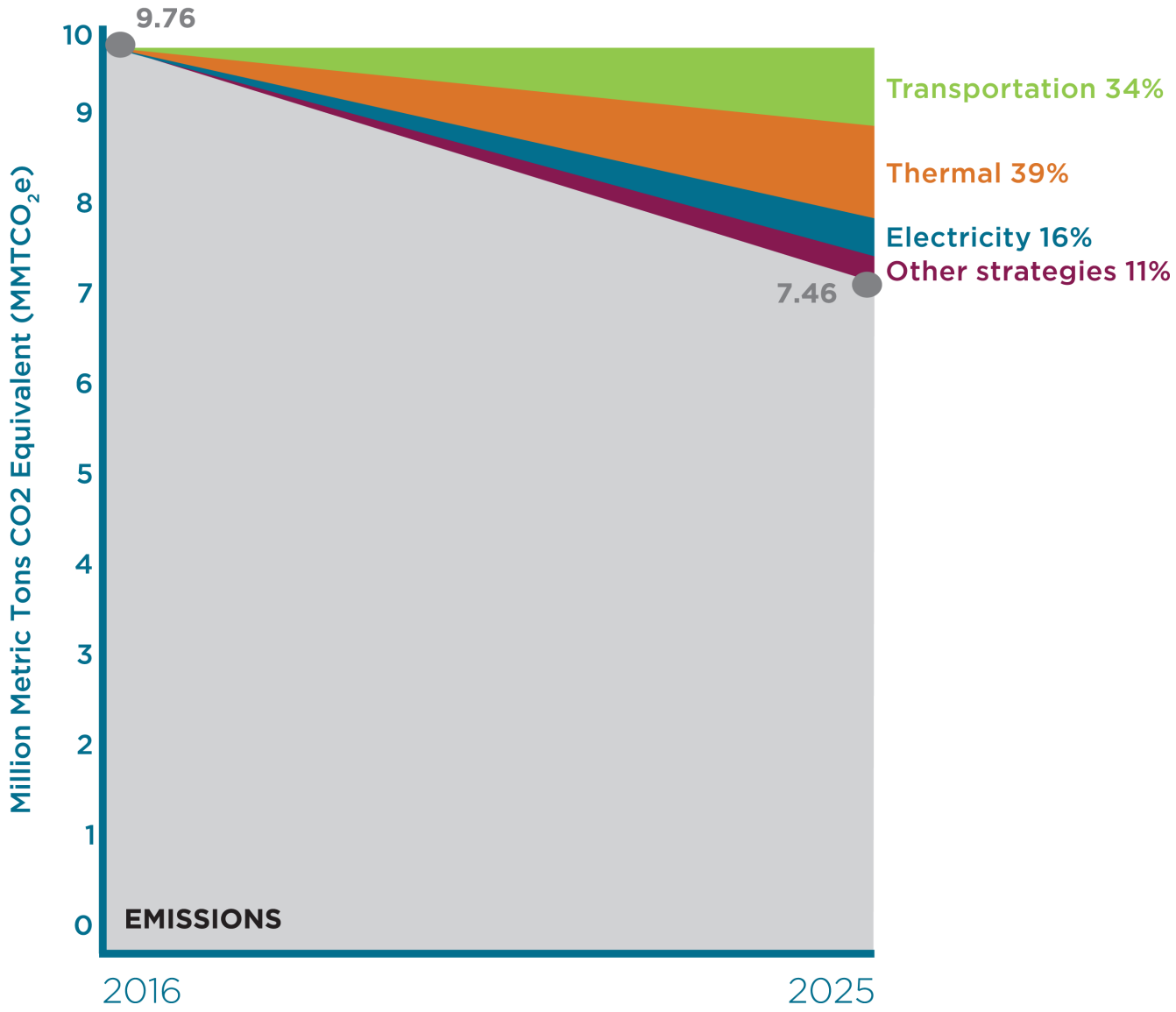
# Wood pellets from Northeast cut GHG emissions vs. fossil fuel heating

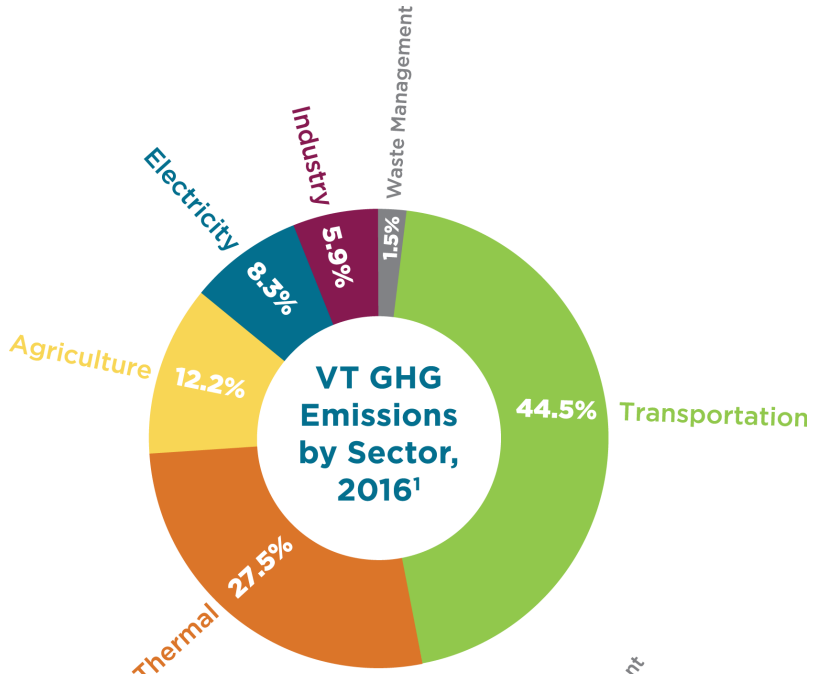


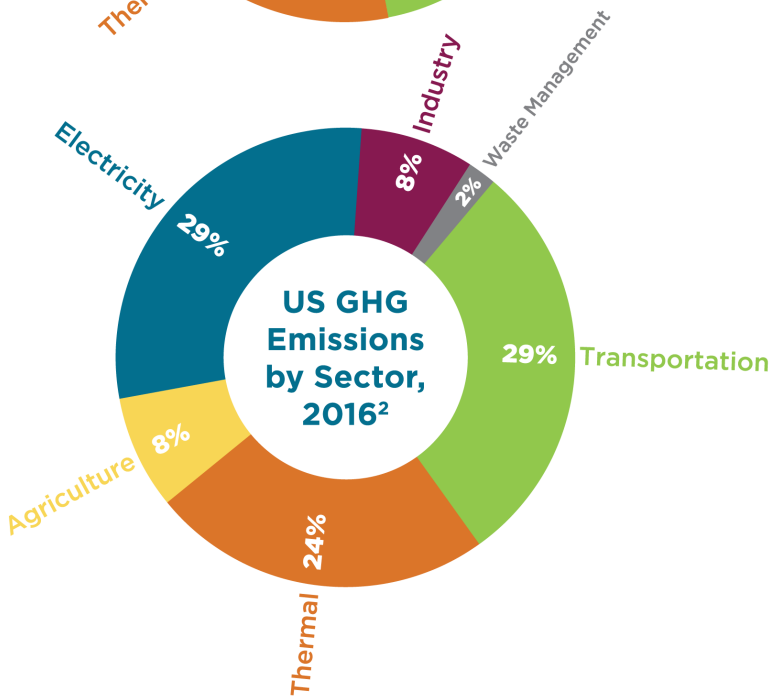
# Business as usual will not get us to 90% by 2050

