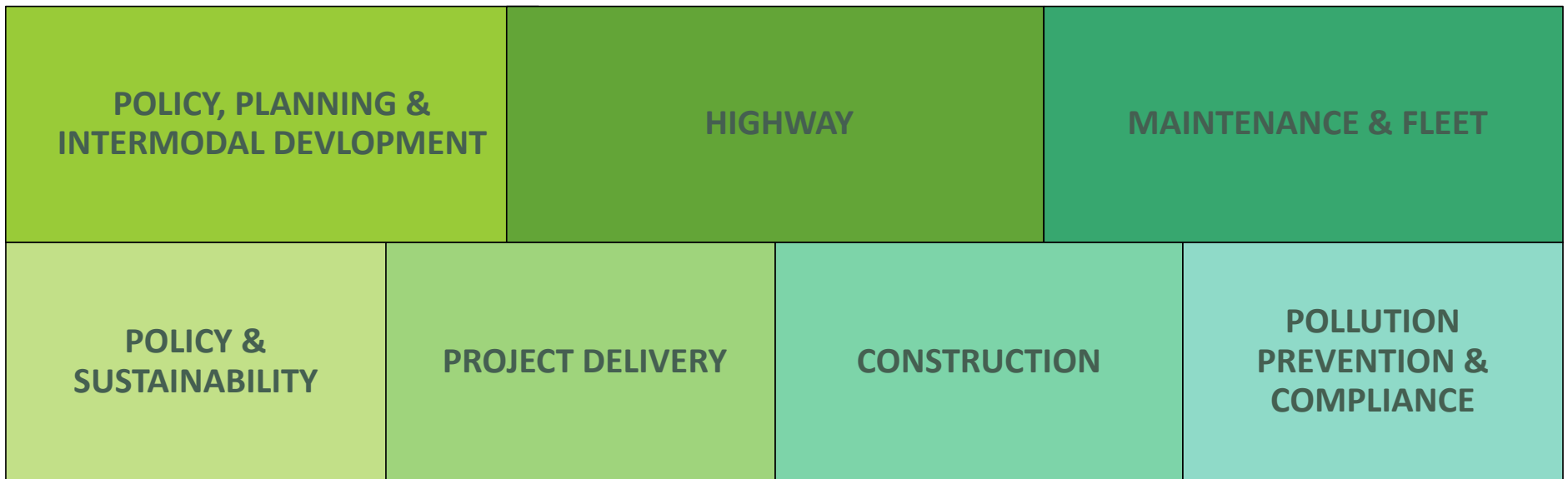

VTRANS CLIMATE PLANNING & PROGRAMMING

ANDREA WRIGHT, ENVIRONMENTAL POLICY MANAGER

HOUSE TRANSPORTATION COMMITTEE

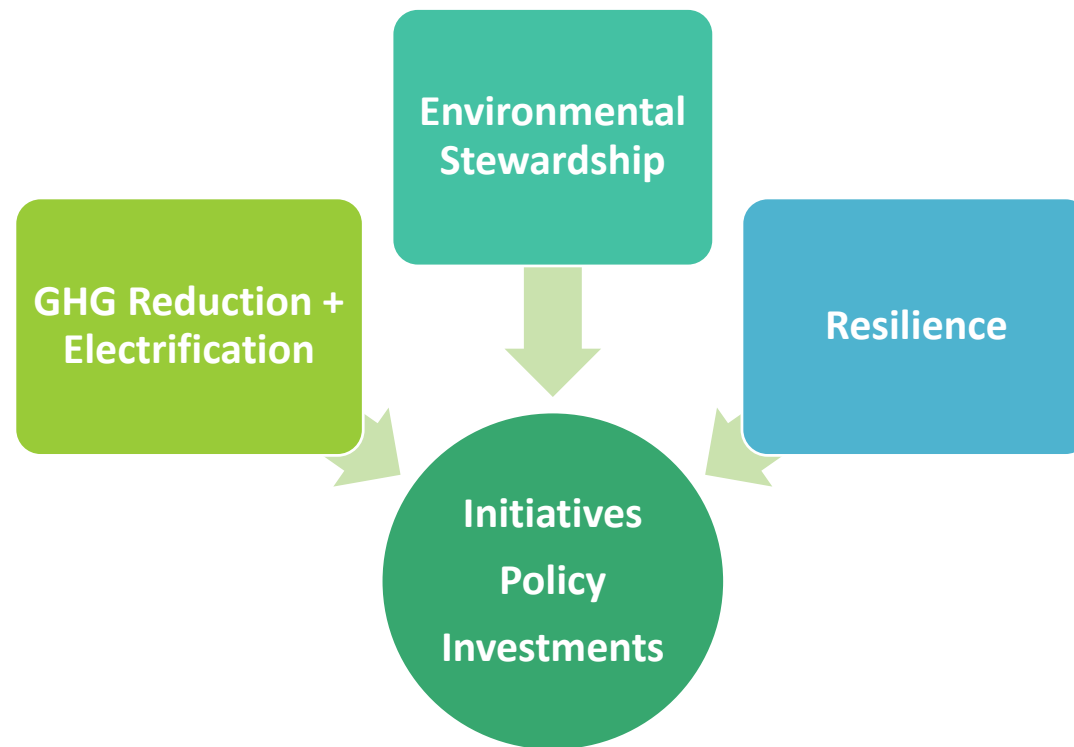
JANUARY 17, 2023

VTrans Environmental



FOUR PILLARS

AOT EPS Section: What We Do



Environmental Policy

**Inter Agency
Coordination**

**Emerald Ash
Borer Mgt
Plan**

**Vegetation
Management
Plan**

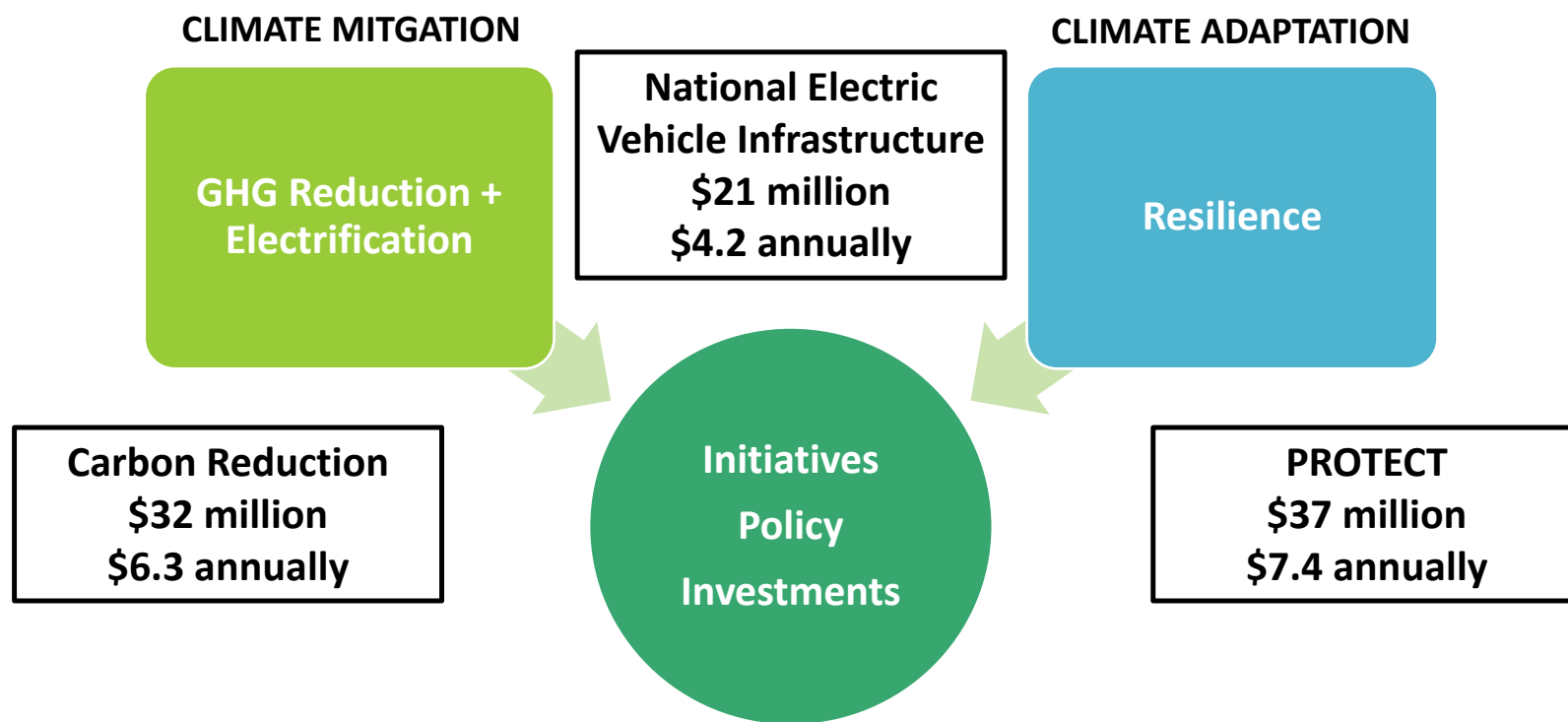
**Contaminated
Soils
Guidance**

Road Ecology

**Permitting
Efficiency**



AOT EPS Section: What We Do



Climate Mitigation

Global Warming Solutions Act

- Reduce GHG emissions below 2005 GHG emissions in Vermont by:
 - no less than 26% below 2005 GHG emission levels by January 1, 2025;
 - by no less than 40% below 1990 GHG emission levels by January 1, 2030;
