

# Vermont Transportation Carbon Reduction Strategy

VERMONT CLIMATE COUNCIL  
CROSS SECTOR MITIGATION SUBCOMMITTEE  
OCTOBER 26, 2023

# Agenda



Introductions



Project Overview



Baseline Forecast, Gap Analysis, & Strategy Analysis



Public and Stakeholder Outreach – Round 2 Input



Recommendations



Discussion

# Project Objectives

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## Support Vermont's requirements for GHG emissions reduction

- Reduce emissions 40% below 1990 levels by 2030
- Reduce emissions 80% below 1990 levels by 2050
- Transportation sector contributes to 40% of reduction

## Support U.S. DOT requirements for each State to develop a Carbon Reduction Strategy

- Describe how new Carbon Reduction Program funding will be used

# Strategy Steps

## *Phase 1*

### **Estimate GHG emissions and reductions associated with VTrans' Capital Program**

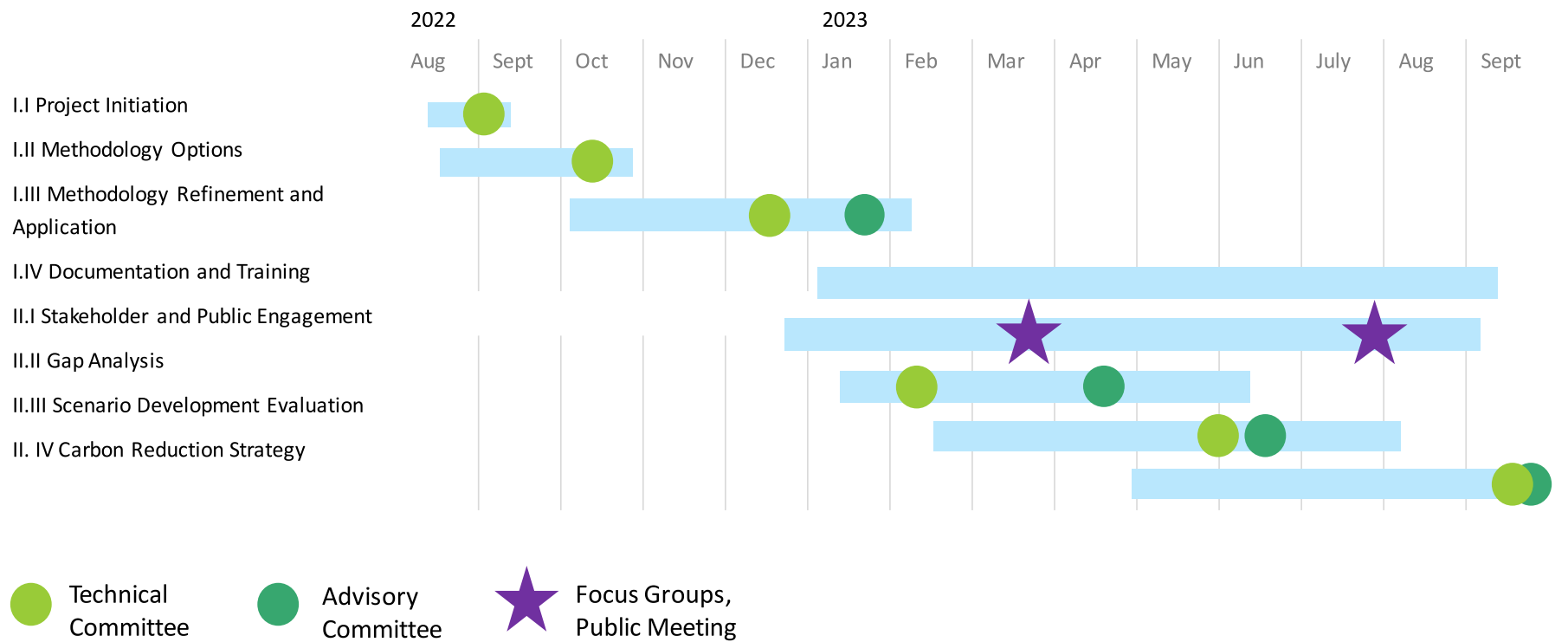
- Baseline projection
- Construction & maintenance
- Transportation system user emissions

## *Phase 2*

### **Develop Carbon Reduction Strategy**

- Stakeholder and public engagement
- Gap analysis
- Strategy and scenario development and evaluation
- Carbon Reduction Strategy

# Project Timeline



# Baseline Forecast, Gap Analysis, & Strategy Analysis

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# Transportation Emissions Baseline Forecast – Key Parameters