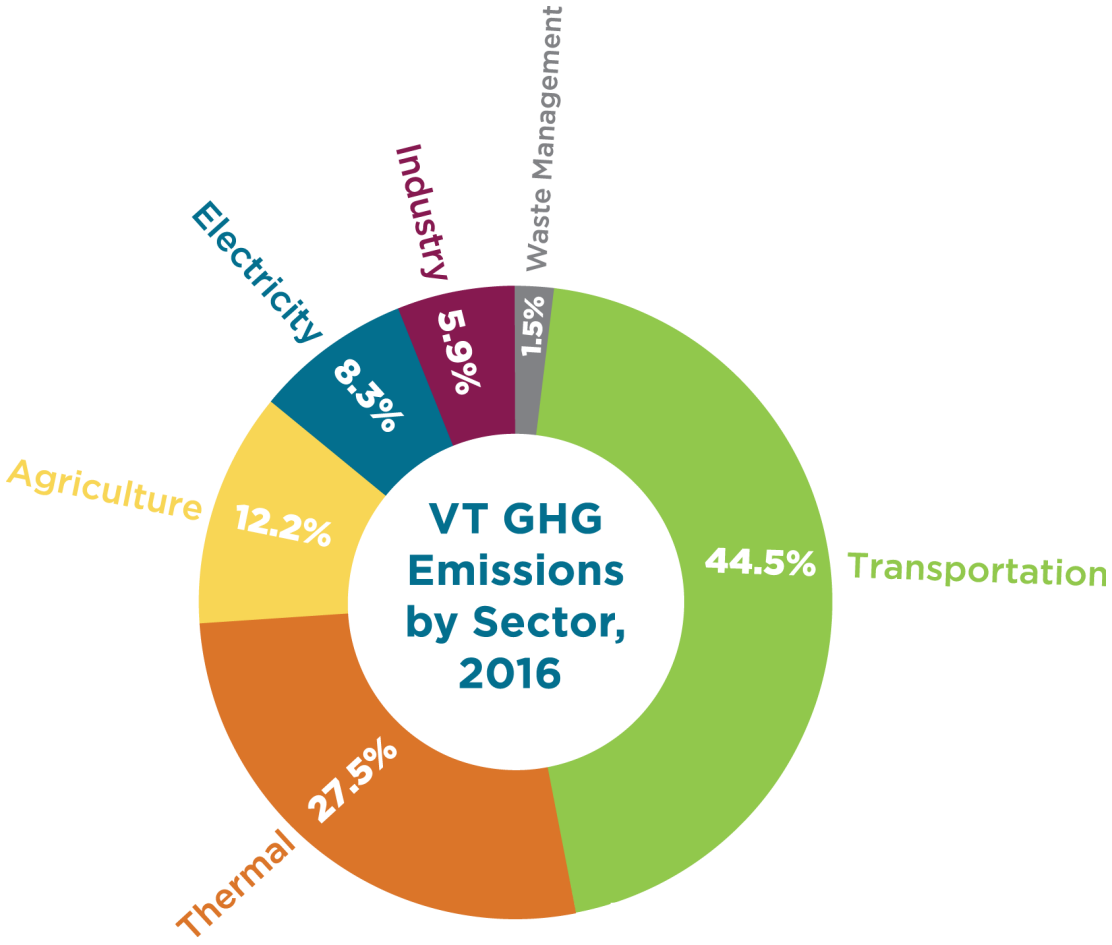


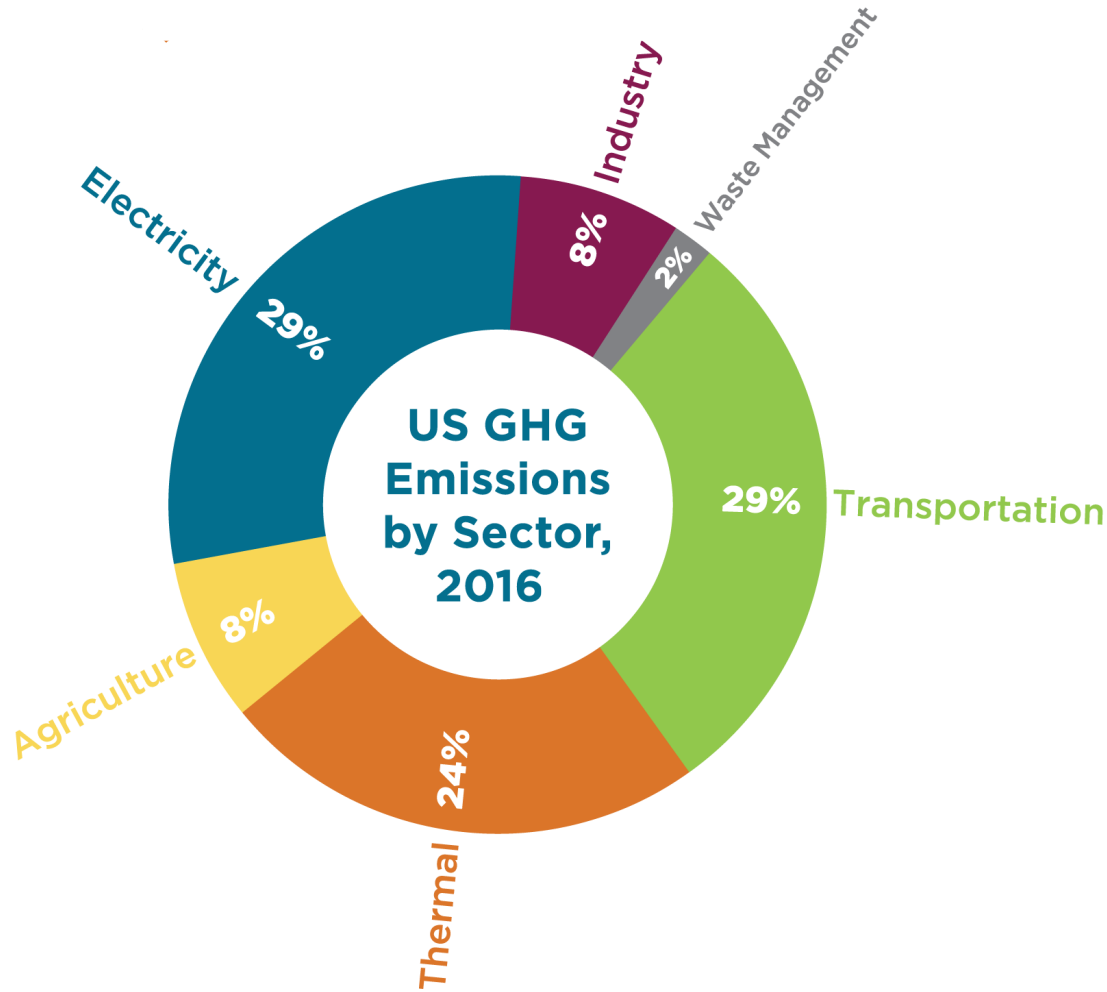
# Getting to Paris will require ALL these efforts