 - and no less than 80% below 1990 GHG emission levels by January 1, 2050.

INITIAL VERMONT CLIMATE ACTION PLAN

Vermont Climate Council
DECEMBER 2021

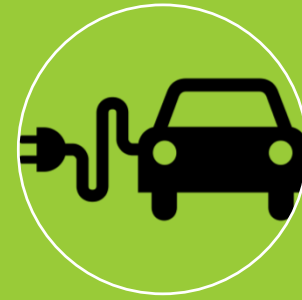
<https://climatechange.vermont.gov/>



GHG



Energy



Electrification



Vehicle Electrification

Vehicle Incentives

- Continued to implement MileageSmart; streamlined administration of the New Plug-In Electric Vehicle Program; launched the Replace Your Ride and eBike Incentive Programs

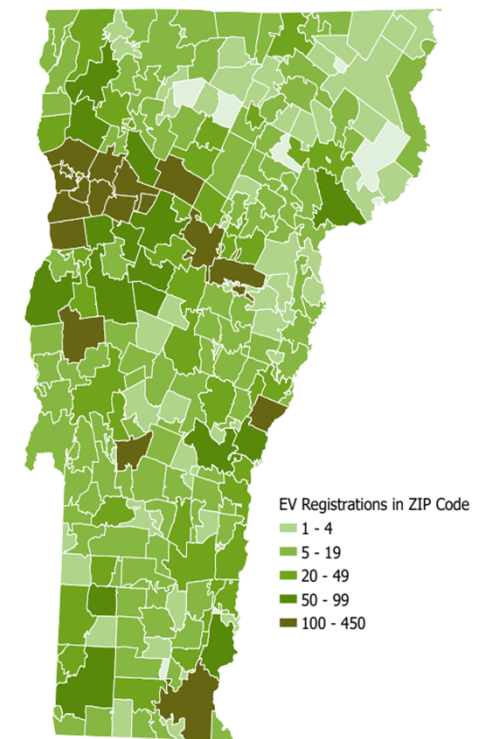
Electric Vehicle Charging

- National Electric Vehicle Infrastructure (NEVI) Plan approved by FHWA
- State partnering for Multi Family Dwellings– \$1M - charging access to over 6,000 households at affordable housing developments

Road Usage Charge

- Completed a study of road-usage charges for electric vehicles and contracted services to develop policy for a mileage-based user fee

