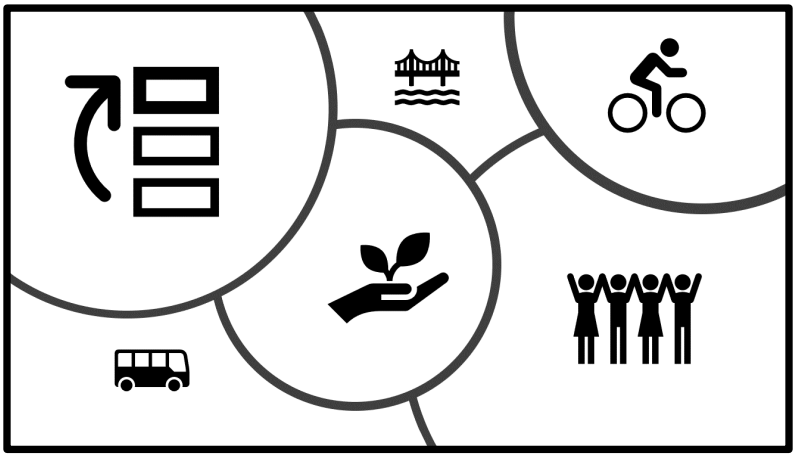

AGENCY OF TRANSPORTATION EFFORTS TO IMPLEMENT THE FEDERAL CARBON REDUCTION PROGRAM AND PROTECT FORMULA PROGRAM; PRIORITIZATION; EQUITY

November 17, 2023

A REPORT FOR THE HOUSE AND SENATE COMMITTEES ON TRANSPORTATION

Andrea Wright, Environmental Policy Manager

November 17, 2023

House Committee on Transportation
Senate Committee on Transportation

Vermont State House
115 State Street
Montpelier, VT 05633-5301

Re: Agency of Transportation efforts to implement the federal Carbon Reduction Strategy Formula Program and PROTECT Formula Program; Prioritization; Equity

Members of the Committees,

Act 62 of 2023 (Act) provided for transportation investments intended to reduce transportation-related greenhouse gas emissions, reduce fossil fuel use, and save Vermont households money in furtherance of the policies articulated in 19 V.S.A. § 10b and the goals of the Comprehensive Energy Plan and the Vermont Climate Action Plan and to satisfy the Executive and Legislative Branches' commitments to the Paris Agreement climate goals. Beyond specific investments identified in the Act, Section 31, outlined specific actions for the Agency to take as it relates to planning for implementation of the federal Infrastructure Investments and Jobs Act (IIJA) Carbon Reduction and Promoting Resilient Operations and Transformative, Efficient, and Cost-Saving Transportation (PROTECT) formula programs.

Section 32 called for a written report summarizing the work completed pursuant to Section 31 of the Act and written recommendations on how to amend statute, including 19 V.S.A. §§ 10b and 10i, to reflect the work completed pursuant to Sec. 31 of this act to the House and Senate Committees on Transportation on or before November 15, 2023.

The Vermont Agency of Transportation (AOT) respectfully submits the attached summaries of the work performed pursuant to Section 31 and 32 of Act 62 0f 2023. Links to related documents are also included.

Carbon Reduction Strategy

Resilience Improvement Plan

Equity Framework

Sincerely,

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Carbon Reduction Strategy

Background

Climate change represents a threat for Vermont's people and the natural systems upon which we depend for our health and well-being. In September 2020, the Vermont Legislature passed the Global Warming Solutions Act (GWSA), a climate-action accountability framework. This Act (Act 153 of 2020) creates a planning process and framework to ensure stepped, strategic action on climate change. It sets deadlines for the state to cut climate pollution, with the 26 percent Paris Climate Accord reduction target as the first milestone in 2030 and achieving 80 percent reduction by 2050.

To support state level Department of Transportation efforts to reduce transportation emissions, the Federal Infrastructure Investment and Jobs Act of 2021 established the Carbon Reduction Program. Administered by the U.S. DOT, this program is expected to provide Vermont with nearly $32 million between federal fiscal years 2022 and 2026. The State has broad latitude to spend this money on a variety of carbon reducing projects, such as mode shift, traffic efficiency, and electric vehicle infrastructure. The Federal Highway Administration (FHWA) requires each state to develop and submit a Carbon Reduction Strategy no later than November 15, 2023, to support efforts to reduce transportation emissions and identify projects and strategies to reduce these emissions.

The Vermont Transportation Carbon Reduction Strategy outlines various project types, programs, policies and other important considerations as the state works to reduce carbon emissions from the transportation sector. In doing so it provides direction for spending CRP funds to support greenhouse gas (GHG) emissions reduction from the transportation sector and serves as Vermont's CRS required under the CRP program. It also identifies additional opportunities for reducing carbon emissions from the state's transportation sector, consistent with the GWSA.

Approach to CRS Development

The approach taken for this work involved two phases. The first was to develop a methodology for evaluating the effect of the Agency Capital Program on greenhouse gas emissions and the second was to develop and evaluate strategies for AOT implementation within its span of authority as well as for the state to consider to meet the requirements of the GWSA.

Development of the Strategy was guided by an Advisory Committee and a Technical Committee made up of representatives of various state agencies, interest groups, and data, modeling, and research experts. The Advisory Committee membership was established to ensure coordination with other state efforts including ongoing development, updates, and implementation of the Climate Action Plan. The Technical Committee ensured the soundness and relevance of data and the analysis methods used to quantify GHG emissions and reduction potential.

Vermont's Transportation Carbon Reduction Strategy was further developed with public and stakeholder engagement through the following means:

- Two sets of virtual public meetings, held in March and August 2023. Meetings were held mid-day and early evening to provide opportunities for more people to attend. Approximately 58 people participated in the March meetings and 41 people participated in the August meetings.
- An online survey made available to the general public providing an opportunity to review early modeling results and to provide input on proposed strategies during July and August 2023. Approximately 700 people responded to the survey.