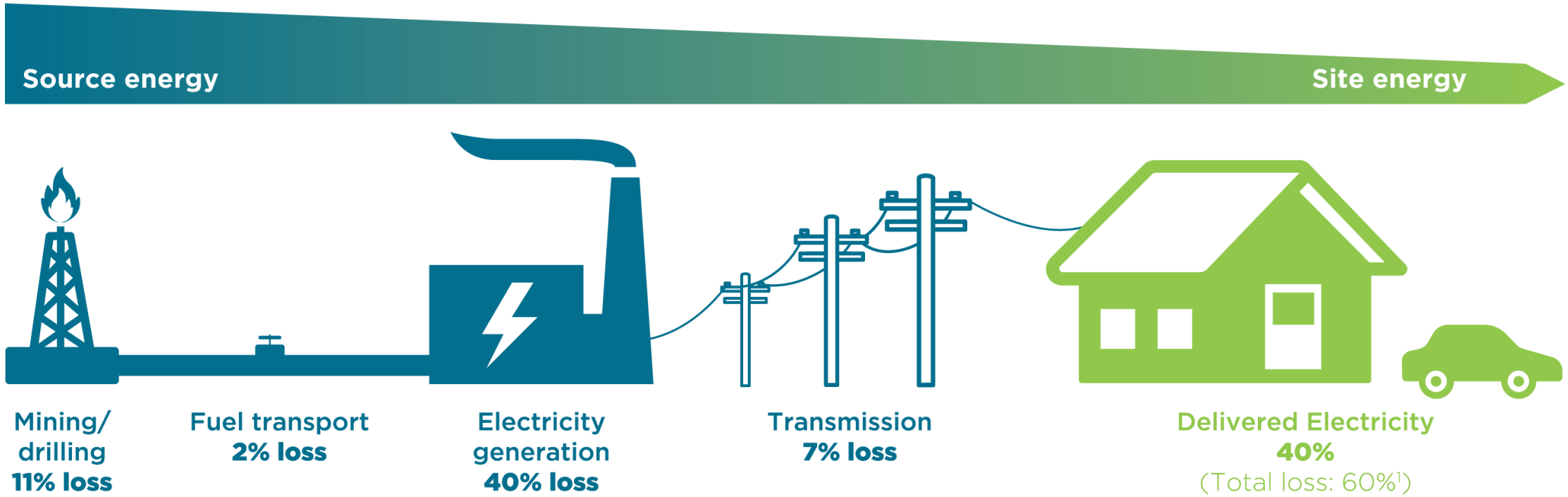


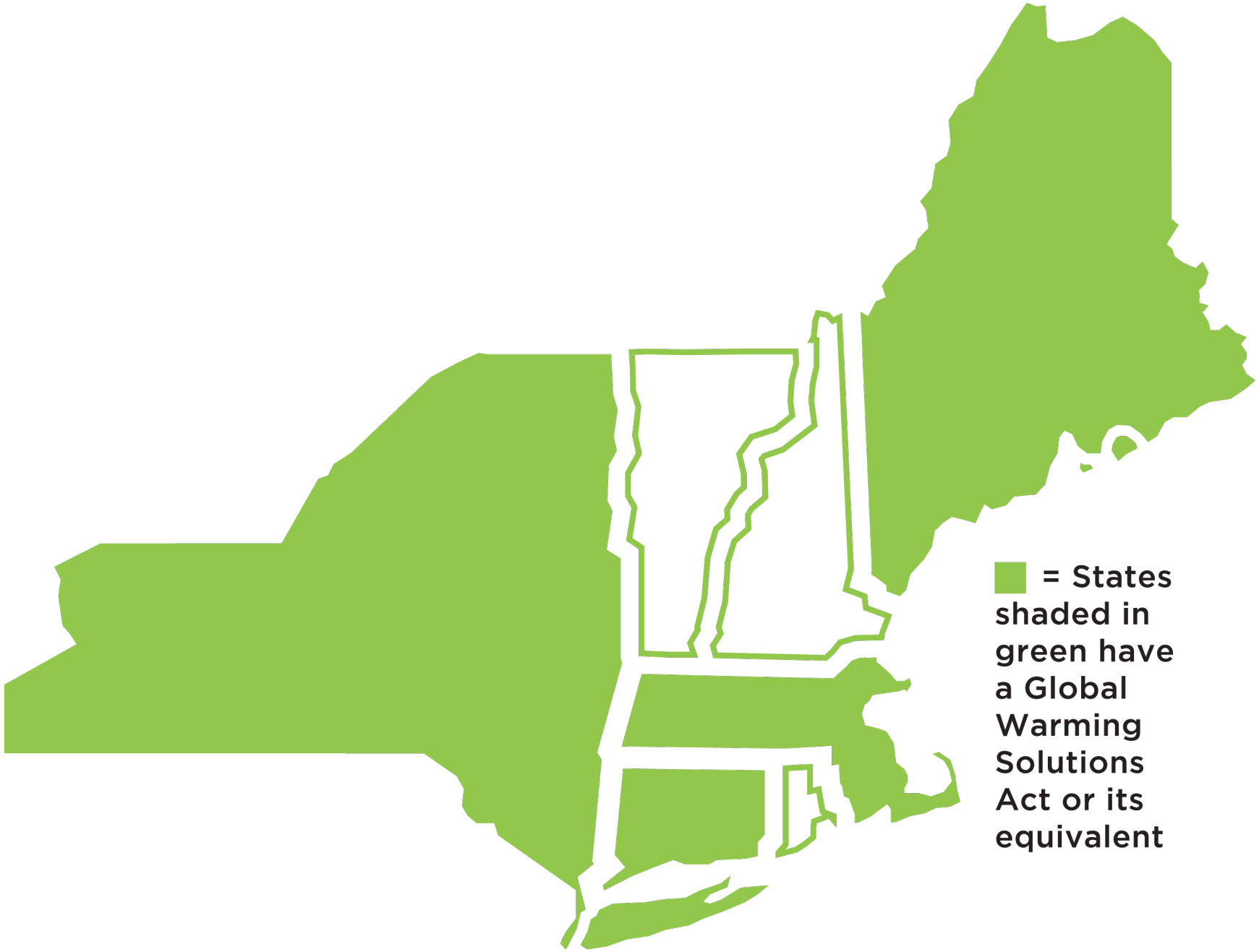

VT GHG Emissions by Sector, 2016[1]
Transportation
44.5%
Thermal
27.5%
Agriculture
12.2%
Electricity
8.3%
Industry
5.9%
Waste Management
1.5%