As of July 2022



Fleet (and Equipment) Electrification

- Increasingly aggressive targets for fleet electrification
- Harley Davidson LiveWire



146/95 Miles
City/Combined Range

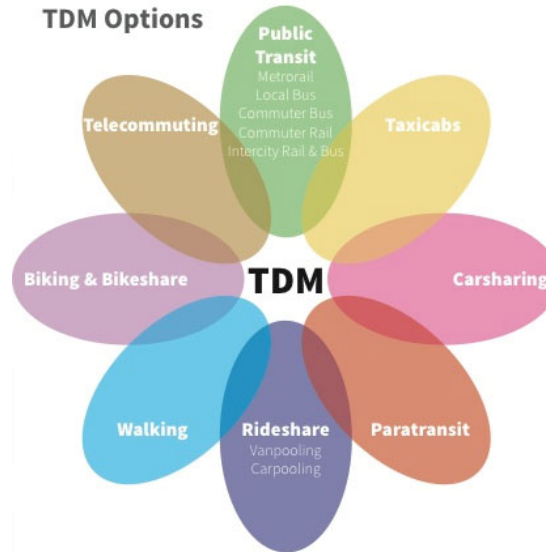
3.0 Seconds
0-60 MPH

60 Minutes
DC-Fast Recharge

Reduce SOV/VMT



TDM Options



VTrans Transportation Demand Strategies

- Public Transit
- Go! Vermont
- Transportation Alternatives
- Park and Ride
- Passenger and Freight Rail



BUS INFORMATION



RIDESHARING



TRAIN INFORMATION



FERRY INFORMATION



EV CARS AND CHARGING STATIONS

VMT Smart Growth Study

Overarching Hypothesis:

Compact, mixed use development patterns intrinsically generate less VMT and GHG emissions per person than more dispersed or rural settlement patterns.

