

Vermont Climate Council
Report to the General Assembly
January 15, 2023

Introduction

This report is required by §591 of the [Vermont Global Warming Solutions Act \(GWSA\) of 2020 \(Act 153\)](#) enacted by the Vermont Legislature on September 24, 2020. The Act requires the Vermont Climate Council (VCC) to report on its activities and progress towards meeting the greenhouse gas reduction requirements in the Act. Understanding that this is an annual report and intended to support the Legislature, we invite the Legislature to provide feedback on the report and recommendations for the Council to consider around what you'd like to see included or removed from future reports.

Background

Core elements of the GWSA include:

- Codifying Vermont's greenhouse gas (GHG) emission reductions goals as statutory requirements and providing an explicit cause of action should the State fail to adopt sufficient measures to achieve the statutory requirements. The requirements are:
 - Not less than 26% from 2005 greenhouse gas emissions by January 1, 2025;
 - Not less than 40% from 1990 greenhouse gas emissions by January 1, 2030; and,
 - Not less than 80% from 1990 greenhouse gas emissions by January 1, 2050.
- Establishing the Vermont Climate Council (VCC), responsible for the development of a comprehensive Climate Action Plan

The VCC is comprised of 23 members, including eight ex-officio members of the Executive Branch, eight members appointed by the Speaker of the House, and seven members appointed by the Senate Committee on Committees. Given the breadth and complexity of the Council's work, the VCC established a Steering Committee to guide the overall process and ensure progress of the work across Subcommittees. The Steering Committee is comprised of two individuals from among the Council's Executive Branch members and four individuals from among the VCC's members who were appointed by the legislature (two who were appointed by the House of Representatives and two who were appointed by the Senate). The members of the Council and its Steering Committee, along with Councilor's biographies, are all available on the Climate Action Office's [website](#). The website is maintained by the Agency of Natural Resources (ANR).

The GWSA charged the VCC with adopting the "Vermont Climate Action Plan by December 1, 2021, and submitting an updated plan at least every four years thereafter, and identified the following elements that must be included in the Plan:

- Strategies and programs to achieve the GHG emissions requirements established in §578 of the GWSA and adopting them in the Vermont Climate Action Plan by December 1, 2021;
- Strategies and programs that build resilience and prepare the State to adapt to the current and anticipated effects of climate change;
- Means to measure the State's progress towards meeting the greenhouse gas emissions requirements; and,
- Guidance to the Vermont General Assembly and the Secretary of the Agency of Natural

Resources on legislative and regulatory changes necessary to implement the Plan. In §591(b), the GWSA also established specific steps to be taken by VCC in developing the Plan, to include:

- Completing inventories of existing programs to reduce GHG emissions and build resilience;
- Identifying new strategies and programs that will be needed to meet GHG emission requirements and improve resilience;
- Developing financing strategies to support implementation of the work;
- Developing a monitoring strategy for tracking implementation efforts and assessing program effectiveness; and,
- Providing guidance to the Secretary of Natural Resources on rules needed to support implementation.

In addition, as identified in §592(d), the specific initiatives, strategies and programs identified in the Plan must further the following objectives:

- Prioritize the most cost-effective, technologically feasible, and equitable GHG emissions reduction pathways, adaptation and preparedness strategies;
- Provide for GHG emissions reductions that reflect the relative contribution of emissions from different sectors;
- Minimize negative impacts on marginalized and rural communities and individuals with low and moderate incomes;
- Ensure that all regions of the state benefit from GHG emissions reductions;
- Support economic sectors and regions of the state that face the greatest barriers to emissions reductions, especially rural and economically distressed regions and industries;
- Support industries, technology, and training that will allow workers and businesses in the state to benefit from GHG reduction solutions;
- Support the use of natural and working lands to reduce GHG, sequester carbon and increase resilience; and
- Maximize the state's involvement in interstate and regional initiatives and programs designed to reduce GHG emissions, and build upon state, national, and international partnerships and programs.

The VCC adopted [Vermont's Initial Climate Action Plan](#) (CAP) on December 1, 2021. As such, the VCC's work in 2022 largely shifted from planning to supporting implementation and is summarized below.