- An online comment mailbox to which anyone could send comments. A total of 69 comments were received.
- Two rounds of focus groups, held in March and July 2023. The focus groups included representatives from interest groups including:
    - Businesses,
    - Community groups with an equity and/or environmental justice focus,
    - Freight and rail transportation,
    - Public transportation providers and regional planning agencies,
    - Environmental interests, and
    - Elected officials (March only, due to scheduling constraints outside of the legislative session).
- Three presentations to the Vermont Climate Council Cross Sector Mitigation Subcommittee.

A webpage, housed within AOT's webpages, was also developed to provide background information about the study, its status, and ways to provide feedback. The virtual meetings and online survey were advertised through media advisories and social media posts, as well as through stakeholder focus groups and committee meetings.

Technical Analysis

The technical analysis to support the Strategy included the following elements:

- A **baseline forecast** of the state's transportation emissions through 2050, considering current adopted policies.
- An assessment of the **GHG impacts of AOT's current Capital Program**, related to project construction, mode shift, efficient traffic operations, and clean vehicles funded by the program.
- An assessment of the **gap** between projected baseline emissions and emission levels required under the GWSA in years 2025, 2030, and 2050.
- Development and evaluation of potential **strategies** to close the gap, including evaluation of potential benefits, costs, and co-benefits.

To develop the baseline forecast, Capital Program evaluation, and strategy evaluation, AOT's consultant team created a spreadsheet tool referred to as the Vermont GHG Sketch Tool. The tool accepts inputs of key baseline parameters (e.g., vehicle-miles of travel, electrification, vehicle efficiency, transit service and fuel consumption) to develop baseline forecasts. The tool also accepts summary data on AOT's Capital Program projects. The tool includes calculation methods to develop planning-level estimates of GHG reductions associated with different types of projects that are or could be included in the Capital Program, including transit service, bicycle and pedestrian improvements, traffic operations, travel demand management (TDM), and electrification infrastructure.

Baseline

The first step in evaluating carbon reduction strategies was to create a baseline forecast of Vermont's transportation emissions through 2050, considering currently adopted policies. Using data and assumptions about Vehicle Miles Traveled (VMT), Vehicle Fuel Efficiency, rates of Zero Emission Vehicle (ZEV) adoption the team developed the baseline forecast. The analysis estimated that about 2.9 million metric tons (MMT) of carbon dioxide-equivalent (CO_2e) were emitted by Vermont's transportation sector in 2022. The vast majority of transportation emissions are from motor vehicles (cars and trucks) operating on Vermont's roadways. Aviation represents just over 3 percent, rail represents just over 2 percent, transit operations are about 0.5 percent, and roadway construction and maintenance emissions comprise about 0.3 percent of total statewide emissions. When considering the adopted federal fuel efficiency standards and state rules to accelerate adoption of zero-emission cars and trucks (ACCII and ACT), the full potential of which is dependent on ongoing funding for incentives and building out of the light and heavy-duty charging networks, emissions are projected to decline to 2.4 MMT in 2030

and under 800,000 metric tons (MT) in 2050. This is largely due to the adopted federal fuel efficiency standards and state rules to accelerate adoption of zero-emission cars and trucks.

Emissions Impacts of AOT's Capital Program

The next step was to understand AOT's Capital Program impact on GHG reductions. This analysis included evaluation of 429 unique projects with construction dates between 2019 and 2028. The database contained basic information including the project type, a description, the length of the project, and geolocation data. Planning-level estimates were developed for the emissions changes expected from Capital Program activities in several categories. The first was **Agency-generated emissions** attributable to construction and maintenance of assets (e.g., roadway maintenance and rehabilitation, bridge replacements) and operation of assets (emissions from operations which are directly funded by AOT, i.e., transit). **Changes in system user emissions** associated with projects affecting GHG emissions were also included. This relates to projects that create VMT change/mode shift, including bicycle and pedestrian investments, expanded transit service, expanded TDM programs as well as operational efficiency improvements such as roundabouts and signal re-timing. Clean technology, including electric/alternative fuel vehicle infrastructure are considered in this analysis due to their associated GHG emissions and relevant effect on the project type evaluated.

Rail and Aviation projects listed in the Capital Program were focused on system maintenance/state of good repair rather than new investments that could encourage passenger or freight mode shifting. Therefore, no changes in emissions related to rail or aviation system users were estimated from these projects. Also, due to lack of data, emissions from rail and airport construction and maintenance were not estimated.

The following **conclusions** can be drawn from the Capital Program analysis:

- Current programmed projects in the capital budget will have a small impact compared to total transportation emissions (about 0.1 percent or less emissions reductions or for 2030 2,115 MT reduction vs 2,400,818 MT of overall emissions).
- As more vehicles electrify in the future, VMT reduction, mode shift, and traffic operations improvements will have proportionately smaller impacts as measured in tons of GHG emissions.

The analysis illustrates the limitations of the agency's current suite of VMT and operations-based measures to meaningfully reduce transportation GHG emissions, particularly in the Vermont context where much of the population lives in small urban or rural areas with limited travel options. However, improving travel options and reducing congestion are still important for a variety of other reasons including mobility, health, safety, economic growth, and quality of life.

Gap Analysis

When we look at the overall forecasted emissions and the minor impact of the capital program, we have a gap. While the projected emissions declines noted above from the adoption of ACCII and ACT are significant, comparing projected with required emissions levels, a gap of 410,000 MT CO_2e in 2030 and nearly 100,000 MT CO_2e in 2050 remains.

Gap Analysis for Vermont's Transportation Sector (MT CO_2e)

Category	2025	2030	2050
Baseline Emissions	2,797,000	2,400,000	762,000
Target Emissions	2,799,000	1,990,000	662,000
Emissions Gap	-1,400	410,000	100,000

Target emissions shown are consistent with the latest 2023 GHG Inventory. The gap evaluated in this work was based on the Vermont Climate Council's recommendation of sectoral proportionality (i.e. transportation accounts for nearly 40% emissions and thus should contribute 40% of the reductions); which may or may not reflect the

most cost effective approach to achieving the state's GHG reduction requirements. The gap estimated in this Strategy may be different than the gap estimated by the Agency of Natural Resources in the latest Climate Action Plan. While every attempt was made to align methods and assumptions between the two plans, evolving policies, standards, and assumptions, as well as differences in technical methods between the two, may still lead to different estimations of future emissions and the gap compared to target emissions. The results, however, do not differ significantly and the takeaway remains, a gap exists. The CRS also provided a sensitivity analysis to account for potential change in variables. Even with a lower rate of vehicle-miles of travel (VMT) per capita consistent with post-pandemic levels, the 2030 gap would still be at least 330,000 MT. Higher than projected rates of population or VMT growth, or slower than projected electric vehicle adoption, could further increase the size of the gap(s).