RESEARCH OBJECTIVES:

1. **Demonstrate** the degree to which smart growth strategies, particularly in the Vermont context, can reduce Vehicle Miles Traveled (VMT) to meet transportation related GHG emission reduction targets as promulgated in the Vermont Pathways Analysis Report (“Pathways” report).

Table 2. Transportation Key Indicators for 2025 and 2030

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%

Pathways Analysis Report_Version 2.0

VMT Smart Growth Study

Overarching Hypothesis:

Compact, mixed use development patterns intrinsically generate less VMT and GHG emissions per person than more dispersed or rural settlement patterns.

RESEARCH OBJECTIVES:

2. **Quantify** the co-benefits of smart growth strategies beyond GHG emission reductions. Such benefits include **health** benefits of increased active and multimodal travel, **safety** benefits for reduced VMT, **reduced maintenance** associated with fewer vehicles and possibly fewer lane miles, and **increased economic activity** located in downtowns and community centers.



VMT Smart Growth Study

Deliverables	Scheduled Quarter of Completion
<p>Deliverable 1: Compilation of existing research and resources. A technical memorandum to document and summarize the most salient and pertinent aspects of previously collected data and methods. The memo will include a data resource list to be used in subsequent tasks</p>	1 st Project Quarter: July-Sep
<p>Deliverable 2: Built Form for Smart Growth Areas. Spatial dataset integrating the data resources identified in Task 1. A web GIS accessible format (ArcGIS online or similar) will be produced with the available datasets.</p>	1 st Project Quarter: July – Sep
<p>Deliverable 3: Estimate VMT Using Passively Collected Data. Analysis of observed passively collected location data across Vermont. Technical memorandum summarizing the data inputs, the characteristics of the data, approach to impute metrics, data weighting and expansion, and summary. Web dashboard with login credentials for visualizing the dataset in a manner to protect Personally Identifiable Information.</p>	2 nd Project Quarter: Oct-Dec
<p>Deliverable 4: VMT Land Use Model. Technical memorandum documenting the data inputs, the analysis methods, and results of the VMT model</p>	3 rd Project Quarter: Jan-Feb
<p>Deliverable 5: Additional Co-Benefits. Technical memorandum documenting the additional resources, models, and approaches to summarize the co-benefits for changes in VMT associated with community design.</p>	3 rd Project Quarter: Jan-Feb
<p>Deliverable 6: Future Scenarios. Technical memorandum summarizing the development of the scenarios with the TAC and a summary of the scenario changes for each of the Community Centers of Interests. The deliverable will summarize key findings on how changes in specific built form and socio-economic characteristics are expected to change VMT.</p>	3 rd Project Quarter: Feb-Mar
<p>Deliverable 7: Case Study and Final Report. A final report will be prepared to incorporate the earlier interim technical memorandums. The final report will include a set of case study summaries to provide a more accessible resource for appliers of the research. The final report will include a section on how best to implement and transfer the technology. A final poster, presentation to the TAC, and reflect comments and revisions to a draft final report.</p>	3 rd Project Quarter: Mar-Apr

Completed

To Come

Project Schedule & Deliverables

Climate
Mitigation -
Energy

Comprehensive Energy Plan Support

Energy Profile

Facilities

Alternative Uses of the ROW

GHG Emissions Reduction

Carbon Reduction Program

**Infrastructure Investment
and Jobs Act (IIJA)**

\$32 million

\$6.3 annually over 5 years

- Public Transit
- Transportation Alternatives
- Congestion Mitigation
- Efficient Street and Traffic Lighting
- Travel Demand Management Strategies
- Deployment of Alternative Fuel Vehicles and related Infrastructure
- Carbon Reduction Strategy



