Overview: Climate Change and Public Policy Solutions in Vermont

Senate Natural Resources and Energy

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Outline of today's talk

Part 1: Existing Vermont Programs for Greenhouse Gas Reduction

Part 2: Requirements Set by the Global Warming Solutions Act

Part 3: Forthcoming Strategies and Associated Considerations

Part 1: Existing Vermont Programs for Greenhouse Gas Reduction

The State of Vermont already has many programs in place to reduce carbon emissions and improve adaptation and resilience.

Many State agencies work together to reduce greenhouse gas emissions

- Agencies of
  - Natural Resources;
  - Administration;
  - Transportation;
  - Agriculture, Food and Markets; and
  - Commerce and Community Development; and
- The Department of Public Service.
- Existing State programs to address carbon emissions and associated impacts are summarized with spending amounts in Appendix A of the Issue Brief.

During fiscal years 2018 through 2021

- About **$160 million per year** was devoted to addressing climate change in Vermont.
  - Of that amount, about **$100 million per year** came from the State budget.
  - In addition, **about $60 million** on average flowed through the Energy Efficiency Utility program, created by the Vermont Public Utility Commission.
    - Most of the $60 million per year was in Efficiency Vermont, the nation's first statewide energy efficiency utility with a focus on the electricity and thermal sectors.

In fiscal year 2022

- The State of Vermont plans to invest **more than $228 million** of State and federal funds in programs related to reducing greenhouse gas emissions, adapting to climate change, and building resiliency.
  - The State budget provides **more than $172 million of State and federal funds**.
    - $50 million of the $172 million was from federal funds in the American Rescue Plan Act.
  - The Public Utility Commission (PUC) plans to invest **over $56 million** in green initiatives through the Energy Efficiency Utility program.
- State programs range from weatherization to public transportation and electric vehicles to environmental conservation.

Examples of investments underway in FY 2022

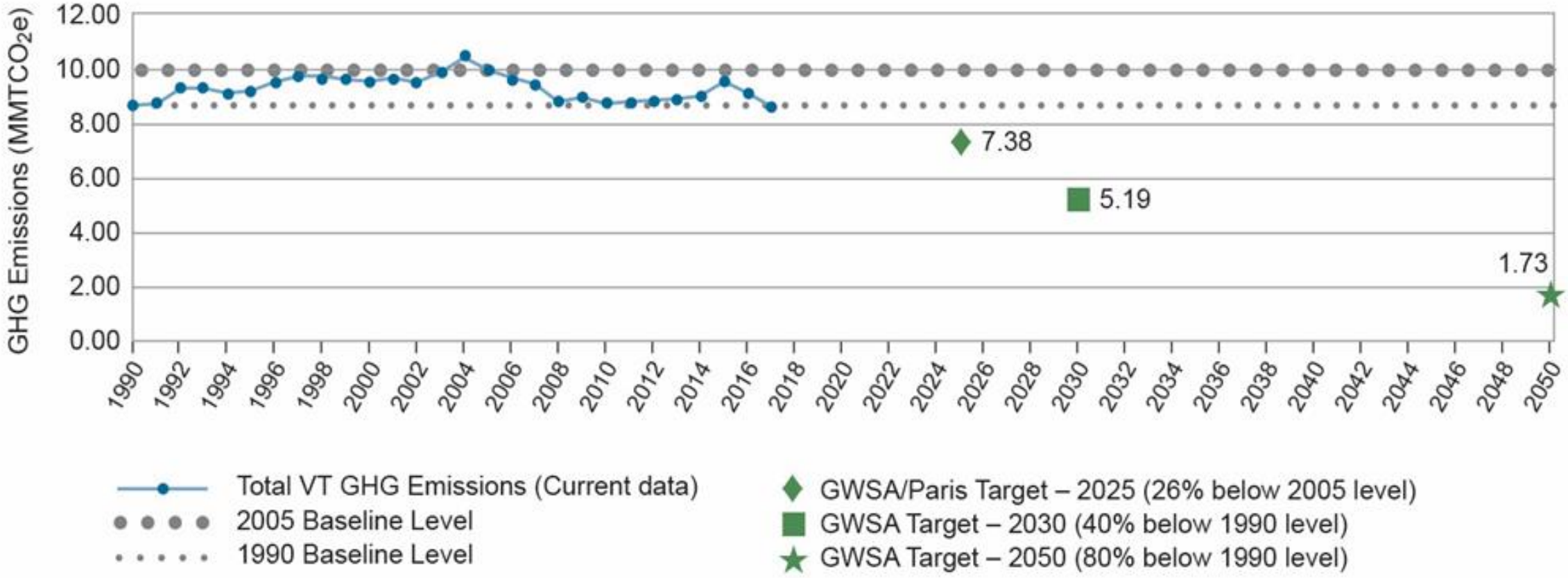
- Several programs target the transportation sector, the largest contributor to greenhouse gas emissions statewide, including:
  - Incentivizing sales of electric, hybrid, and fuel-efficient vehicles;
  - Encouraging residents to adopt cleaner and more efficient transportation modes;
  - Assisting low-income residents with vehicle emissions repairs; and
  - Expanding the infrastructure for charging electric vehicles.
- Home Weatherization Assistance program targets buildings, the second largest contributor to greenhouse gas emissions statewide.
  - The program assists Vermonters with low income with energy efficiency improvements in their homes and reduces greenhouse gas emissions.

Part 2: Requirements Set by the Global Warming Solutions Act

The State of Vermont codified its greenhouse gas emissions requirements in Act 153, the 2020 Global Warming Solutions Act (GWSA, 10 V.S.A. § 578).