Implementation Efforts

Many of the recommendations outlined in the CAP – especially those aimed at the most impactful pollution reduction and adaptation measures – will require legislative and administrative action. Regarding the legal requirements to reduce greenhouse gas emissions established in the Global Warming Solutions Act (Act 153 (2020)), the Climate Action Plan (CAP) contains three priority recommendations that were identified as “high impact” meaning that they can reasonably be expected to get Vermont more than 10 percent of the way towards either the GWSA’s 2025 and/or 2030 emissions reduction requirements. Of those three high impact policy recommendations, to date one has moved forward – the Advanced Clean Cars II and Advanced Clean Truck rules which are described in greater detail in this report. The two other high impact policy recommendations from the CAP that have not advanced are:

1. Clean Heat Standard.

- Expected share of total emissions reduction requirement by 2030: **34%**
- Status: Vetoed by Governor. 1 House vote short of override in 2021

2. Transportation and Climate Initiative Program (TCI-P)

- Expected share of total emissions reduction requirement by 2030: Approx. **10%**
- Status: Stalled due to "regional viability" after CT, RI, and MA withdrew from TCI-P in late 2021; future uncertain.

Furthermore, below is a full suite of legislative initiatives with ties to the CAP and their status after the 2022 legislative session¹.

Bill	Signed by Governor
S.96 – An act relating to the State Planning Office	N/A
S.148 – An act relating to environmental justice in Vermont	Signed
S.234 – An act relating to proposed changes to Act 250	N/A
H.523 – An act relating to reducing hydrofluorocarbon emissions	Allowed to become law without signature
H.552 – An act relating to transportation initiatives to reduce carbon	N/A
H.606 - An act relating to community resilience and biodiversity protection	Veto
H.646 – An act relating to joining the Transportation and Climate Initiative	N/A
H.697 - An act relating to the creation of an ecological management qualification for the Use Value Appraisal program	Signed
H.715 – An act relating to Clean Heat Standard	Veto
H.518 – An act relating to municipal energy resilience initiatives	Signed

¹ In the table, N/A means that the bill did not pass out of the Legislature.

S.19 – Climate Change Response Plan	N/A
S.213 - EVSE Payment Option	N/A
S.272 – Renewable Energy Programs List Expansion	N/A
S.277 – Feebates	N/A
H.647 – related to H.646 Transportation Climate Initiative	N/A
H.526 – Energy Star Standard for EVSE	N/A
S.226 - An act relating to expanding access to safe and affordable housing	Signed
S.11 - An act relating to economic and workforce development	Signed

Development of Climate Action Office

In addition to policies and rulemaking, a key recommendation of the Initial Climate Action Plan was the creation of a Vermont Office of Climate Action (CAO) in the Agency of Natural Resources (ANR); funding for the CAO was included in the FY23 state budget. The CAO will provide the long-term, intergovernmental structure to necessary to coordinate and manage the policies, programs, and tools needed to implement climate mitigation, adaptation, and resilience strategies statewide. CAO staff will be focused on supporting the implementation of mitigation, resilience and adaptation, and natural and working lands programs and initiatives across state government, including tracking and reporting on the collective impact of the work, as well as continued emphasis on community engagement.

The Vermont Office of Climate Action will coordinate and provide expertise and capacity for state-led climate initiatives, as well as the monitoring, assessment and tracking of climate adaptation, mitigation, and resilience activities necessary to evaluate progress over time in achieving the requirements of the GWSA. To carry out this work, the CAO will work closely with staff across ANR, other state Agencies, the state climatologist, and key stakeholders. This coordination will ensure the programmatic functions of the CAO are additive and supportive of existing climate action work in state government. The CAP emphasizes the importance of the public’s role, specifically those of frontline and impacted communities, in enabling climate action. Activities conducted by the CAO will encourage broad citizen participation and will work to foster partnerships in pursuit of effective delivery of climate solutions for all Vermonters.

To buttress coordination across state Agencies, an Inter-Agency Advisory Board (IAAB) was stood up that meets regularly. It was a priority to stand up this advisory board early in the process with the understanding it will play a critical role in the development of the Office. The IAAB is comprised of and chaired by staff from the CAO and up to two designees from the Public Service Department, the Agency of Transportation, Vermont Emergency Management, Agency of Agriculture, Food and Markets, Buildings and General Services, Agency of Human Services (Department of Children and Families and Vermont Department of Health), Agency of Commerce & Community Development, and the State Climatologist.