Strategies to Reduce GHG Emissions and Close the Gap

Vermont could implement numerous combinations and implementation levels of transportation carbon reduction actions beyond current programmed projects and adopted policies. For purposes of this Carbon Reduction Strategy a sample portfolio of strategies was developed, and emissions benefits and costs estimated for those strategies. The strategies were identified based on past planning efforts (including the Climate Action Plan), input from stakeholders and the public, as well as experience from other states and entities working to reduce transportation carbon emissions. The implementation levels were established consistent with stakeholder assessments of implementation feasibility of each strategy.

These strategies evaluated included:

- Bicycle and pedestrian network expansion.
- Transit service expansion.
- Micromobility subsidies.
- Expanded travel demand management programs to encourage less carbon-intensive means of travel.
- Transit vehicle electrification.
- Compact land use/smart growth.
- Broadband expansion to serve the entire state.
- Advanced Clean Fleets to further electrify truck fleets in the state.
- Feebates to further incentivize clean vehicles.

These additional strategies were modeled to further close the 2030 gap by about 18 percent, with an estimated cost of approximately $400 million cumulatively through 2030. Those activities under the direct purview of VTrans would result in approximately 7% of the gap reduction at a cost of approximately $141 million. Modeling of these strategies shows the 2050 gap being closed. Assuming a linear decline, supported by adequate funding for continued investment in vehicle adoption incentive and charging infrastructure programs, between 2030 and 2050, the baseline projection would reach the 2030 target level by roughly 2035.

Again, although the impact of these carbon reduction strategies on overall GHG emissions appears relatively modest, their co-benefits must be considered. These strategies can have significant benefits in addition to reducing GHG emissions. These important benefits include (but are not limited to) local air quality (reduction of hazardous air pollutants), mobility, and public health. Carbon reduction should not be the only, or in some cases even the primary, consideration for deciding how much to invest in these strategies.

Cost-Effectiveness and Co-Benefits of Carbon Reduction Strategies[a]

Strategy	GHG Emissions	Air Quality (particulate emissions)	Mobility (new non-SOV trips)	Health (cost savings)
Bicycle and Pedestrian Network	++	++	+++	+++
Transit: Service Expansion	+	-	+++	+
Micromobility	++	++	+++	++
Travel Demand Management	++	++	+++	++
Transit: Vehicle Electrification	+++	+++	-	++
Telework	++	+++	-	-
Land Use	+++	++	-	+++
Advanced Clean Fleets	+++	+++	-	++
Feebates	+++	-	-	-

[a]More "+" signs means a higher cost-effectiveness, based on public sector implementation costs. See Appendix D, Section D.10 for a legend and description of the co-benefits analysis.

To reach the 2030 requirements, the state will need to consider which of the above strategies could be implemented and to what levels, and will need to analyze additional programs for their ability to close the gap between projected and required emissions in an equitable manner. These additional programs could include a Clean Transportation Standard to reduce the carbon intensity of transportation fuels, and/or a cap-and-invest system to establish a declining emissions cap and direct revenue from the auction of emissions allowances towards carbon reduction strategies and uses that benefit equity. These strategies require greater detailed program design and analysis to model their benefits. Modeling without those program details would be incomplete and inaccurate, thus their effects were not quantified as part of this work.

Additional Carbon Reduction Strategies

The strategy analysis showed that closing the gap between projected emissions and required emissions levels will pose a significant challenge for the transportation sector. The state will need to go beyond simply expanding AOTs current programs and project portfolio and consider the development and implementation levels of additional, innovative policies and programs to move towards more rapid decarbonization. These additional strategies fall into the following categories:

1. Expand **transportation capital program investment and services**, as feasible consistent with available funding.

2. Expand programs and incentives (tax credits, prioritized funding, etc), provide technical support and design guidance, and reform land use regulations to encourage **compact land use and teletravel.**[1]

3. Support maximum conversion of Vermont's vehicle fleet to **zero-emission vehicles.**

[1] Teletravel is defined as conducting activities virtually (on-line) rather than physically traveling to them. Teletravel includes telework as well as remote shopping, health care, education, and other activities.

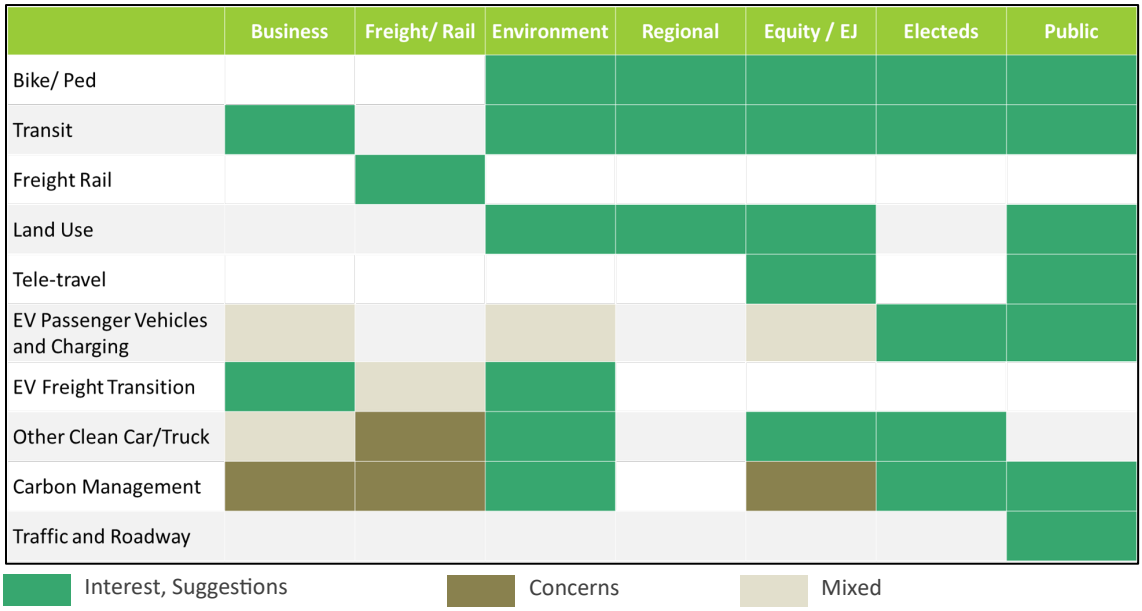
4. Undertake a process with public and stakeholder involvement to **further evaluate, develop, and implement additional programs** to further close the remaining gap between projected and emissions levels required by the GWSA while also providing a funding source for additional investments as described in other strategies and ensuring equitable outcomes that benefit all Vermonters.