US GHG Emissions by Sector, 2016[2]
Transportation
29%
Thermal
24%
Agriculture
8%
Electricity
29%
Industry
8%
Waste Management
2%


VT GHG Emissions by Sector, 2016
Transportation
44.5%
Thermal
27.5%
Agriculture
12.2%
Electricity
8.3%
Industry
5.9%
Waste Management
1.5%

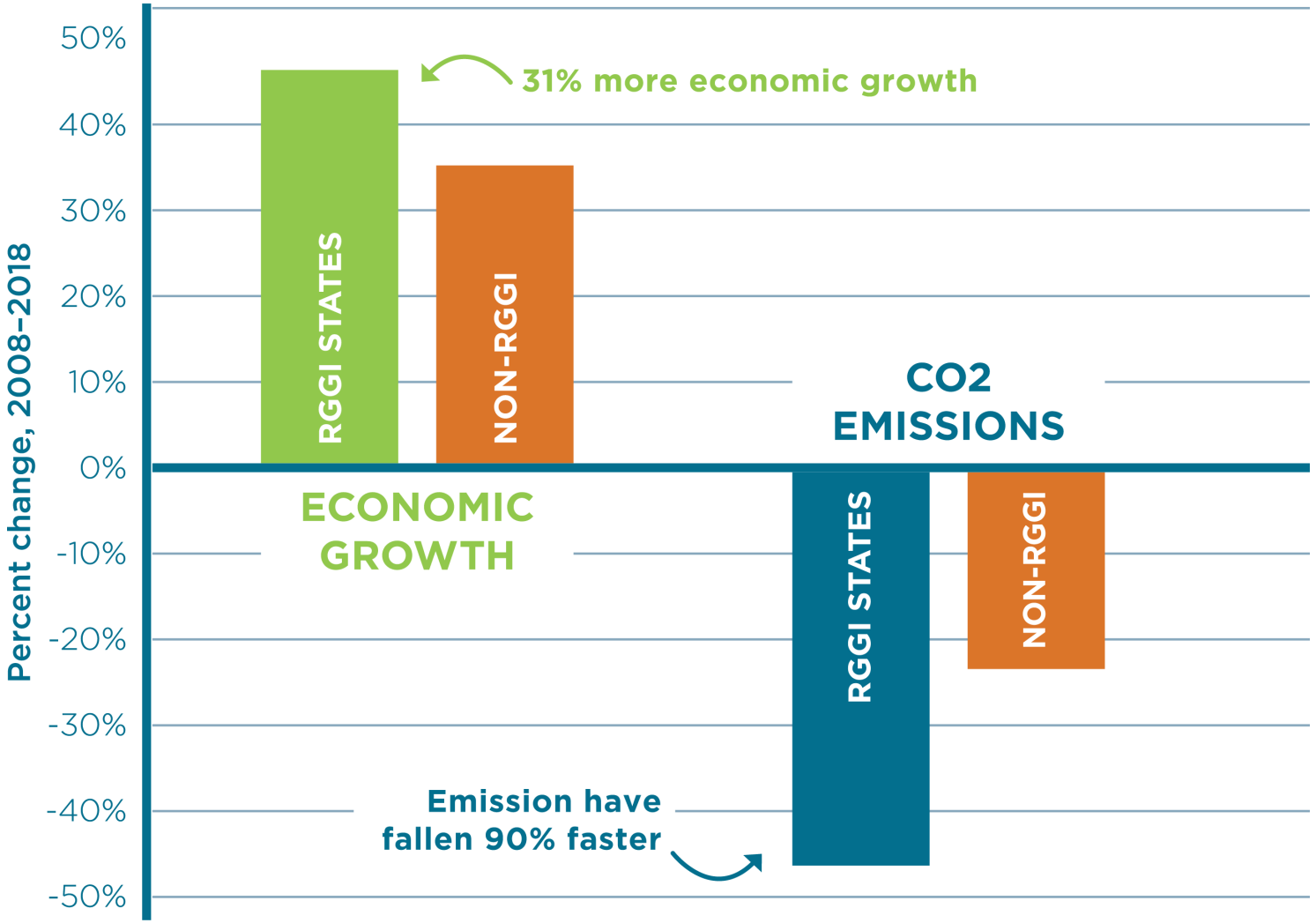

US GHG Emissions by Sector, 2016
Transportation
29%
Thermal
24%
Agriculture
8%
Electricity
29%
Industry
8%
Waste Management
2%


Source energy
Site energy
Mining/
drilling
11% loss
Fuel transport
2% loss
Electricity
generation
40% loss
Transmission
7% loss
Delivered Electricity
40%
(Total loss: 60%[1])



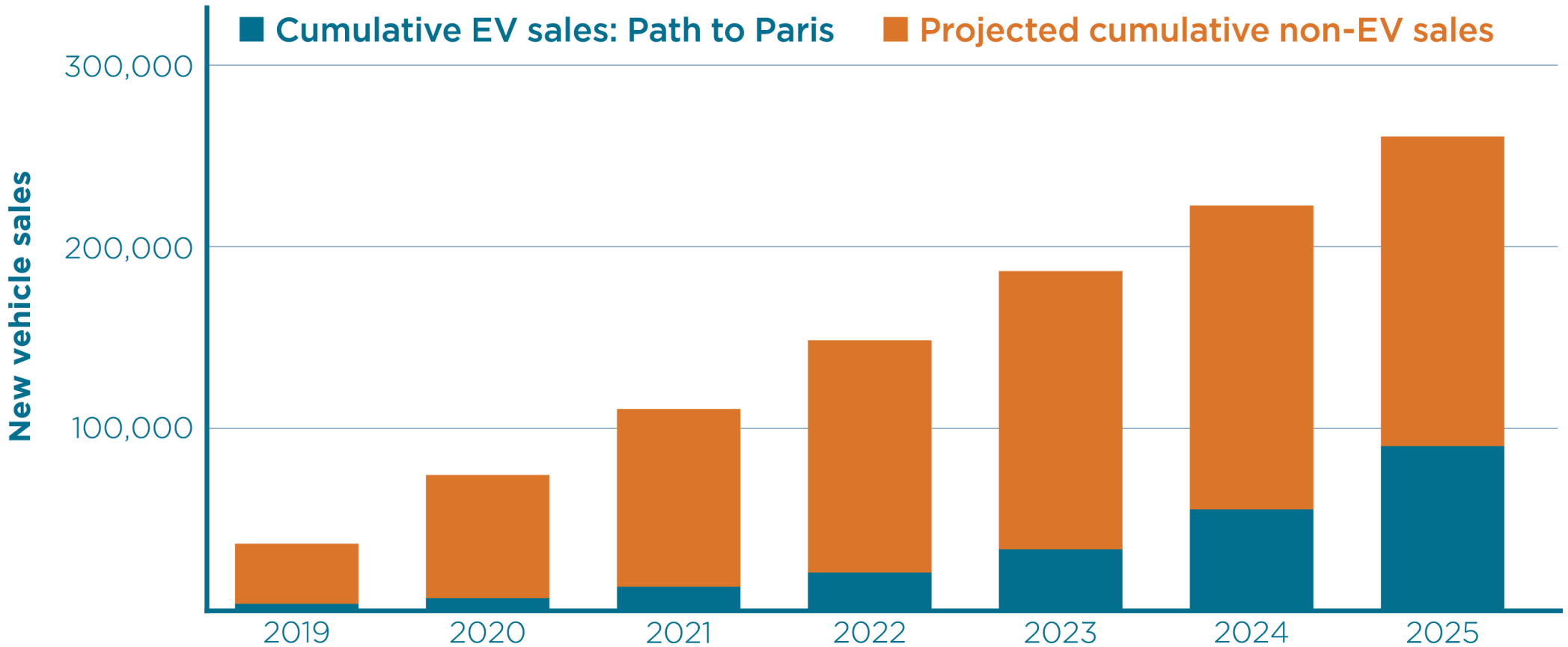
= States shaded in green have a Global Warming Solutions Act or its equivalent

