



AGENCY OF NATURAL RESOURCES

ADMINISTRATION PLANS TO MEET GREENHOUSE GAS (GHG) REQUIREMENTS UNDER 10 VSA 578

GLOBAL WARMING SOLUTIONS ACT

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Request from SNRE

Administration Plans to meet Green House Gas (GHG) requirements under 10 VSA 578 and the Global Warming Solutions Act.

- *Review of plan for transportation energy*
- *Review of the plan for thermal energy*
- *Review of the plan for agricultural energy*

Before talking about the “how” – review the “what”

- Information drawn largely from *Vermont Pathways Analysis Report 2.0* (February 2022).

Transportation Sector: Key Takeaways

Compared to 2018 levels, to achieve the requirements of the GWSA, needed emissions reductions are:

- 11% by 2025
- 31% by 2030
- 88% by 2050

Emissions declines are primarily anticipated to occur as a result of expanding numbers of passenger car and light-duty truck EVs.

Smaller opportunities include:

- Increasing fuel economy
- Increasing use of biofuels/low carbon fuel standard
- Reducing vehicle miles traveled
- Electrifying non-road vehicles like lawn mowers, snow machines and boats

Transportation Sector: Key Takeaways

Transportation	2025	2030
Number of EVs	27,000	126,000
EV Share of Sales	17%	68%
VMT Reduction from Baseline	1.9%	3.5%
EV share of VMTs	5%	23%
EV Managed Charging	27%	50%

Currently about 1% (<5,000) of the nearly 433,000 vehicles registered in Vermont are ZEVs.

Thermal/Building Sector: Key Takeaways

Compared to 2018 levels, to achieve the requirements of the GWSA, needed emissions reductions are:

- 27% by 2025
- 48% by 2030
- 88% by 2050

Emissions declines are primarily anticipated to occur as a result of weatherization, increased use of heat pumps for water and space heating and increased use of biofuels and advanced wood heat.

- Wood heating and biofuels are projected to serve roughly 1/5 of the residential energy demand in 2050.
- Expanded use of biofuels is primary driver of reduced emissions from industrial buildings.

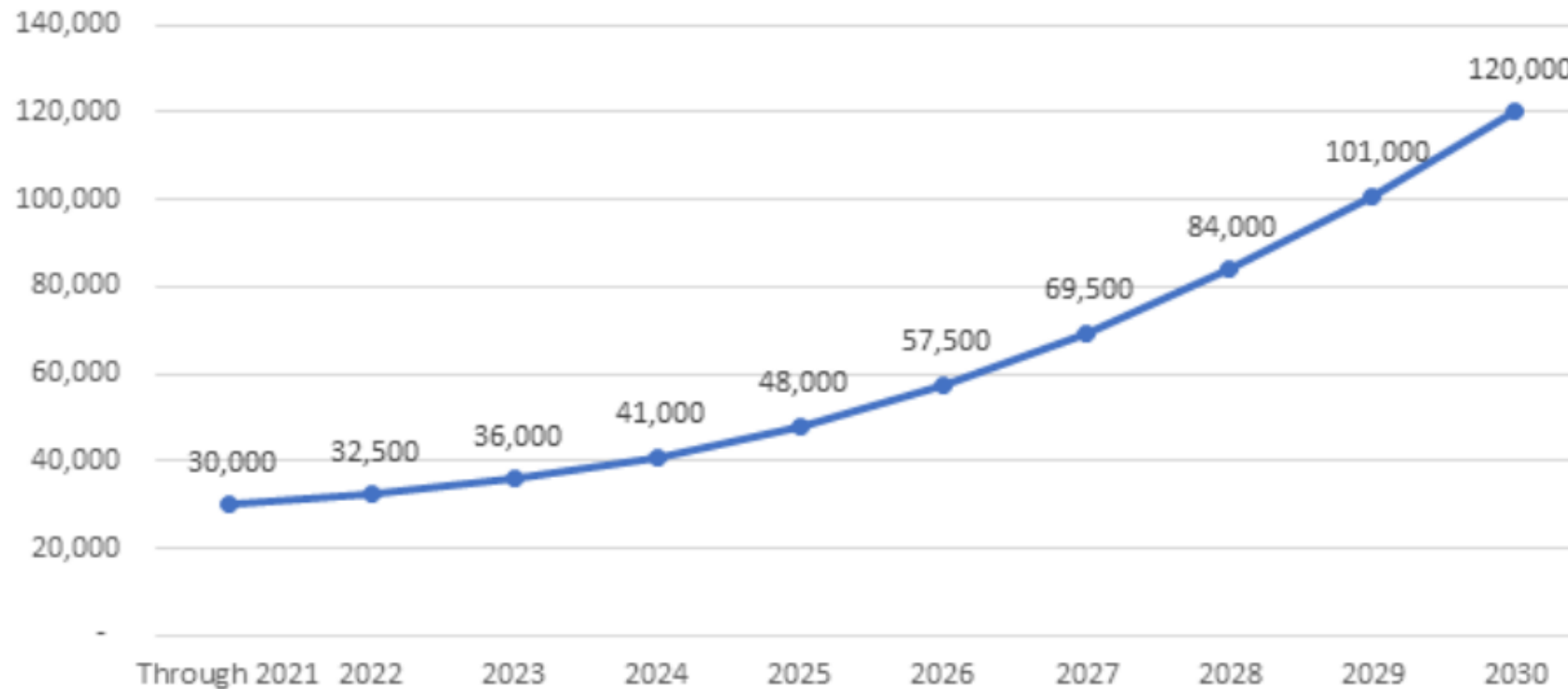
Thermal/Building Sector: Key Takeaways

Residential	2025	2030
Homes Weatherized	69,000	120,000
Heat Pumps Installed	96,224	177,107
Heat Pump Water Heaters Installed	63,247	136,558
Homes with Advanced Wood Heat	12,898	14,992
Homes with Biofuels	12,112	21,086

From 2015-2020, Vermonters installed about 30,000 heat pumps and 13,000 heat pump water heaters.