5. **Center equity in carbon reduction** to ensure strategies are designed and implemented in an accessible and affordable manner such that all Vermonters benefit, and that historically overburdened or disadvantaged populations are not placed at further risk of harm or financial burden by emission reduction strategies.

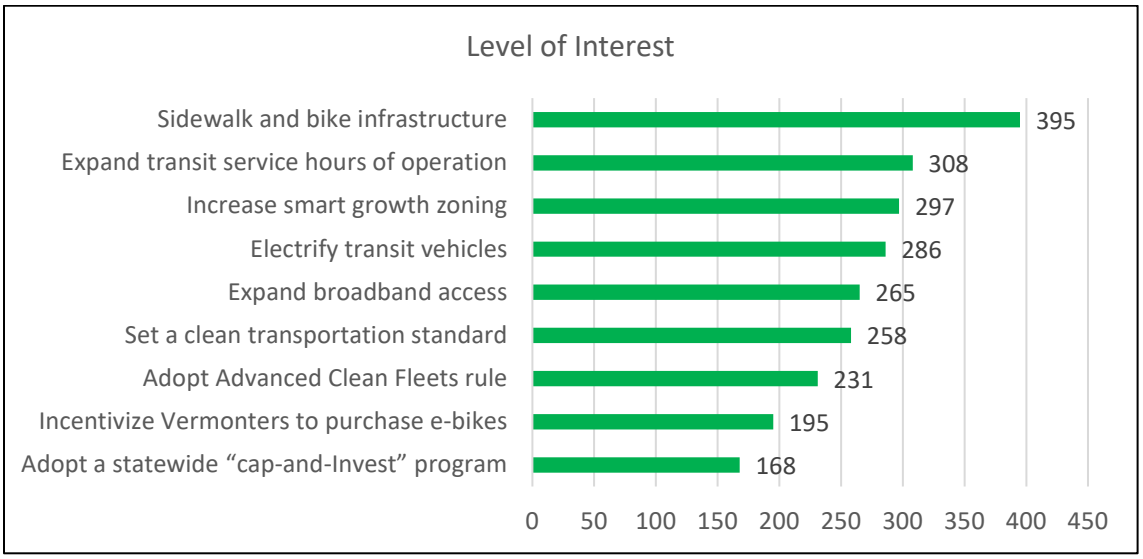
6. **Monitor and track progress**, at a level of detail sufficient to support continuous improvement in the effectiveness of emission reduction policies and programs.

The Carbon Reduction Strategy goes into detail about these additional strategies. Each is in a separate section with an overview of current activities, to set the context for additional actions; opportunities for additional program and activities; and considerations to take based on stakeholder comments, potential concerns, and how those concerns could be addressed.

Stakeholder Input



Public Survey



This public survey question asked, “what strategy most interests you?” Respondents were allowed to make multiple selections. ~700 responses; Average 353 responses per question.

The Strategy also acknowledges AOT’s authority in, as well as the collaboration with and the roles of other entities needed for, implementation of the full suite of additional strategies. AOT can support implementation of the strategy through the choices it makes in its long-range planning and Capital Program investments, as well as through other policies such as street design and materials standards. While these Agency actions will result in some GHG emissions reductions, they are more desirable and effective from a co-benefits standpoint. Many of the most effective strategies to reduce emissions towards the requirements of the GWSA extend beyond the Agency of Transportation’s purview. Full implementation of the Strategy will require action and coordination on the part of many stakeholders.

Implementation Responsibilities

Strategy	Agency of Transportation	Other State Agencies	Legislature	Municipalities & RPCs
Transportation investments & services	✓		✓	
Land use & teletravel		✓	✓	✓
Zero-emission vehicles	✓	✓	✓	✓
Additional policies and programs		✓	✓	

Use of Carbon Reduction Program Funds

The U.S. DOT Carbon Reduction Program is one source of funds that AOT will use to support carbon reduction strategies. Other sources that the state has and/or will use in the future include the Congestion Mitigation and Air Quality Improvement Program (CMAQ), the NEVI Program, and Surface Transportation Program (STP) including the Transportation Alternatives set-aside (STP-TA). The total CRP funding expected to be authorized from Federal Fiscal Year 22 through Federal Fiscal Year 2026 is approximately $31.6 million. The VTrans CRP funding priorities and their approximate effect on GHG reductions is shown below.

Carbon Reduction Program Funding Priorities for State-Directed Funds

Project Type	Target %	Approximate Funds Available FY22-26	MT GHG Reduced (2030)
Bicycle and pedestrian projects, including Complete Streets, shared-use paths, bike lanes, and sidewalks, prioritized within designated smart growth locations (town and village centers)	33%	$9-10 million	130
Transit and micromobility services and incentives (e.g., microtransit, shuttles, e-bike incentives)	33%	$9-10 million	1,200
Fleet conversion, including conversion of transit buses and/or AOT heavy equipment to electric and/or other zero emission technology, and supporting infrastructure	33%	$9-10 million	530

These priorities were selected based on 1) relative cost-effectiveness at reducing GHG emissions and providing other co-benefits; 2) support from stakeholders and the public; 3) alignment with the Vermont Climate Action Plan and Long-Range Transportation Plan; and 4) immediate need and opportunity.