# Economic growth & emissions reductions in RGGI states

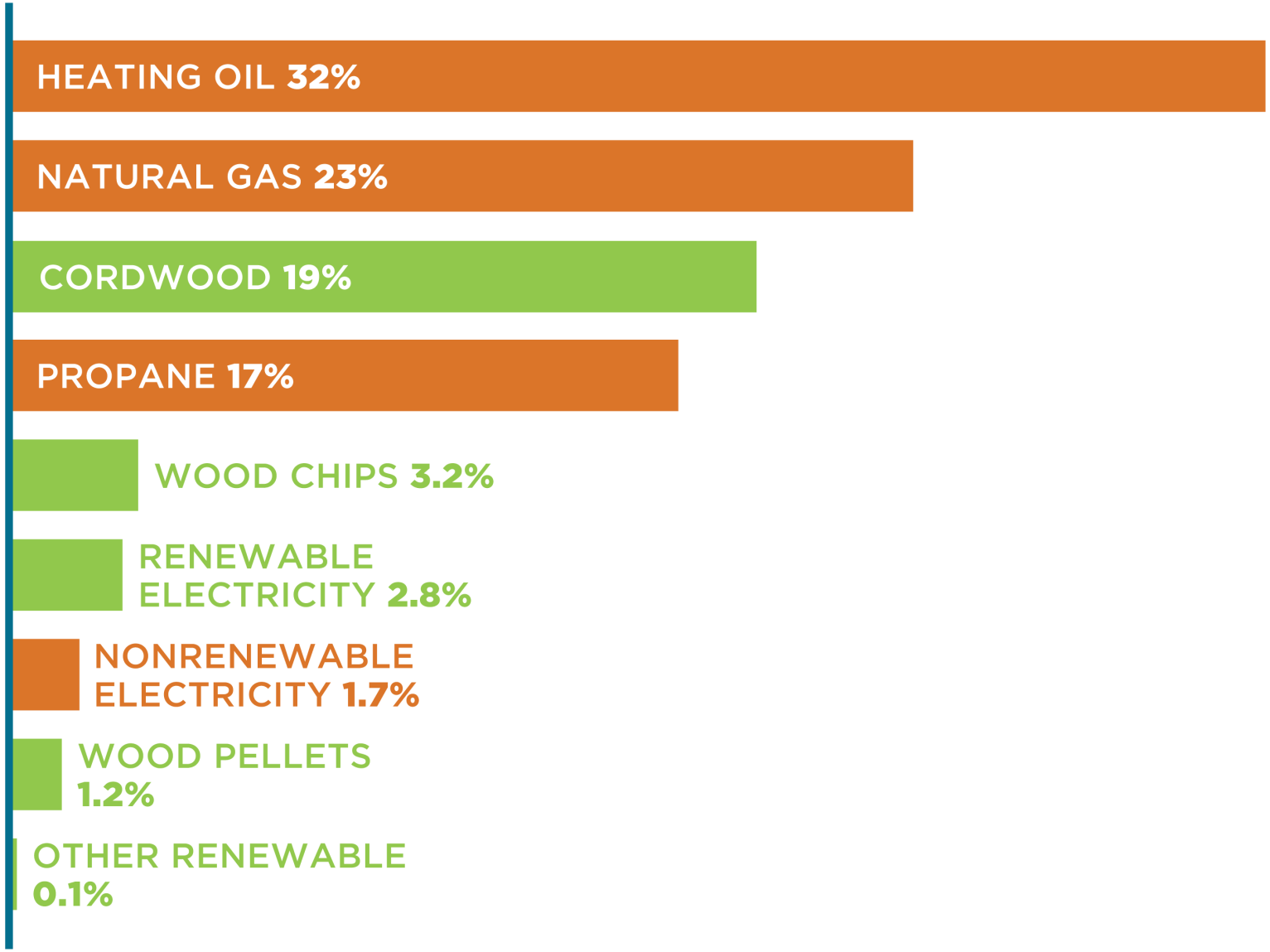


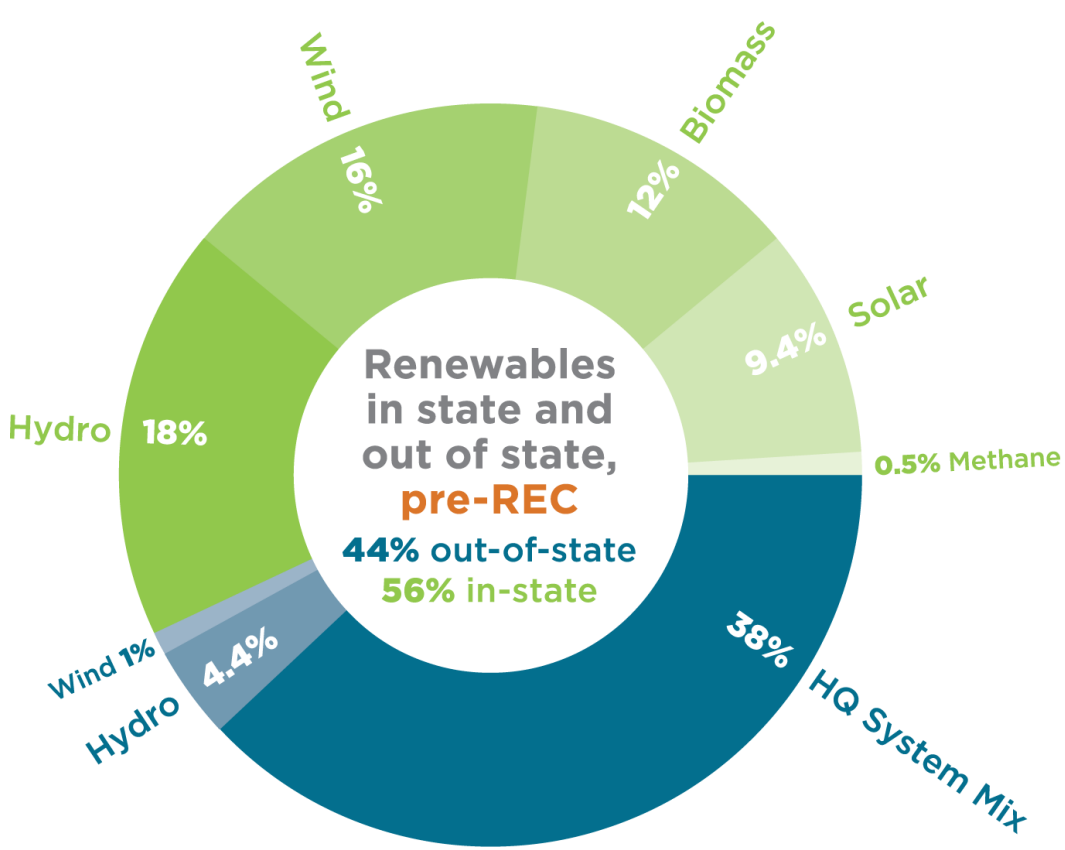

Source: Acadia Center. 2019.