Vermont's Greenhouse Gas Emissions

Source: Vermont Greenhouse Gas Emissions Inventory and Forecast: 1990 – 2017



Sources of greenhouse gas emissions in VT

Again, from the Vermont Greenhouse Gas Emissions Inventory and Forecast, 1990—2017.

Table 1: **Vermont Greenhouse Gas Inventory by Sector**

Inventory Sector	MMTCO$_2$e (2017)	Percent of Total
Transportation/Mobile Combustion	3.39	39.1%
Residential/Commercial Fuel Use	2.69	31.0%
Agriculture	1.37	15.8%
Industrial Processes	0.57	6.5%
Electric Generation	0.49	5.7%
Waste	0.13	1.5%
Fossil Fuel Industry	0.03	0.3%
Total	**8.67**	**100.0%**

Transportation and heating sectors are the key contributors to greenhouse gas emissions

- The two sectors combined account for 70 percent of greenhouse gas emissions in Vermont.
- Technologies exist to reduce greenhouse gas emissions and long-term operating costs in those sectors, but they often require large upfront investments
  - Electric vehicles
  - Heat pumps
- Publicly-funded programs can play an important role in an equitable transition

Gross vs. net emissions

- The Greenhouse Gas Inventory Report and the 2025 and 2030 GWSA requirements focus mainly on ***gross*** annual emissions.
  - Gross emissions represent the total amount of greenhouse gas emissions from the sectors listed in Table 1.
- The 2050 requirement is zero ***net*** carbon emissions.
  - Net emissions represent gross emissions minus sequestration from carbon sinks which absorb greenhouse gases, such as forests and agricultural soils.
- For example, gross emissions in 2017 were 8.67 million metric tons of CO_2 equivalent
  - Forests sequestered about 4.63 million metric tons of CO_2 equivalent
  - Net emissions in 2017 were about 4.24 million metric tons
  - Less carbon sequestered by forests over time implies larger needed reductions in gross carbon emissions by 2050.

Part 3: Forthcoming Strategies and Associated Considerations

Vermont will need to implement a wide variety of ambitious public policy solutions to achieve the requirements established in the GWSA.

The Act requires policy makers to simultaneously consider ***equity*** (being fair and avoiding disproportionate impacts on some) and ***efficiency*** (achieving the largest reduction in emissions per dollar invested).

Want to avoid disproportionate hardship on certain Vermonters

- People with higher incomes historically have been early adopters of major technological and social transformations; e.g., electricity, broadband, or public education.
- People with lower incomes have been generally less able to benefit owing to upfront costs, price adjustments, lifestyle changes, or other unforeseen consequences.
- The same is happening with electrification of vehicles and heating.
  - Special attention is needed to avert hardship among:
    - Vermonters with low and middle incomes,
    - Those living in rural areas, or
    - Others adversely affected.

Potential public policy options

- **Carbon pricing** places a fee or tax on greenhouse gas emissions resulting from producing or consuming goods and services.
  - Revenues can be invested to reduce emissions or distributed to ease disproportionate effects borne by citizens with low and middle incomes.
- **Cap-and-trade system** limits (or caps) emissions and creates a market for businesses to buy or sell emission allowances (permission to emit greenhouse gases over some otherwise established level).
  - Vermont already participates in a cap-and-trade system for electricity through the Regional Greenhouse Gas Initiative.
  - A similar program could be set up for the heating and transportation sectors to limit emissions and incentivize switching to lower-emission fuel sources. Such methods work best when coupled with direct public investment to help address equity concerns.
  - A report commissioned by the legislature in 2019 recommended such a solution (Regulatory Assistance Project, 2019).

Potential public policy options, continued

- **Direct public investment** can occur in various forms including technology subsidies, grants for innovation and research, procurement standards, and clean energy products.
- Some examples include the following:
  - Prioritize technology subsidies with the biggest bang for the buck based on energy efficiency evaluations.
    - For example, when weatherizing a home, insulation is better than new windows on a "per dollar" emission reduction basis. To increase equity, programs could include tiered subsidies based on income or direct support for rural households.
  - Grants for innovation and research could spur new technologies that may have long-term benefits but carry more risk.
  - Setting efficiency standards for State purchases is one way to lead by example while also reducing greenhouse gas emissions.

Moving forward on reducing emissions

- The Infrastructure Investment and Jobs Act signed into law on November 16, 2021 as well as federal legislation possibly under negotiation are likely to help Vermont fund some of the needed public investments in electric vehicles, charging stations, heat pumps, hot water heat pumps, and cleaner fuel.
- The Climate Action Plan released by the Vermont Climate Council on December 1, 2021 illustrates steps that Vermont needs to take to reach the GWSA requirements in 2025, 2030, and 2050.
  - Not to be overlooked: the Climate Council recognizes the critical importance of maintaining a focus on social justice.
  - Participation by households at all income levels, especially households with low and middle incomes, will be key to adopting the new technologies on a large scale.

Resources

- Issue Brief: “Climate Change and Public Policy Solutions in Vermont”
  - https://ljfo.vermont.gov/assets/Publications/Issue-Briefs/df76e1fc59/Climate_Change_Issue_Brief_11-30-2021_final.pdf
- Vermont Climate Council, “Initial Vermont Climate Action Plan”
  - https://climatechange.vermont.gov/readtheplan
- Vermont’s Greenhouse Gas Emissions Inventory (1990-2017)
  - https://dec.vermont.gov/sites/dec/files/aqc/climate-change/documents/_Vermont_Greenhouse_Gas_Emissions_Inventory_Update_1990-2017_Final.pdf
- Regulatory Assistance Project, “Economic Benefits and Energy Savings through Low-Cost Carbon Management,” 2019
  - https://ljfo.vermont.gov/assets/Subjects/Reports/a5e545b014/RAP-Report-on-carbon-management-VT-JFO-february-2019.pdf