The objectives of this group will be the following:

1. Provide a space for proactive coordination on climate action across state government.
2. Articulate where policy and financial implications overlap around climate action to ensure resources are maximized.
3. Support the monitoring of progress over time in meeting the state's climate goals and requirements.
4. Identify and frame up gaps where the CAO might prioritize support and/or where policy changes are needed.
5. Develop state positions on issues related to climate change.

Rulemaking

The initial Climate Action Plan and GWSA required ANR to adopt California's Advanced Clean Cars II (ACC II) Regulations (amending Vermont's existing Low and Zero Emission Vehicle Regulations), Advanced Clean Trucks, the Heavy-duty Low NOx Omnibus Rule, and the Phase 2 Greenhouse Gas Rule for Trucks and Trailers by December 2022. These rules set and amend standards for auto manufacturers that will reduce greenhouse gas and criteria air pollutant emissions from passenger cars, light-duty trucks, and medium- and heavy-duty vehicles, along with engines that are delivered for sale or placed in service in Vermont. They also require auto manufacturers to deliver lower emitting and more electric vehicles to Vermont. This work was initiated and conducted in pursuant to the GWSA and in accordance with the procedures for administrative rulemaking in the Vermont Administrative Procedure Act (APA). Given the scope of these rules and the tight timeframe in which ANR was required to act, this was a significant undertaking that drew from resources and staff not only within ANR and other state agencies, but also regional organizations and partnerships that have supported work in this space for decades. The GWSA requires a series of reports, rule record sharing, and public engagement in addition to the requires of the APA, and ANR engaged with the Climate Council, the legislature, stakeholders, and the public to fulfill these requirements.

ANR led a robust public engagement process designed to support the enhanced outreach requirements of the GWSA, with multiple meetings held in areas and communities that have the most significant exposure to the impacts of climate change, including disadvantaged, low-income, and rural communities and areas. Public events and meetings were held in Manchester, Newport, Bellows Falls, Barre, and Burlington, as well as two virtual meetings including one that focused specifically on the medium- and heavy-duty vehicle rules. ANR received 236 written comments in favor of the rules, and 27 written comments opposed, with over 300 individuals and entities signing on to written comments which were responded to via a responsiveness summary that was filed with the Final Proposed Rule. On November 17, 2022, the Legislative Committee on Administrative Rules approved the rules and ANR filed the adopted rule with the Secretary of State on December 1, 2022, meeting the requirements of the GWSA. The rule amendments were effective on December 16, 2022.

Climate Toolkit Development

The GWSA requires the Vermont Climate Council to recommend tools for municipalities to use to assess their climate preparedness, assess financial capacity to address infrastructure resilience, and prioritize investments in that infrastructure. In early 2022, staff in the CAO convened a task group to design a Municipal Climate Toolkit that would help Vermont municipalities act on climate change. The task group includes representation from municipal governments, regional planning commissions, State technical assistance providers, and non-profit partners.

The intent of the Municipal Climate Toolkit is to provide a hub for existing tools, resources, and information, relevant for designing and implementing climate action measures or strategies at a municipal level. The task group has worked over the past year to host stakeholder input sessions with municipal officials, regional planning commissions, and State staff; has presented and held input sessions at various conferences and summits; and meets regularly to refine the design of the toolkit to ensure its usefulness and accessibility for municipal officials. The group has been working hard to ensure municipalities at varying levels of readiness to take climate action feel empowered and reflected in the design of the Toolkit.

Moving into 2023, the task group is working to further refine resources in the Toolkit and will begin working with IT partners shortly to design the Toolkit, which will ultimately be housed on the climatechange.vermont.gov website. The goal is to have the Toolkit finalized by spring of 2023.