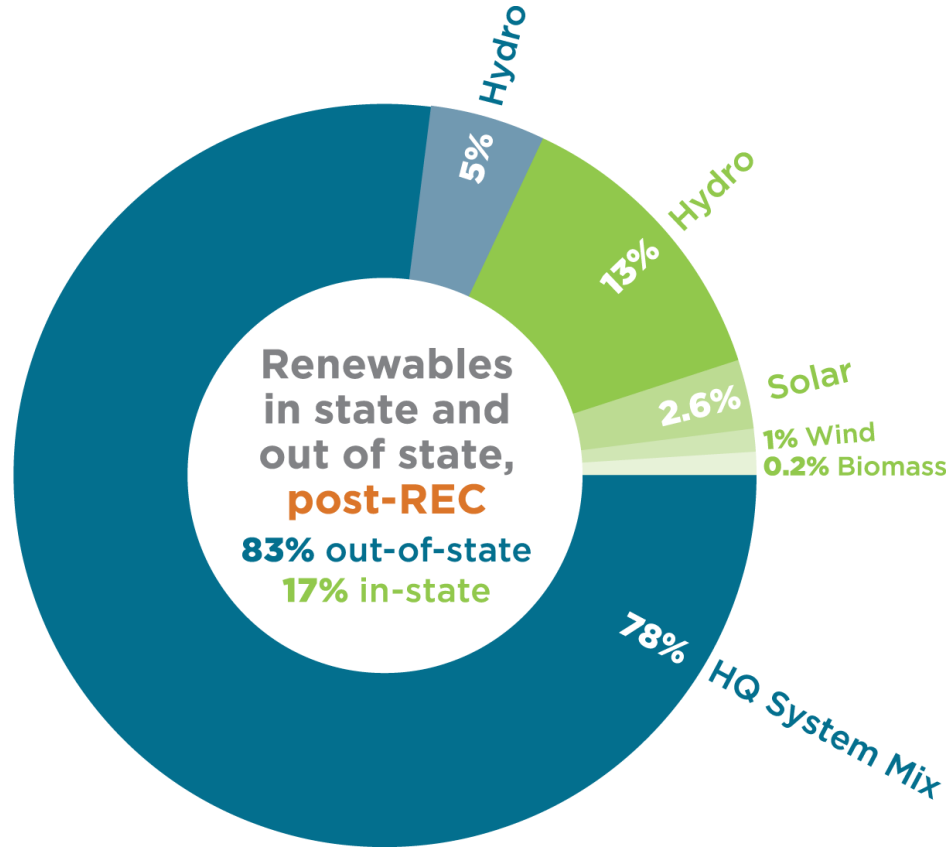
# EVs need to make up at least a third of new vehicles sold through 2025