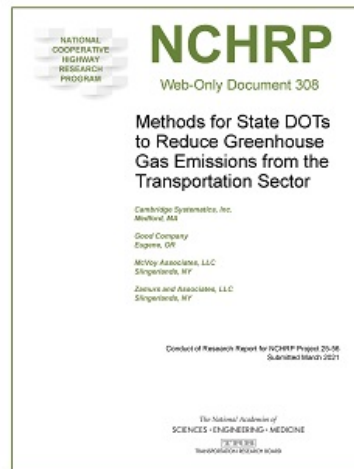
Carbon Reduction Strategy

Capital Program GHG Accounting Methodology

January 2023

Carbon Reduction Strategy

Nov 15, 2023



Carbon Reduction Strategy

Considerations

Opportunities

Challenges

CAMBRIDGE SYSTEMATICS



- The majority of GHG emission reductions will come from technological advances including clean vehicles and fuels. VTrans can play an important supporting role in these advances, for example, by assisting with deployment of **electric vehicle (EV) charging infrastructure**. However, it may be hard to quantify the specific contribution of VTrans' activities to overall benefits achieved through State electrification policies and programs.
- It is also hard to “move the needle” much just through the types of investment choices normally included in a **transportation agency's capital program**. This is especially true in a state like Vermont where there is already a minimal focus on capacity expansion and primary emphasis on system preservation and multi-modal investments. Transit services, bicycle and pedestrian infrastructure, and travel demand management can play dividends for mobility, equity, public health, and local economies, but will have only incremental effects on GHG emissions.
- Because of the relative importance of “**co-benefits**” of transportation investments, it is essential that consideration of GHG benefits be integrated into the overall consideration of transportation benefits supporting the State's goals, and that the full range of benefits of these various types of investments be communicated when discussing and making investment decisions.

Carbon Reduction Strategy

Considerations

Opportunities

Challenges

- The short-term (2030) benefits of **land use strategies** in a state like Vermont, with low population growth rates, will be modest; but they will multiply over the long-term (2050). Land use decisions are made mainly at a local(municipal) level, but VTrans can support and reward transportation-efficient land use through project selection criteria and investment decisions.
- **Pricing strategies** such as carbon pricing, cap-and-invest, and vehicle feebates can have larger emissions benefits but can also elicit substantial public concern. If there is any hope for these strategies to be implemented, they must be designed carefully, and in close collaboration with stakeholder groups representing various segments of the public and Vermont's business community, to address potential concerns regarding equity and economic impacts. Again, most of these strategies go beyond VTrans' purview to implement; VTrans can be an important partner but not the lead agency.
- With these considerations in mind, it is essential to clearly communicate robust information on the **effectiveness, cost- effectiveness, and co-benefits** of the various transportation GHG reduction opportunities so that stakeholders and the public can understand what can realistically be achieved, and what some of the more difficult choices may be when working to meet GHG reduction targets.



Carbon Reduction Strategy

Technical Committee

AOT
ANR
CCRPC
UVM
VCC TTG
EAN

Advisory Committee

AOT
ANR
ACCD
CCRPC
FHWA
RPC/VAPDA
Dept of Health
VT Public Transit Association
VNRC
CVOEO

Figure 1 Schedule

Phase/Task	2022					2023									
	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	
I.I: Project Initiation	■														
I.II: Methodology Options	■		1												
I.III: Methodology Refinement and Application			■		2	■		3							
I.IV: Documentation and Training							■								
II.I: Stakeholder and Public Engagement		■													
II.II: Gap Analysis							■								
II.III: Scenario Evaluation								■		4	■		5		
II.IV: Carbon Reduction Strategy											■				6
Technical Committee	★		★		★	★			★		★		★		
Advisory Committee					★			★			★		★		
Focus Groups & Public Meetings								★				★			
	1 - Recommendation of methodology														
	2 - Testing of methodology														
	3 - Application of methodology/legislature presentation														
	4 - Scenario development														
	5 - Scenario analysis and recommendations														
	6 - Draft Carbon Reduction Strategy														

GHG Emissions Reduction

Carbon Reduction Strategy

Phase I

Develop a greenhouse gas (GHG) accounting methodology for the capital program

Phase I – Accounting Methodology - 2022



May
IIJA Guidance

June / July
Scope of Work
Consultant Contract

September
Technical Committee

December
Capital Program
Accounting
Methodology

Carbon Reduction Strategy

Phase I

TASK I: PROJECT INITIATION

- September 2022
- Technical Committee Kick-off
- Review the scope, discuss roles and to gather members' comments on available information

TASK II: METHODOLOGY OPTIONS EVALUATION

- October 2022
- Present and discuss the most appropriate and practical tools and methods available

TASK III: METHODOLOGY RECOMMENDATION AND APPLICATION

- December 2022 – January 2023
- Develop tool based on TC input
- Apply/test tool on FY 2023 Capital Program
- **Share/review results with Technical Committee**
- **Apply revisions to CY 24 Program**

IV: DOCUMENTATION AND TRAINING

- Draft and final technical guide
- Deliver a training workshop

Carbon Reduction Strategy - Phase I

Table 1. GHG Mitigation Measures and their points/metric in each compliance year.