Technical Analyses

ANR managed multiple requests for proposals and contracts this year to meet the requirements of the GWSA and support the work of the VCC. These contracts included professional facilitation services to support the VCC and Subcommittee meetings, outreach and engagement support, and specific technical analyses to inform future iterations of the Climate Action Plan and meet the remaining requirements of the GWSA. The specific technical analyses that have been completed or are underway are as follows:

1. [Final Pathways Analysis](#)

The final analysis and detailed scenario modeling using the Low Emissions Analysis Platform (LEAP) model, presenting details on the pathways, strategies, policies, and actions that meet the requirements of the GWSA across three time periods: 2025, 2030, and 2050 was finalized in February of 2022. The LEAP model was also the basis for the Comprehensive Energy Plan which was updated in 2022. One of the key findings of this analysis showed that meeting the pollution reduction requirements of the GWSA is not only possible, but that it would be good for the state's economy. The analysis noted that in comparison to the baseline or "business as usual," by 2050 the central mitigation scenario modeled in LEAP offers \$ 6.4 billion of net (economic) benefits.

2. [Mitigation Cost Curve Lifecycle Analysis](#)

This report provides additional analysis of the costs over time for the measures needed to meet our emissions reductions requirements. The “measures” which are analyzed were the ones included in the central mitigation scenario developed in the Final Pathways Analysis designed to meet our emission reduction requirements. The analysis indicates that there are mitigation measures that will result in net savings over time while others will never overcome their upfront costs. In part, this will reduce the overall cost of reducing emissions to the required levels over time. However, all the measures analyzed need to be implemented to meet the 2030 and 2050 targets in the central mitigation scenario. So, while ideally the GWSA targets could be achieved by implementing only measures with negative or low marginal abatement costs, those measures cannot be scaled to meet the targets. A [presentation](#) was delivered to the [Cross-Sector Mitigation Subcommittee](#) which explores the challenges of considering individual measures on their own.

3. Municipal Vulnerability Index

The development of the Municipal Vulnerability Index (MVI) is a requirement of the GWSA, and when completed will provide a tool that will support individuals and communities in assessing their preparedness for and resilience to the impacts of climate change. Specifically, the MVI is intended to help identify communities that may be most adversely affected by climate change, focusing on the pressures that climate change will place on Vermont’s transportation, electric grid, housing, emergency services, and communications infrastructure, with particular attention to the challenges faced by rural communities across the state in addressing these pressures. It will be a key resource made available to municipalities through the Climate Toolkit described above.

ANR is advancing a contract which will develop the vulnerability index tool and a relative vulnerability assessment of Vermont municipalities. This tool will be key to support the implementation of the Climate Action Plan and will be completed in the Summer of 2023.

4. Life-Cycle Analysis of Vermont’s Energy Use

As required by the GWSA, ANR has engaged a Contractor to develop a methodology for, and to complete the performance of, a life cycle analysis of greenhouse gas emissions from the use of energy in Vermont, including but not limited to electricity from fossil fuels, renewable sources (solar, wind, hydroelectric) and nuclear generation, liquid fuels including fossil and biofuels, gaseous fuels including fossil and renewable fuels, and solid fuels including wood and other biomass. The life cycle analysis will assess environmental impacts associated with all the stages of the life cycle of each energy source, from raw material extraction and processing, through manufacture, distribution and use, to the recycling or final disposal. This work will occur largely between now and the Summer of 2023.

5. Building/Thermal Decarbonization

ANR, with the unanimous support of the Climate Council, has engaged a Contractor to perform an assessment of policy options to reduce greenhouse gas (GHG) emissions in the

buildings/thermal energy sector in Vermont necessary to meet the emission reduction requirements of the GWSA. The assessment includes an initial qualitative evaluation of a suite of policy options specified by the State plus any additional options identified by the contractor, followed by a detailed quantitative evaluation of up to five options selected based on the results of the qualitative assessment. The results of the assessment will be included in a comprehensive final report and communicated in presentations to the key stakeholders and the public. This work will largely be finalized by the Spring of 2023.

Also included in this work will be an update to the “Business as Usual” model completed the Final Pathways Analysis described above to reflect the emission reductions Vermont can reasonably expect from the passage of the Inflation Reduction Act. This critical data is needed to accurately reflect the gap Vermont must close to reach our emission reduction requirements.