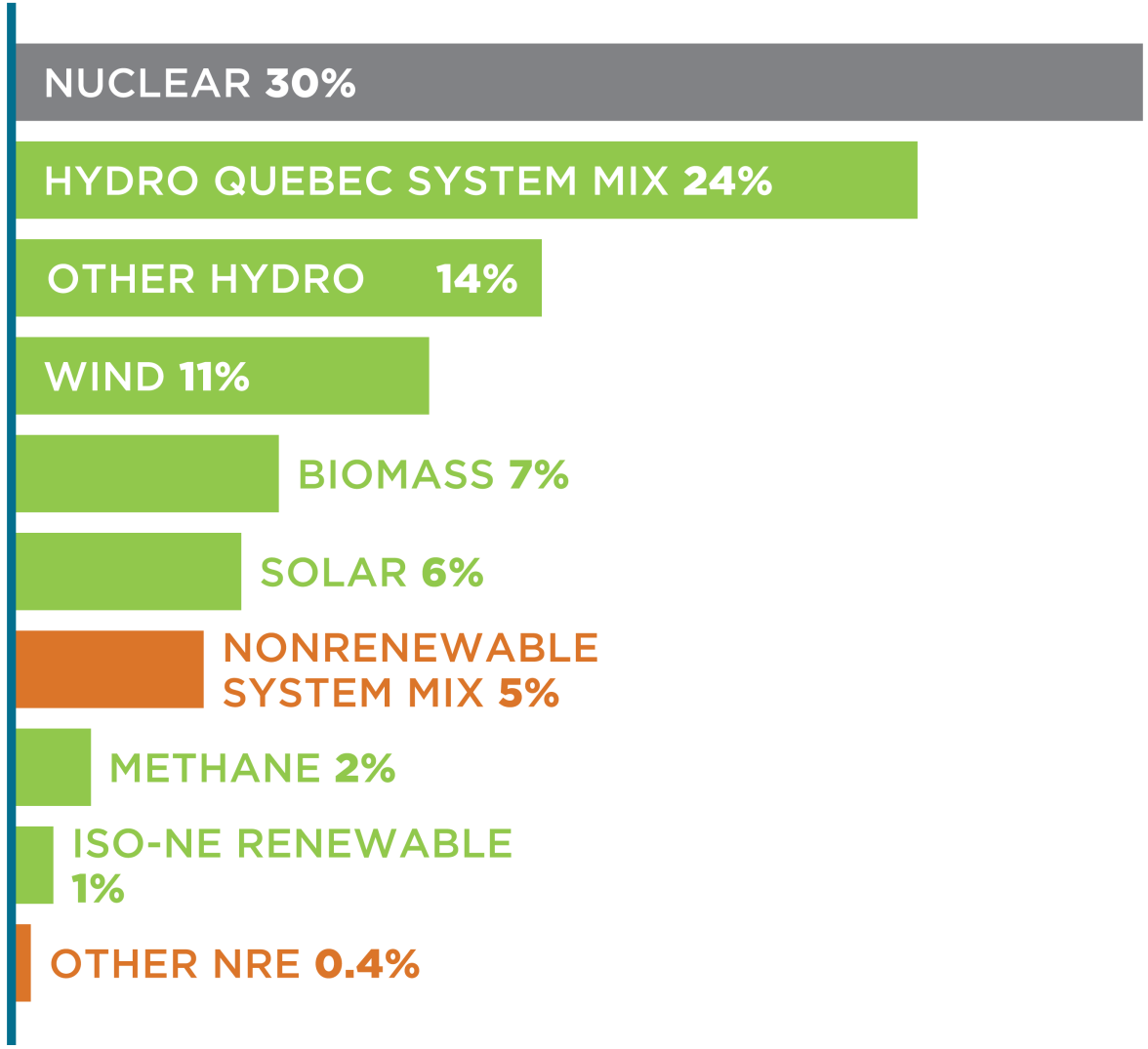
# Vermont heating energy sources



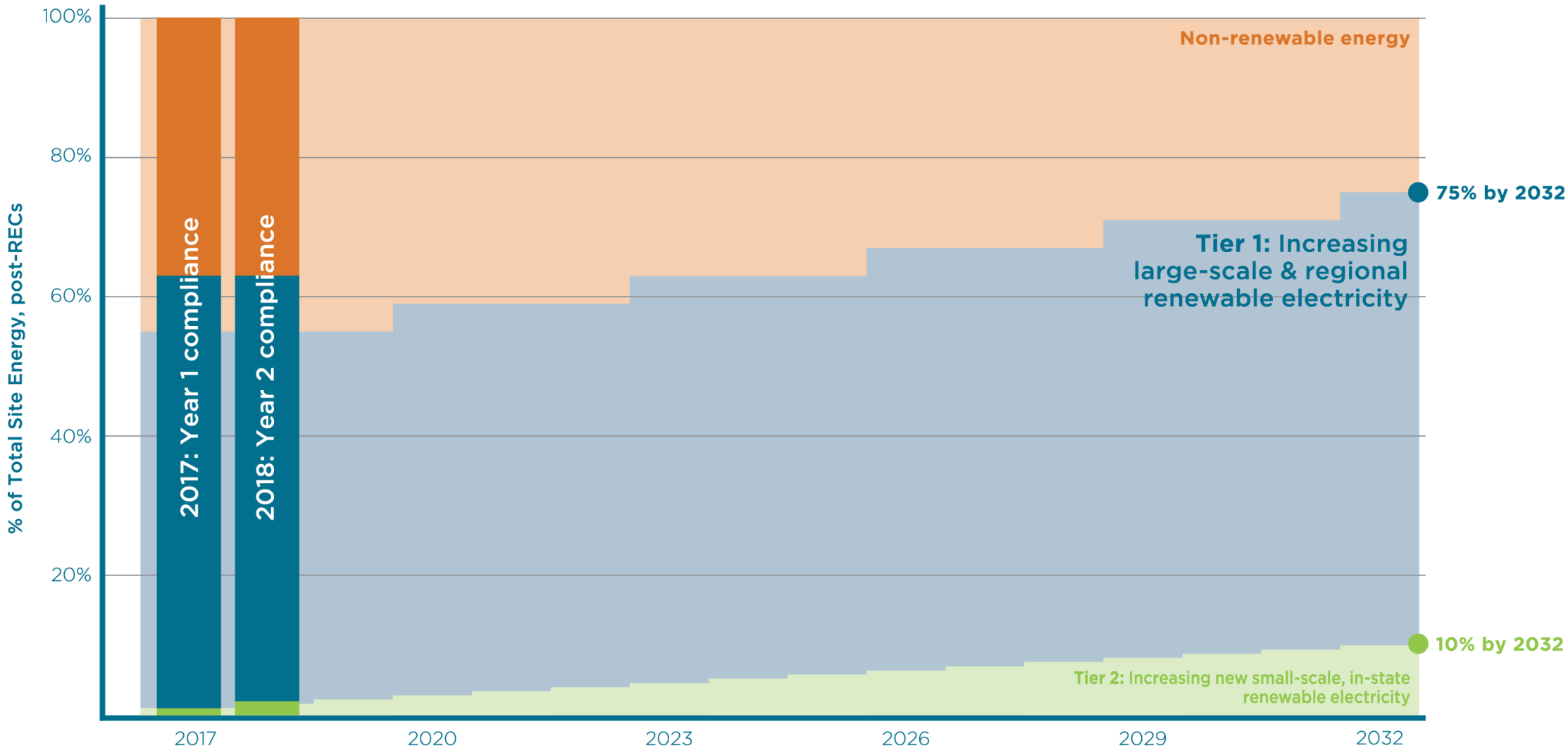

Renewables in state and out of state, pre-REC
44% out-of-state
56% in-state
Wind 16%
Biomass 12%
Solar 9.4%
0.5% Methane
HQ System Mix 38%
Hydro 4.4%
Wind 1%
Hydro 18%

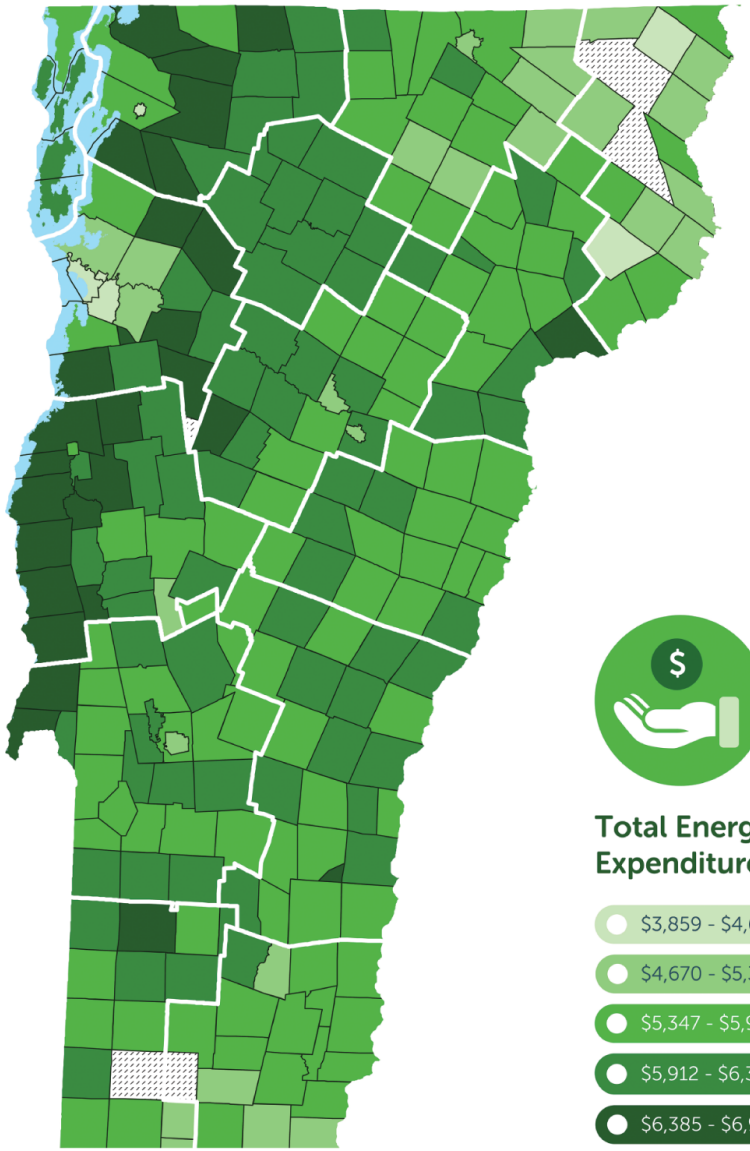

Renewables in state and out of state, post-REC
83% out-of-state
17% in-state
Hydro 5%
Hydro 13%
Solar 2.6%
1% Wind
0.2% Biomass
HQ System Mix 78%