Project Type	Metric	Project Lifetime (Years) ¹	Points/Metric ²	Points/Metric	Points/Metric	Points/Metric	Additional Multipliers
			Now-2025 ³	2026-2030	2031-2040	2041-2050	
Pedestrian/Bicycle							
Bike lane/facility - core urban ⁴	Miles of two-way facility built between plan year 1 and evaluation year ⁵	30	23	19	9	3	2.0 – separated / protected lane or bike boulevard
Bike lane/facility - urban			12	10	5	2	
Bike lane/facility – suburban			4	3	1	1	1.5 – within mixed-use district or ½ mi of transit station or school
Bike lane/facility – rural			1	1	1	1	

Example Calculation: New Bike-Lanes (Suburban)

➔ Step 1: Calculate Avoided VMT

Input from Capital Program

0.4

Miles of facility * New Daily Cyclists per facility-mile * Prior Mode Share * Average Trip Length

25

60%

2.3

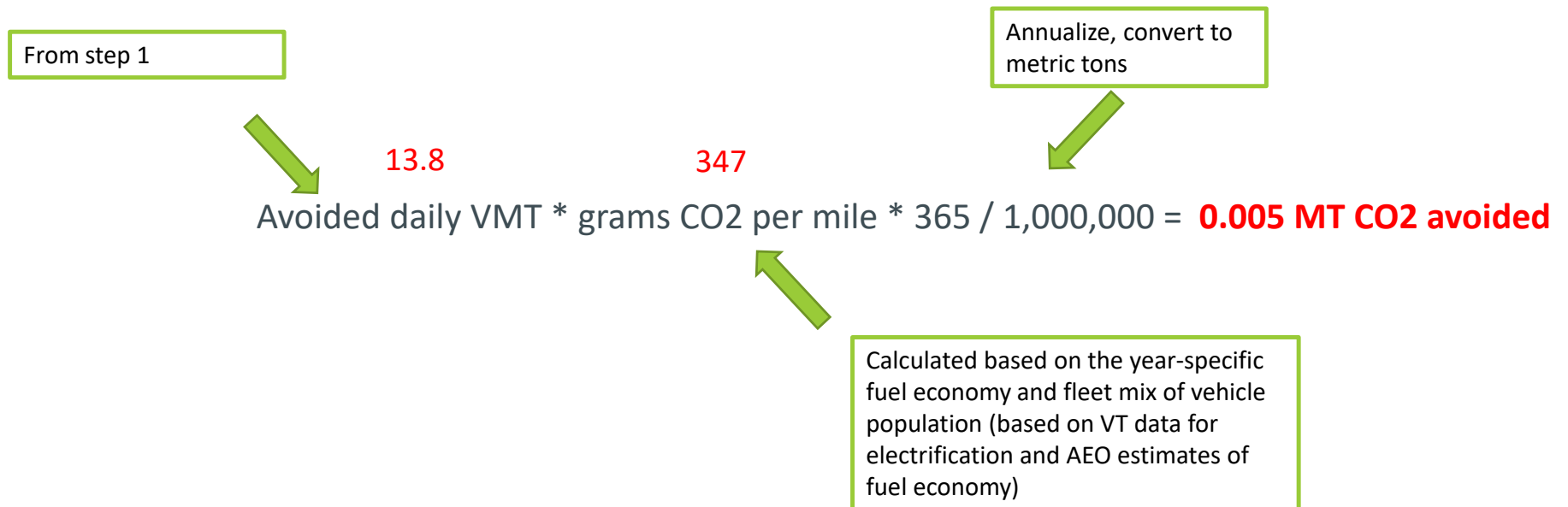
Factor developed based on literature; broken out by area type
e.g. in "suburban" area type, 60% of new cyclists trips would have been from a car

Factor developed for TCI tool based on literature; broken out by area type
e.g. in "suburban" area type, 25 new cyclists