Thermal/Building Sector: Key Takeaways

Weatherization at Scale Trajectory - Cumulative Total



- Vermont currently weatherizes approximately 2,000 homes per year
- By 2050, nearly 3/4s of Vermont housing units (243,500) will need to be weatherized.

Agricultural Sector: Key Takeaways

Compared to 2020 levels, to achieve the requirements of the GWSA, needed emissions reductions are:

- 8% by 2025
- 16% by 2030
- 32% by 2050

Emissions declines are primarily anticipated to occur as a result of alternative feed practices/feed additives, best practices for manure management (inc. waste digestors) and soil sequestration.

Agricultural Sector: Key Takeaways

Non-Energy	2025	2030
Enteric Fermentation	20%	39%
Manure Management	29%	57%
Agricultural Soils	9%	19%

More, Vermont-specific research is needed to understand emissions from agriculture, including current emissions, scope and pace of potential reduction and the costs to reduce agriculture non-energy emissions.

What has happened since the Climate Action Plan was adopted?

Administration has/is...

- Established the Climate Action Office in ANR and convened an initial meeting of the Interagency Climate Advisory Council.
- Completed rulemaking to adopt California's Advanced Clean Cars II (ACC II) Regulations, Advanced Clean Trucks, the Heavy-duty Low NOx Omnibus Rule, and the Phase 2 Greenhouse Gas Rule for Trucks and Trailers.
 - Filed with the Secretary of State in December 2022

What has happened since the Climate Action Plan was adopted?

Administration has...

Worked to deploy nearly **\$250 million** in federal funds (ARPA) and state one-time monies in climate action:

- Weatherization
- EV charging stations and purchase incentives
- Electrical system upgrades
- Municipal energy resilience
- Buyouts of flood vulnerable properties
- Expanded cost share for agronomic practices
- Tree planting

What has happened since the Climate Action Plan was adopted?

Administration is...

Reviewing and strategically participating in pursuing competitive funding opportunities under IIJA and IRA

- Many state agencies will be eligible applicants for various funding solicitations.
 - Other Vermont entities will be able to pursue certain opportunities directly
- Federal guidance for many programs is under development.
 - Currently, there is limited information/instructions or timeline estimates for when final programs will be announced

What has happened since the Climate Action Plan was adopted?

Administration has/is...

Completed significant technical analyses:

- *Pathways Analysis*: Includes detailed scenario modeling to evaluate and compare GHG benefits of future energy strategies.
- *Mitigation Cost Curve Lifecycle Analysis*: Upfront costs and net savings over time of mitigation measures.

Developing Municipal Climate Toolkit for Vermont municipalities to use to assess climate preparedness

- Includes the Municipal Vulnerability Index which will help identify communities that may be most adversely affected by climate change.
- Will be completed Summer 2023.

What has happened since the Climate Action Plan was adopted?

Administration is...

Undertaking additional technical analyses to inform program design, including:

- *Life-Cycle Analysis of Vermont's Energy Use*: Assess environmental impacts associated with the life cycle of energy sources, from raw material extraction and processing, through manufacture, distribution and use, to the recycling or final disposal.
- *Evaluation of Building/Thermal Decarbonization Policy Options*: Includes a quantitative evaluation of up to five policy option and update the *Pathways Analysis* to reflect anticipated emission reductions as a result of the IRA.
- *Agricultural Sector Emissions and Sequestration Review*: Devises approach(es) to better quantify GHGs emitted and sequestered by agricultural operations.
- *Carbon Reduction Strategy (Vtrans)*: Develops an investment strategy and identify projects to reduce transportation emissions as part of VTrans' Capital Program.

What has happened since the Climate Action Plan was adopted?

Administration is...

Redefining and expanding public engagement around climate action

- Building relationships and communication channels that will help Vermonters work collaboratively on future climate action.
- Enhancing awareness around climate action efforts in the state, with a particular focus on communities experiencing impacts and other frontline communities.
- Lifting-up voices and viewpoints of communities into the implementation of climate-related initiatives across government, so that a diverse group of Vermonters can influence these efforts.
- Coordinating efforts with the ANR Environmental Justice Unit.

What has happened since the Climate Action Plan was adopted?

Administration is...

Identifying the means to accurately measure the impact of climate action work being led by various state agencies

- Reviewing Vermont's *Greenhouse Gas Emissions Inventory and Forecast* to take advantage of best, currently available data
- Working with sister agencies/departments (Tax, DMV, PSD) to understand currently available information on the type and volume of fossil fuel deliveries into Vermont and identify changes needed to ensure timely, accurate data
- Developing an RFP for the development of a tool for evaluating and tracking implementation progress for key strategies to reduce GHG emissions, as well establishing quantitative metrics for resilience and adaptation, in line with the Global Warming Solutions Act requirements.

Thank you.

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