These strategies align with the Climate Action Plan in that the CAP outlines a two-pronged approach to make both vehicles and the transportation system more efficient by 1) replacing carbon intensive fuels (gas and diesel) with zero emission or low carbon fuels such as electricity; and 2) creating options for Vermonters to drive less or use alternatives to the single occupancy vehicle to get where they need to go, while also expanding options for those who cannot drive.

In Federal Fiscal Years 2022 and 2023, AOT was authorized just over $12.7 million in Carbon Reduction Program funding. These funds have not yet been spent on eligible projects, however, based on the recommendations of this Strategy planning for obligation is underway. Although exact distribution of funds not been finalized the Environmental Policy and Sustainability Program is working with Project Delivery, Transit, Central Garage, and Facilities to support projects related to bicycle and pedestrian infrastructure, transit electrification and mobility, and fleet conversion, respectively.

The CRP and other existing funding sources will not provide adequate funding to fully implement all of the recommendations in this plan, estimated to be in the range of $140-330 million by 2030 (beyond current investment levels) for the strategies quantified in Section 3.4. The agency has limited ability to redirect other funding that is needed to maintain Vermont's existing roadway system and transit services. Furthermore, funding is likely to decrease in the future as the federal and state gas taxes – the state's main source of transportation revenue – declines as vehicles become more efficient and electrify.

Additional funding sources

A cap-and-invest program is one strategy that can work towards emission reductions and provide a potential funding source. Examples of other mechanisms that have been expanded, newly implemented, or proposed in various states and local jurisdictions to support transportation programs include motor vehicle registration fees, motor fuel taxes, mileage-based road user fees, road tolls, sales taxes, and carbon pricing.

Tracking and Reporting Progress

Tracking progress will require a coordinated effort between the AOT and ANR to develop and maintain the data systems needed to estimate and update progress on transportation GHG emissions and associated drivers.

While overall transportation emissions can be tracked through fuel sales, monitoring of key indicators and strategies in more detail can help the state understand which strategies are most effective and where strategies might be falling short of expectations – helping to prioritize and target future policies and investments.

The Strategy recommends Vermont enhance its data and analysis tools to support strategy evaluation and progress tracking and reporting specific to transportation sector emissions. Specifically,

- AOT should collaborate with ANR to develop annual updates **reporting on key drivers** of emissions (e.g., VMT, average vehicle economy, electrification, fuel sales, rail volumes). AOT can use these updated data in the sketch tool developed for this project to update emissions estimates and projections by transportation source (light-duty vehicle, truck, bus, rail, aviation, and other).
- AOT should conduct post-implementation data to **evaluate the effectiveness** of implemented projects and programs and assist in designing more effective programs in the future. Examples might include monitoring usage of shared-use paths; or conducting occasional surveys of transit riders, micromobility users, and active travelers to understand how they would have traveled if the facility or service were not available.

The Agency is committed to continuous improvement and will follow a cycle of Plan-Do-Study-Act to understand the impacts of its actions and to make informed decisions for improvement. The recommendations as stated above align with the current plans and actions of the Environmental Policy and Sustainability Program to create a VTrans Climate Dashboard as well as the FHWA Every Day Counts initiative on Integrating GHG Assessment and Reduction Targets in Transportation Planning and a FHWA proposed rule for a GHG Performance Measure.

Resilience Improvement Plan

Background

Resilience is central to ensuring that the Vermont Agency of Transportation (VTrans) meets our core mission to provide for the safe and efficient movement of people and goods in a socially, economically, and environmentally sustainable manner. As Vermont is subjected to increasingly severe and frequent weather events, resilience has become all the more important to accomplishing this mission. A Resilience Improvement Plan (RIP) contributes to the overall resilience of the transportation system by supporting efforts to identify vulnerabilities, develop proposed resilience solutions, and schedule and prioritize resilience improvements to meet the needs of the State's communities and travelers. Five goals were identified to guide the development of the RIP:

1. Less damage in the future.
2. Systems return to normal quickly.
3. Vermont is resilient for all people.
4. Essential freight moves.
5. Resilience efforts are coordinated.

The Promoting Resilient Operations for Transformative, Efficient, and Cost-saving Transportation (PROTECT) program allows for the creation of a Resilience Improvement Plan. A RIP is not required, but having an FHWA approved RIP increases the federal share for PROTECT formula and grant funded projects from 80% up to 90%. Vermont will receive $37 million in formula funds through the PROTECT program between federal fiscal years 2022 and 2026, and having a RIP in place will reduce the amount of state funds that will be required for match on projects identified as a priority. Both PROTECT formula and discretionary grant funds can only be used for standalone resilience projects or the incremental cost of the resilience components of a project. An example of incremental cost would be the cost difference between replacing a culvert with a larger structure and replacing it in-kind.

Methodology

The core of the RIP is project identification and prioritization. The foundation of the analysis is vulnerability to inundation flooding and fluvial erosion. Hazard analysis at VTrans and across Vermont state agencies has emphasized the threat posed by heavy rainfall and specifically the effect that heavy rainfall events have on infrastructure. Much of the rain that falls during these events accumulates in our rivers and drainage infrastructure which can then cause inundation and erosion from flooding. The RIP project prioritization methodology described below integrates preexisting tools and analyses that assess the risk posed by heavy rainfall and associated inundation flooding and erosion. Future iterations of the RIP will expand the hazard analysis to include additional natural hazards. It is through the RIP project identification and prioritization process that resources can be directed to the areas where they will have the most impact and make the most progress towards achieving the goals of the RIP.

Six metrics were used to identify and prioritize locations for future resilience projects. If a location met the conditions for the metric, it was assigned one or more flags. The greater the number of flags, the higher the location's priority for future resilience improvements. Both state and local roads and structures were assessed and ranked. The metrics used are as follows:

1. High Transportation Resilience Planning Tool (TRPT) Risk Score (1 or 2 flags)

a. 1 flag was assigned to assets with a risk score of greater than 5 for a 2% annual event. A second flag was assigned to assets with a risk score of greater than 8. This metric captures locations with a high likelihood of future damage and high criticality to the overall network and local communities.