Sourced from National Household Travel Survey
e.g. average bike trip = 2.3 miles

Example Calculation: New Bike-Lane

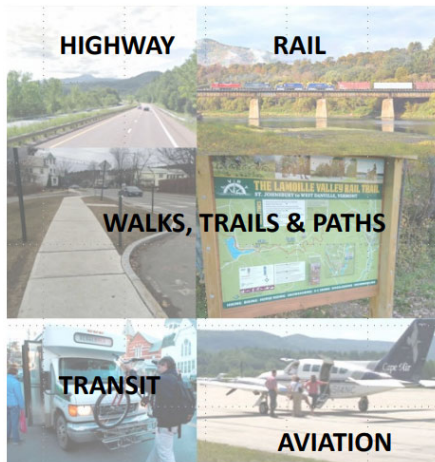
➔ Step 2: Calculate Avoided Emissions



VTrans Project Selection and Prioritization Process

VPSP2

FIVE MODES



EIGHT CRITERIA

SAFETY Max points = 20	ASSET CONDITION Max points = 20
MOBILITY / CONNECTIVITY Max points = 15	COMMUNITY Max points = 10
ECONOMIC ACCESS Max points = 10	ENVIRONMENT Max points = 10
RESILIENCY Max points = 10	HEALTH ACCESS Max points = 5

Environment: reducing the negative impacts of travel (e.g., reducing greenhouse gas [GHG] emissions, improving air quality, enhancing safe wildlife passage, and/or improving water quality).

- *Impacts to wildlife, air quality, water quality, cultural resources (look at required vs. voluntary mitigation in project scope).*

GHG Emissions Reduction

Carbon Reduction Strategy

Phase II

Develop a strategy for the implementation of projects that most cost-effectively reduce GHG emissions

Phase II – Strategy Development - 2023



January
Advisory
Committee

Spring - Summer
Stakeholder and
Public
Engagement

October
Strategy

Carbon Reduction Strategy

Phase II

TASK I: STAKEHOLDER AND PUBLIC ENGAGEMENT

- Two rounds of focus group meetings with up to six stakeholder groups
- Minimum of two, statewide public meetings

TASK II: GAP ANALYSIS

TASK III: DEVELOP AND EVALUATE STRATEGY SCENARIOS

Four scenarios:

- One specifically and exclusively for the typical transportation infrastructure and service investments,
- One specifically and exclusively for policy and regulatory approaches, and
- Up to two additional that are some combination of strategies

TASK IV: CARBON REDUCTION STRATEGY

Carbon Reduction Strategy - Phase II

Relative Cost-Effectiveness of Strategies

Table 6. Cost-Effectiveness of Clean Transportation Strategies

Strategy	GHG	PM2.5	New non-SOV trips	Jobs	Health benefits
Light duty EVs	+++	+++	-	+	++
Electric transit buses	+++	+++	-	+	+++
Electric school buses	+++	+++	-	+	++
Electric trucks	+++	+++	-	++	++
Hydrogen trucks	+++	+++	-	++	++
Shared ride incentives	+	+	+++	+	+
Micromobility: Shared e-scooters & e-bikes	+	+	++	+	++
Micromobility: E-bike ownership	++	++	+++	+	++
Land use/smart growth	+++	++	-	++	++
Bicycle investment	++	++	+++	++	+++
Pedestrian investment	+	+	+++	++	+++
Travel demand & mobility management	++	++	+++	++	++
Bus rapid transit	+	+	+++	++	+
Commuter/intercity rail	+	+	++	++	+
Bus service: Expansion	+	-	++	+++	+
Bus service: Efficiency	++	+	++	+++	++
Electric microtransit	+	+	+++	++	+
Traffic flow improvements	+++	-	-	+++	-

Table 5. Benefits Key

Benefits Range	GHG tons/\$M	PM2.5 lbs/\$M	New non-SOV trips per \$M	New jobs per \$M	Value of health benefits per \$M
-	<10	<1	<1,000	<1	<\$0.1M
+	10 – 100	1 – 10	1,000 – 50,000	1 – 10	\$0.1 – \$0.25M
++	100 – 1,000	10 – 100	50,000 – 250,000	10 – 20	\$0.25M - \$2.5M
+++	>1,000	>100	>250,000	>20	>\$2.5M

Note: A typical car emits about 4 to 5 tons of GHG per year, so 100 tons is equivalent to taking 20 cars off the road, and 1,000 tons is equivalent to taking 200 cars off the road.