6. Agricultural Sector Emissions and Sequestration Review

ANR has engaged a Contractor to support the development of a methodology to better understand the universe of modeling tools and datasets available to quantify greenhouse gases emitted and sequestered from agricultural operations in Vermont in order to quantify the agricultural component of an Agriculture, Forestry and Other Land Use (AFOLU) sector. Identifying the most appropriate tool(s) and protocols is crucial to accurately quantifying emissions in this sector, informing decision-making related to policies and investments that promote agricultural activities, and to evaluating conservation practices that maximize the mitigation of GHGs from agricultural operations and management strategies in Vermont. Tools analyzed may have unique utility as applied to the greenhouse gas inventory, the carbon budget, and as a tracking and measuring progress tool also being developed in the future, so identifying appropriate application on various tools will also be critical.

This work also provides an opportunity to gather research-based information on how the Environmental Protection Agency’s State Inventory Tool (SIT) modules align, or do not align, with IPCC standards for AFOLU, which will offer insights into opportunities and potential challenges in using IPCC guideline methods for Vermont in how we approach accounting for net and gross emissions from agriculture sector. This work will be done in the Spring of 2023.

7. Facilitation and Public Engagement Services

The budget for the Climate Action Office in ANR includes funding to support the ongoing facilitation and public engagement services. ANR is currently reviewing proposals to secure a contractor who will provide facilitation support to the Council. In addition, this contract will be critical to support public meetings in a way that engages Vermonters in the implementation of the 2021 CAP, consistent with the public engagement strategy further described below.

State Agencies are coordinating closely on how to redefine what engagement looks like with Vermonters and see this as a critical role of the Climate Action Office, helping state government to be more responsive to Vermonters and proactively lift up their voices to inform policy development, rather than respond to it. This will require the Climate Action Office, in coordination with the Climate Council and other state Agencies, to work continuously in the following areas:

- **Enhance awareness** around climate action efforts in the state, with a particular focus on communities experiencing impacts and other frontline communities.
- **Lift up the voices and viewpoints of communities** into the implementation of climate-related initiatives and the ongoing work of climate action across government, so that a diverse group of Vermonters can influence these efforts.
- **Build relationships and communication channels** that will help Vermonters work collaboratively on future climate action.

As required by the GWSA and described above, ANR worked to develop and apply this approach as we advanced a suite of new rules and amendments related to low emission and electric vehicles. ANR five held five in-person events across the state this fall, as well as two online sessions including one focused at medium and heavy-duty vehicle stakeholders, to discuss the benefits and impacts of the rules, provide the public with information about existing programs and resources that support the transition to electric vehicles, and to hear from Vermonters about what more is needed so that everyone can benefit from this transition. The feedback that ANR heard at all these events was incorporated, when possible, into the rulemaking package and, perhaps more importantly, will be used to guide state government in advancing the implementation of these rules in the coming years to meet the needs of Vermonters.

Lessons learned from these events will carry into the planning for the engagement led by the Public Service Department this coming year to review renewable energy programs in Vermont. Community engagement focused on renewable energy programs in Vermont will be a focus in the climate space this year.

Climate Action Plan Updates

The Initial Climate Action Plan was the result of more than a year of work, but due to the aggressive timeline for drafting, fell short in several areas. From the adoption, the Council was clear that there were two areas of substance that needed further work – transportation and biomass. It is also important to note that, currently, the current plan and suite of actions does not add up to achieving the requirements of the GWSA. To further this work, task groups were formed to develop possible addenda to the CAP for the Council to consider.

Transportation

The withdrawal of support for the regional Transportation and Climate Initiative-Program (TCI-P) by several states days before the CAP was adopted left a significant gap in the strategies to reduce emissions from the transportation sector. Without TCI-P, the CAP lacks a primary policy mechanism or a dedicated source of funding to help ensure Vermont meets its legal obligation to reduce emissions from the transportation sector in line with GWSA requirements. As of

2018, transportation emissions accounted for nearly 40% of the state's total greenhouse gas emissions. To further advance the goals of this sector, the Council adopted an [addendum](#) to the Initial Climate Action Plan on November 14, 2022 by a vote of 11-5, with one Councilor abstaining².