2. Repeat Damage Location (1 or 2 flags)
    a. 1 flag was assigned to assets if the same asset had been damaged in two federally declared disasters and 2 flags if it had been damaged in three or more. This metric accounts for those locations that have already caused disruptions due to past damage.
3. Social Vulnerability Index (1 flag)
    a. 1 flag was assigned to assets within census tracts rating moderate to high (4 or more flags) through the Vermont Department of Health Social Vulnerability Index (SVI). This metric gives greater weight to projects in communities that are more vulnerable to the impacts of emergencies.
4. Fixed Route Bus Service (1 flag)
    a. 1 flag was assigned to assets through which a fixed-route bus route passes. This metric captures the importance of maintaining transit service as a means for ensuring mobility for all.
5. Emergency Freight Access (1 flag)
    a. 1 was assigned to assets within 5 miles of emergency freight distribution centers identified by Vermont Emergency Management. In the event of a major disruption, it is essential that access to these locations is maintained for the collection and distribution of aid.
6. Interagency Coordination (1 flag)
    a. 1 flag was assigned to assets that are also identified for improvement in a plan belonging to another Agency. Currently, only transportation recommendations from Vermont Department of Environmental Conservation Tactical Basin Plans are included in this initial RIP analysis. This metric reflects the importance of collaboration among state agencies and other partners in directing resilience efforts.

Project Lists

The project identification and prioritization methodology was used to generate a ranked list of priority resilience locations. PROTECT funded projects in those locations are then eligible for the increased federal share of 90% and are exempt from the requirement to complete a benefit cost analysis for a discretionary grant application. In order to generate a more manageable list only “high flag” locations were included. These are defined as road segments earning three or more flags and structures earning two or more. The resulting list identified 1.1% of public road miles and 1.2% of structures as priority resilience locations. A greater proportion of the state system is represented with 4.6% of state road miles and 3.5% of state structures identified as compared to 0.4% of local road mileage and 0.7% of local structures. This is a reflection of both the methodology used and the greater size of the municipally maintained system. Transit routes are more prevalent on state routes and damage data is more complete for state routes, so the current methodology provides more opportunities for state routes to earn flags. Centralized collection or curation of damage data for the municipal network would improve the RIP analysis for the municipal system.

Use of PROTECT Funds

The PROTECT Guidance calls for a minimum of 2% of formula funds to be spent on planning activities such as developing a resilience improvement plan; resilience planning, predesign, or design; technical capacity-building; and the development of data tools to simulate disruptions and assess vulnerabilities while the remaining funds are for implementation. In Federal Fiscal Years 2022 and 2023, AOT was authorized just over $14.4 million in PROTECT formula funds for implementation and almost $320,000 for planning. Both planning and implementation funds can only be used for projects, or portions of projects, whose primary purpose is to address resilience, such

as floodplain restoration, or for the incremental cost of a resilience component of a larger project. Examples of incremental costs of resilience components are slope stabilization costs and the cost difference between replacing a structure with a larger structure versus replacing it in kind.

As an immediate step to implement the RIP, the prioritized list of resilience locations was compared to the existing VTrans Capital Program. The intent was to identify opportunities to fund resilience components of existing projects to promptly and effectively allocate PROTECT formula funds. An Agency of Transportation internal stakeholder group has met throughout the RIP planning process and is continuing to meet to identify and implement these projects. The list of resilience locations joined to Capital Projects is included as a secondary list in the RIP. Although exact distribution of funds has not been finalized, the Environmental Policy and Sustainability Program is working with Project Delivery to identify both bridge and roadway projects that address RIP listed sites whose incremental costs would be covered at the 90% federal share as well as those that are not on the RIP list of projects but do address resilience directly, whose incremental costs would be covered at the 80% federal share.

The first round of PROTECT discretionary grants was released this fall before the RIP was completed. McFarland-Johnson was hired to assist with an application for several planned structure replacements on Vermont Route 12 in Worcester and Elmore. Awards have yet to be announced.

Now that the RIP and its prioritized resilience location list is complete, AOT will use the list to position for the next round of PROTECT discretionary grants. AOT will work within the Agency and with external partners, including RPCs and municipalities, to identify priority resilience locations on the state and municipal systems without currently planned projects. Using PROTECT planning and potentially other funds, AOT will hire a consultant to scope projects for these locations. The resulting scoping reports will be used to apply for PROTECT discretionary grants to design and build resilience projects in these high priority locations.

Stakeholder Engagement

Two stakeholder groups convened to inform the development of the RIP. One group was composed of internal Agency of Transportation staff and the other of staff from other state agencies. Both groups' members were chosen based on their relevant expertise and knowledge in resilience and of existing processes and plans such that the process for development of this Plan was comprehensive and such and additive, rather than duplicative. Both stakeholder groups provided input on the methodology, its utility, and the underlying data. The internal group is expected to use the RIP, and especially the project list, for AOT project planning and implementation and their input was sought to make the RIP most useful for this purpose. The external stakeholders are expected to consult the RIP throughout their own planning processes and to incorporate it into hazard mitigation and other plans where appropriate. The RIP draws from external plans for both its hazard analysis and project prioritization and both areas will be the focus of continuing engagement with external state agency partners.

The VTrans RIP team also presented to and solicited feedback from the RPCs and MPO at multiple TPI meetings. The team is in the process of sharing the completed Plan with regional Transportation Advisory Committees. The focus of regional and municipal engagement has been and will continue to be incorporating regional and municipal priorities. As the focus of the RIP shifts from planning to implementation, regional and municipal stakeholders will help guide transportation resilience investments in the local transportation system.

Integration Into Project Prioritization

Per U.S. DOT requirements, AOT must annually develop a Statewide Transportation Improvement Program (STIP), detailing the specific projects the agency will undertake and the funding by fiscal year, covering the next four fiscal years. The program must identify the specific funding source(s) for each project (federal, state, and local/other and specific programs). AOT develops a Capital Program, or "budget book", a one-year budget passed annually by the legislature and governor for the next state fiscal year. The Capital Program is consistent with the STIP. AOT's Project Selection and Prioritization (VPSP2) is the system used to evaluate and select projects for inclusion in the Capital Program and STIP.