Source: Rhode Island Clean Transportation and Mobility Innovation Report (2020)

VTrans RESILIENCE

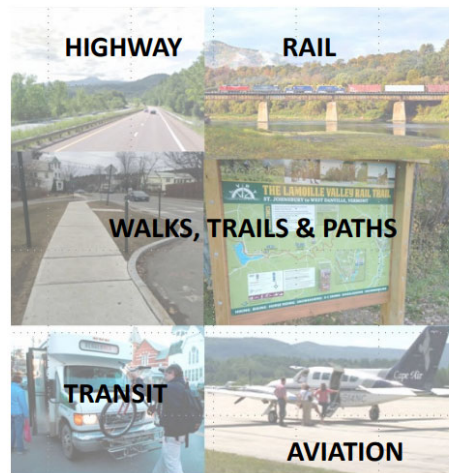
*“The ability to anticipate, prepare for, and adapt to changing conditions and withstand, respond to, and recover rapidly from disruptions”
(FHWA Order 5520)*

- EMERGENCY RESPONSE AND RECOVERY
- DESIGN AND ENGINEERING
- PLANNING AND PROGRAMMING
- INFRASTRUCTURE INVESTMENTS

Emergency Management	Transportation Planning and Project Delivery			
	Plan & Program	Design	Build	Operate & Maintain
Prepare	✓			✓
Respond				✓
Recover		✓	✓	✓
Mitigate	✓	✓	✓	

VTrans Project Selection and Prioritization Process VPSP2

FIVE MODES



EIGHT CRITERIA

SAFETY Max points = 20	ASSET CONDITION Max points = 20
MOBILITY / CONNECTIVITY Max points = 15	COMMUNITY Max points = 10
ECONOMIC ACCESS Max points = 10	ENVIRONMENT Max points = 10
RESILIENCY Max points = 10	HEALTH ACCESS Max points = 5

Resiliency: minimizing the impacts of planned and unplanned events (e.g., work zones, floods and extreme weather).

- *Uses the Transportation Resilience Planning Tool (TRPT) to determine a project's resilience score (combo of vulnerability and criticality scores)*

RESILIENCE

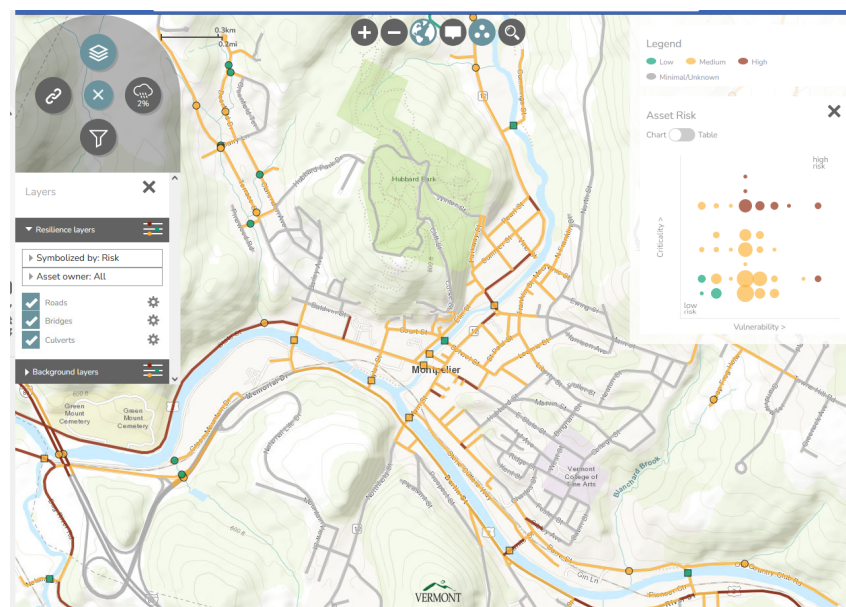
PLANNING AND PROGRAMMING ACTIVITIES

Transportation Resilience Planning Tool (TRPT)

Risk = Vulnerability + Criticality

- 100% State Coverage
- Statewide Training underway
 - Web-based tool

<https://vtrans.vermont.gov/planning/transportation-resilience>



RESILIENCE

INFRASTRUCTURE INVESTMENTS



FEMA Grants

- **Pre-Disaster Mitigation**
- **Building Resilient Infrastructure & Communities**
- **Hazard Mitigation**



RESILIENCE

INFRASTRUCTURE INVESTMENTS

**Promoting
Resilient
Operations for
Transformative,
Efficient, and
Cost-saving
Transportation**

PROTECT FORMULA PROGRAM

INFRASTRUCTURE INVESTMENT & JOBS ACT (IIJA)

\$37 MILLION FOR VERMONT -- \$7.4 ANNUALLY OVER 5 YEARS

- Natural Hazards
- Planning
- Resilience Improvement
- Evacuation Routes
- Nature Based Designs
- Resilience Improvement Plan

Environmental Policy and Sustainability Contacts

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