In the addendum, the Council recognized “(t)he only currently known policy options for which there is strong evidence from other states, provinces and countries of the ability to confidently deliver the scale and pace of emissions reductions that are required of the transportation sector by the GWSA are one or a combination of: a) a cap and invest/cap and reduce policy covering transportation fuels and/or b) a performance standard/performance-based regulatory approach covering transportation fuels.” They also made specific recommendations to continue forward progress in this sector, including the following recommendations contained within the addendum:

- **Continue to advance the transportation recommendations laid out in the initial Climate Action Plan** adopted in December 2021 while simultaneously maximizing the GHG efficacy, cost effectiveness, and equity outcomes of current programs and incentives. This includes:
 - **Continue to advance** cornerstone measures like Advanced Clean Cars II and Advanced Clean Trucks, and further the design and implementation of other supporting strategies identified in the plan needed to maximize the impact of ACCII and ACT, including efforts to realize greater vehicle efficiency and decrease vehicle miles travelled to complement the deployment of electric vehicles.
 - **Continue to ramp up outreach and public engagement** to help identify preferred public priorities and inform and shape preferred policy and program design to achieve an equitable transition. This work should be undertaken in collaboration with the Just Transitions Subcommittee of the Vermont Climate Council and other key stakeholders. Some public engagement efforts are currently underway with the ACCII and ACT and others are planned for as VTRANS ramps its work to develop a Carbon Reduction Strategy.
 - **Develop and implement strategic revisions to the state's EV incentive programs** that will help cut gasoline use faster, more efficiently, and at a lower cost; maximize the carbon reductions of the EVs put into use; improve equity; complement federal programs and funding; and foster a transition that prioritizes zero-emissions vehicle ownership to lower income and historically underserved Vermonters.
 - **Support the State's equitable build out of highway, multi-unit dwelling, community, and workplace charging** such that all Vermonters feel confident purchasing an EV of any weight class and that the funding to maintain Vermont's infrastructure is viable long-term. This recommendation includes the equitable transition of Vermont's current infrastructure that supports internal combustion engine vehicles and the Vermonters that own and operate them.
 - **Be prepared to join the TCI-P, as originally recommended in the CAP, if and when regional viability re-emerges.**
- **Develop a framework for legal jurisdiction** to implement potential cost- and carbon-

² Note that only 17 of the 23 Councilors were present for the vote.

effective economy-wide policies or programs identified through the development of the CRS.

- **Collect and analyze timely and accurate Vermont-specific data**, including information on volumes and fuel types, foundational to the successful design of any future policy or program. Specifically, develop a GHG emissions reporting program for the transportation sector to replace the large federal datasets that are currently used with actual reported values from Vermont entities. This data will also improve accuracy and timeliness of the annual GHG Inventory prepared by ANR. Consideration should be given to whether this data is best collected by developing a universal reporting program from existing fuel and tax reporting programs to minimize reporting burdens. Consideration should also be given to extending this work to include the thermal sector.

Biomass

The recommendations developed around the application of biomass for electricity generation and home heating for the Initial CAP were tabled. The Council acknowledged that there was not enough time for the Agriculture & Ecosystems and Cross Sector Mitigation subcommittees to come together discuss the issue of biomass, and as such, prioritized work in 2022 with an aim to provide resolved language in the fall of 2022. A task group comprised of Subcommittee members from four Subcommittees (Just Transitions, Science and Data, Agriculture and Ecosystems, and Cross-Sector Mitigation) met for the better part of the last year to determine a [scope of work](#) and to [draft recommendations](#) for the Council to consider. Good progress has been made and the Council will consider the recommendations in the coming months.

Next Steps

The work of the VCC is ongoing, and in service to future iterations of the Climate Action Plan. While the Legislature, the Agency of Natural Resources and other agencies of state government will work to implement climate action, the VCC will continue its efforts in several key areas, including but not limited to:

- Identifying funding and financing strategies, with an immediate emphasis on recommendations related to the expenditure of one-time funds to support implementation of the CAP (see: [memo to the Governor and Vermont General Assembly](#)).
- Guiding on-going public engagement, including around recommended addendum to the CAP.
- Furthering the implementation of the Guiding Principles and the Scoring Rubric in the program design of priority actions.
- Onboarding new Councilors appointed by the House in 2023.
- Finalizing ongoing technical analyses, and identifying additional work required to inform and support future iterations of the CAP.
- Identifying the means to accurately measure the impact of implementation of the Plan.