Carbon Reduction

Currently GHG emissions are considered indirectly, through an "environment" criterion that is scored based on the number of environmental mitigations included in a project. The environment criterion is broken down into four categories: wildlife, air quality, water quality, cultural resources. The assignment of points is based on the projects incorporation of required vs. voluntary mitigation in those four areas; thus a proactive project gets more points. The total value for the environment criterion is 10; with the entire process total of up to 100 points. Three air quality mitigations are currently listed: 1) design incorporates potential for EV charging stations; 2) design supports operational efficiency; 3) design features address TDM resulting in reduced VMT. AOT will be working to enhance the consideration of GHG emissions in programming decisions including for projects funded through other sources than the CRP. For example, this may include updating its VPSP2 scoring to directly assign points for GHG reduction based on the relative effectiveness or cost-effectiveness of each type of project with carbon reduction benefits. AOT could use the evaluation tool developed for this strategy to estimate effectiveness and cost-effectiveness. The level of effort for use of the tool to develop a quantitative rather than qualitative analysis, compared to the potential for it to move the need on the level of project prioritization will need to be evaluated.

Resilience

Resilience has been a criterion within the VTrans Project Selection & Prioritization Process (VPSP2) from the beginning, earning a potential project a maximum of 10 out of the 100 total points. The resilience criteria has evolved over time as the tools available to assess risk have been refined. Initially, the Statewide Highway Flood Vulnerability and Risk Map was used to provide the resilience score. This was then replaced by the Transportation Resilience Planning Tool (TRPT) which incorporates many more factors into its flood risk scoring. AOT is currently in the process of transitioning the VPSP2 resilience criteria yet again to the Resilience Improvement Plan (RIP) analysis. The benefit of using the RIP analysis in project prioritization is that it incorporates the TRPT risk assessment while going beyond it by also scoring assets based on equity, transit access, freight access, and opportunities for interagency coordination.

Equity

The Transportation Equity Framework (TEF) outlines an approach to embed equity considerations and achieve equitable outcomes in day-to-day AOT and Regional Planning Commission (RPC) activities. Developed in response to Section 41 of Act 55 (2021) of the General Assembly, the framework is consistent with and supports adjacent work within Vermont and at the federal level to further equitable outcomes, including the Act 154 Vermont Environmental Justice Act and the USDOT Equity Action Plan.

The TEF is organized by four pillars of equity, the fourth of which is Corrective Equity. Corrective equity seeks to improve equity of the transportation system through embedding equity factors into the process of selecting and prioritizing investments. AOT staff is currently evaluating the VTrans Project Selection & Prioritization Process (VPSP2), to better understand how mobility equity may currently be embedded within the existing eight criteria and how it might be improved to emphasize equitable outcomes.

While no explicit equity criteria currently exist in VPSP2, criteria such as mobility & connectivity, health access, and economic access support transportation investments of particular importance to Vermont's most vulnerable

populations. Changes in scoring of existing criteria may support more equitable outcomes. For instance, awarding points for enhancing active transportation (bike/ped), transit service connections, or other improvements to multimodal connectivity may inherently support a more equitable transportation system. Other considerations could be to assign points based on populations served within a project area, for instance Environmental Justice Focus Populations as defined by Act 154.

AOT staff will continue to evaluate VPSP2 this year with the goal of summarizing alternative strategies that emphasize equity in the determination of transportation investments. This objective is part of the AOT Strategic Plan for FFY23-25.

Recommendations for Statute Amendments

Section 32 of Act 62 of 2023 requires the Agency to provide written recommendations on how to amend statute, including 19 V.S.A. §§ 10b and 10i, to reflect the work completed pursuant to Sec. 31 of the Act. The policies articulated in 19 V.S.A. § 10b speak to the Agency comprehensively considering the economic, social, and environmental effects of its programs and for those programs to be implemented in alignment with other related State and Agency Plans. Subsection 10i further codifies the policies of 10b by calling out specific actions during planning and programming.

Over the past couple of years, several important State and Agency actions have taken place that relate to this statute:

- The Agency Mission and Vision Statements have been updated to incorporate social, economic, and environmental sustainability, and now read:

  Mission

  Through excellent customer service, provide for the safe and efficient movement of people and goods in a socially, economically, and environmentally sustainable manner.

  Vision

  A safe, reliable, and environmentally sustainable multimodal transportation system that grows the economy, is affordable to use and operate and serves vulnerable populations.

- The federal government, through its funding programs, has placed an emphasis on Climate Mitigation and Adaptation and has specifically placed responsibility on State Departments of Transportation through the National Electric Vehicle Infrastructure Program, the Carbon Reduction Program, the Promoting Resilient, Transformative, Efficient, and Cost-Effective Transportation Program as well as several related discretionary grant programs to plan, design and construct projects that address transportation climate and associated equity issues.
- The Agency has developed Plans to describe the most effective use of relevant federal funds.
- There have been new and updated State plans; including, the Vermont Climate Action Plan (CAP) adopted in December of 2021 and the State Hazard Mitigation Plan (SHMP) undergoing a current update and the Comprehensive Energy Plan (CEP) update in January of 2022; all of which have pathways and strategies specific to transportation.
- The Agency developed a Transportation Equity Framework consisting of a range of recommendations to embed equity throughout the Agency's work in coordination and cooperation with the Regional Planning Commissions per 19 V.S.A §§ 10l.

It is with these more recent developments that the Agency provides suggested revision of 19 V.S.A §§ 10b and 10i changes below.