# VT electricity generation and purchases 2018, pre-REC



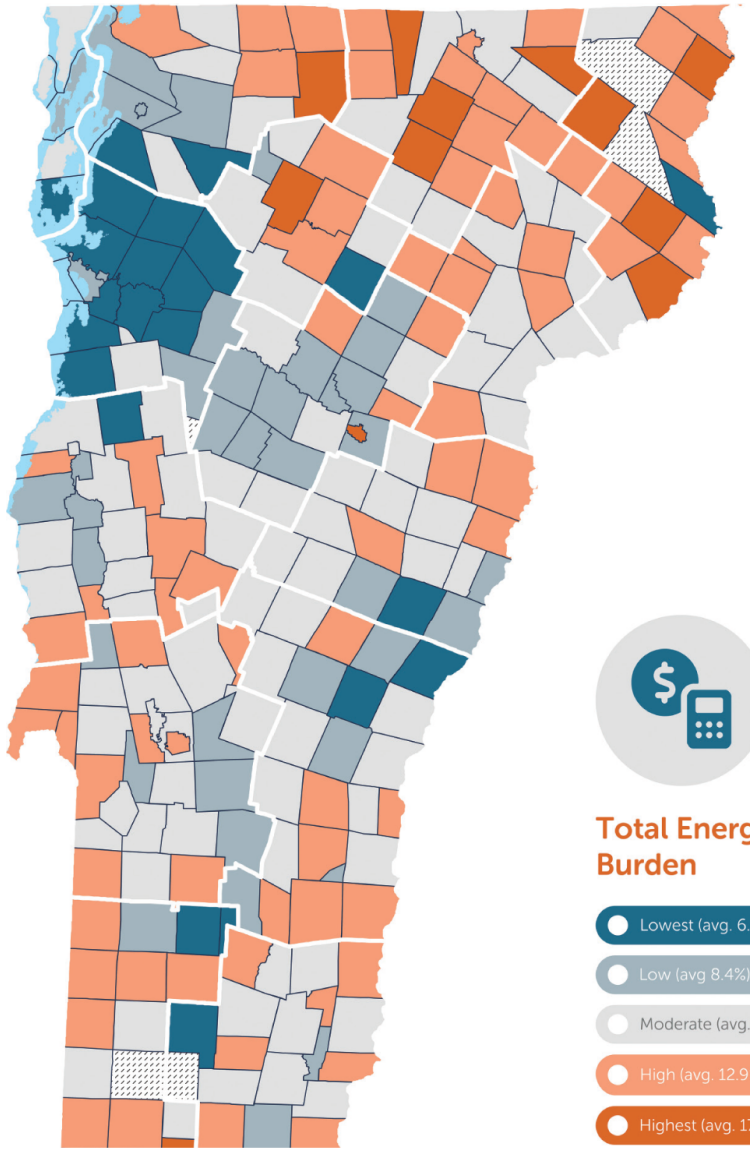
# Vermont Renewable Energy Standard targets and compliance





**Total Energy Expenditure**

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

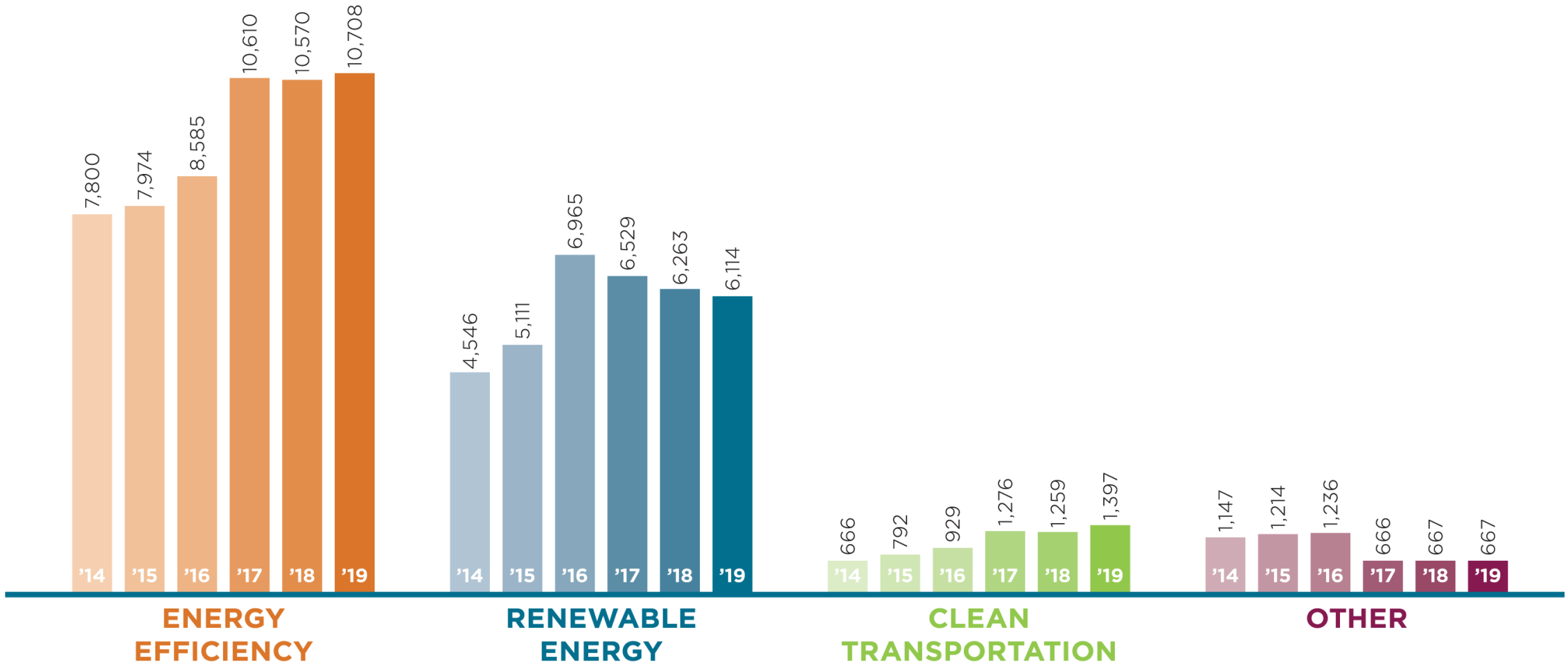


**Total Energy Burden**

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

Source: Efficiency Vermont

# 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 |