Title 19 : Highways

Chapter 001 : State Highway Law; General Transportation Provisions

(Cite as: 19 V.S.A. § 10b)

§ 10b. Statement of policy; general

(a) The Agency shall be the responsible agency of the State for the development of transportation policy. It shall develop a mission statement to reflect:

(1) that State transportation policy shall be to encompass, coordinate, and integrate all modes of transportation and to consider complete streets, as defined in section 2401 of this title, principles; and

(2) the need for transportation projects that will improve the State's economic infrastructure, as well as the use of resources in efficient, coordinated, integrated, cost-effective, equitable and environmentally sound ways, ~~and that will be consistent with the recommendations of the Comprehensive Energy Plan (CEP) issued under 30 V.S.A. § 202b~~.

(b) The Agency shall coordinate planning, education, outreach, and training efforts with those of local and regional planning entities to:

(1) ensure that the transportation system as a whole is integrated; that access to the transportation system as a whole is integrated; and that statewide, local, and regional ~~conservation and efficiency~~ carbon reduction and resilience opportunities and practices are integrated; and

(2) support employer-led or local or regional government-led carbon reduction, resilience, ~~conservation, efficiency, rideshare, and bicycle~~ active transportation, ~~programs~~ and other innovative transportation programs ~~advances, especially employer-based incentives~~.

(c) In developing the State's annual Transportation Program, the Agency shall, consistent with the planning goals listed in 24 V.S.A. § 4302 and with appropriate consideration to local, regional, and State agency plans and ensure that there is an environmentally sustainable, efficient, resilient, multimodal transportation system that will have economic, environmental, equity, and public health benefits for all Vermonters by:

(1) developing or ~~incorporate~~ incorporating programs and designs that provide an integrated, safe, ~~and~~ efficient, equitable, and resilient transportation system and that are consistent with the recommendations of the Agency's Long Range Transportation Plan, Transportation Equity Framework, National Electric Vehicle Infrastructure Plan, Carbon Reduction Strategy, and Resilience Improvement Plan ~~CEP~~;

(2) considering complete streets principles in all State and municipally managed transportation projects and project phases, including planning, development, construction, and maintenance, except in the case of projects or project components involving unpaved highways;

(3) ~~promote~~ promoting economic opportunities for Vermonters ~~and the best use of the State's environmental and historic resources~~; and

(4) minimizing impacts to the State's natural and cultural resources; and

(5) manage available funding to:

(A) give priority to preserving the functionality of the existing transportation infrastructure, including bicycle and pedestrian infrastructure ~~trails~~ regardless of whether they are stand-alone facilities or located along a highway shoulder; and

(B) adhere to credible project delivery schedules.

(d) The Agency of Transportation, in developing each of the program prioritization systems schedules for all modes of transportation, shall include the following throughout the process:

(1) The Agency shall annually solicit input from each of the regional planning commissions and the Chittenden County Metropolitan Planning Organization on regional priorities within each schedule, and those inputs shall be factored into the prioritizations for each program area and shall afford the opportunity of adding new projects to the schedules.

(2) Each year, the Agency shall provide in the front of the Transportation Program book a detailed explanation describing the factors in the prioritization system that creates each project list.

(Added 1989, No. 121, § 1, eff. June 22, 1989; amended 1989, No. 246 (Adj. Sess.), § 1; 1993, No. 89, § 20; 2005, No. 175 (Adj. Sess.), § 48; 2007, No. 75, § 34, eff. June 7, 2007; 2007, No. 209 (Adj. Sess.), § 7; 2011, No. 34, § 2; 2017, No. 139 (Adj. Sess.), § 10; 2021, No. 105 (Adj. Sess.), § 348, eff. July 1, 2022; 2023, No. 62, § 33, eff. July 1, 2023.)

Title 19 : Highways

Chapter 001 : State Highway Law; General Transportation Provisions

(Cite as: 19 V.S.A. § 10i)

§ 10i. Transportation planning process

(a) Long-range systems plan. The Agency shall establish and implement a planning process through the adoption of a long-range multi-modal systems plan integrating all modes of transportation, as required under 23 C.F.R § 450.216. The long-range multi-modal systems plan shall be based upon Agency transportation policy developed under section 10b of this title; other policies approved by the General Assembly; Agency goals, mission, and objectives; demographic and travel forecasts; design standards; performance criteria; and funding availability. The long-range systems plan shall be developed with participation of the public and local and regional governmental entities and pursuant to the planning goals and processes set forth in 1988 Acts and Resolves No. 200. The plan shall be consistent with the ~~State's Comprehensive Energy Plan (CEP), the CAP, and the SHMP.~~ Agency's Carbon Reduction Strategy, PROTECT Hazard Mitigation Plan, and Agency Energy Plan.

(b) Corridor studies. The Agency shall develop transportation corridor studies as needed, consistent with asset management policies implemented by the Agency, that identify environmental issues, community concerns, and travel projections, growth patterns and related opportunities for mode shift. For each corridor, problems shall be identified and ranked according to their criticality and severity. Corridor studies shall solicit input from all stakeholders to align with the criteria of the Agency Project Prioritization Process, at a minimum.

(c) Transportation Program. The Transportation Program shall be developed in a fiscally responsible manner to accomplish the following objectives:

(1) managing, maintaining, and improving the State's existing transportation infrastructure to provide capacity, safety, resiliency, and equity ~~and flexibility~~ in the most cost-effective and efficient manner;

(2) developing an integrated sustainable transportation system that provides Vermonters with transportation choices;

(3) strengthening the economy, protecting the quality of the natural environment, and improving Vermonters' quality of life; and

(4) achieving the recommendations of the ~~CEP.~~ Agency's Carbon Reduction Strategy, PROTECT Hazard Mitigation Plan, and Agency Energy Plan.

(d) Project identification and scope. The Agency shall identify and develop specific projects consistent with the objectives set forth in subsection (c) of this section. For each project, a project scope shall be prepared to identify the problem to be resolved by the project, the preferred alternative, project limits, and its conceptual design and estimated costs.

(e) Information manual. An information manual giving a clear description of the planning process shall be prepared for town officials and the public.

(Added 1989, No. 246 (Adj. Sess.), § 36; amended 2003, No. 160 (Adj. Sess.), § 31, eff. June 9, 2004; 2017, No. 139 (Adj. Sess.), § 11; 2021, No. 105 (Adj. Sess.), § 350, eff. July 1, 2022.)