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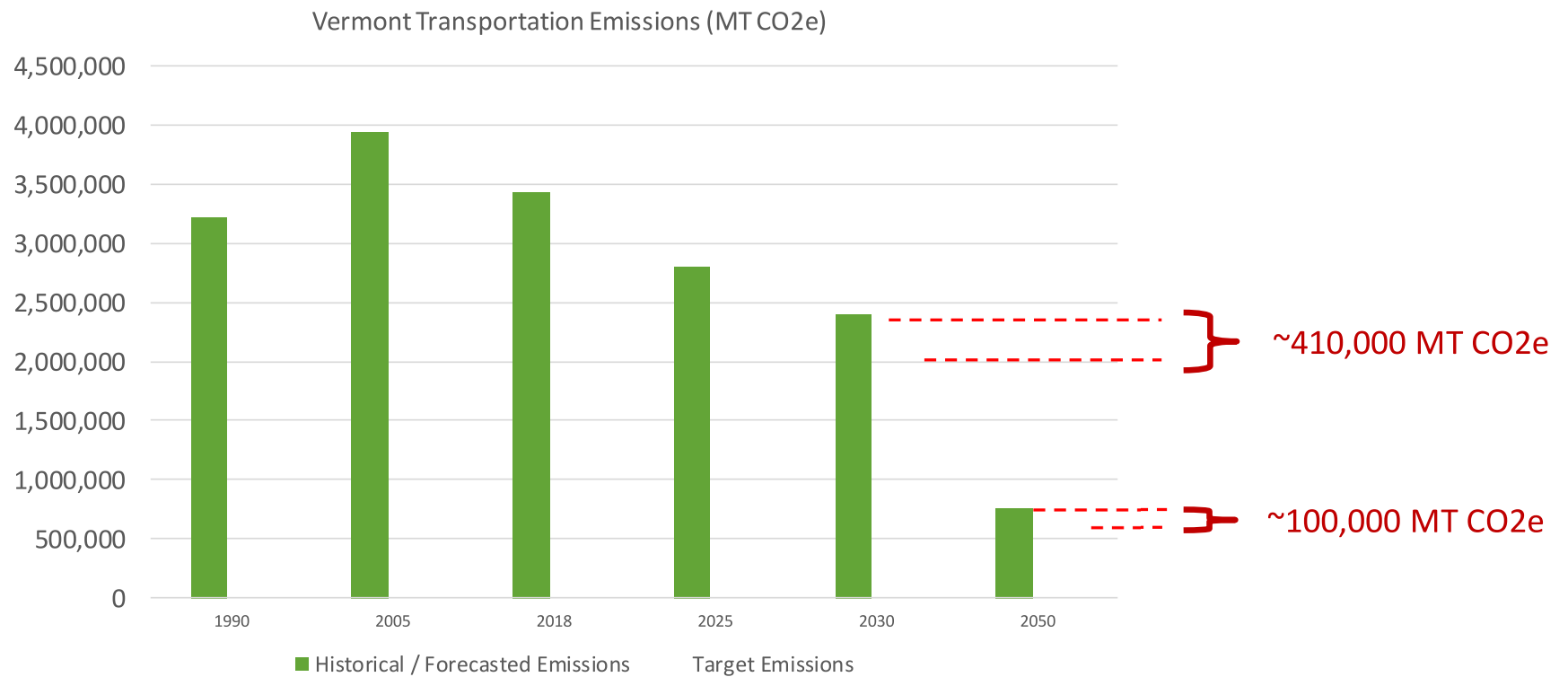
Parameter	2025	2030	2050
Light Duty Passenger VMT (million)	6,310	6,851	7,301
Medium and Heavy Duty Truck VMT (million)	841	927	1,092
Light Duty Passenger ZEV Stock %	4%	18%	85%
Medium and Heavy Duty Truck ZEV Stock %	1%	10%	58%

# Transportation Emissions Baseline Forecast (MT CO<sub>2</sub>e)

Source Category	2022	2025	2030	2050
Onroad Vehicles	2,650,367	2,546,692	2,146,801	508,778
Public Transit	15,781	15,781	15,781	15,781
Rail	63,453	64,221	65,120	65,171
Aviation	99,502	100,702	102,104	102,188
Navigation	33,555	33,961	34,434	34,465
Other	29,128	29,480	29,892	29,916
Construction and Maintenance	7,390	7,095	6,686	6,179
<b>Total</b>	<b>2,899,177</b>	<b>2,797,933</b>	<b>2,400,818</b>	<b>762,477</b>
Target Emissions		2,799,000	1,990,000	662,000
Gap		-1400	410,000	100,000



# Gap Analysis



# Transportation Emissions Gap – Sensitivity Analysis (MT CO2e)

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Scenario	2025	2030	2050
Baseline	-1,400	410,000	100,000
Higher Population Growth (+30% growth = +5,000 residents in 2030)	800	430,000	106,000
Slower EV Adoption (20% slower than ACC2/ACT forecast)	11,500	481,000	407,000
Lower VMT Per Capita (-5%, similar to pandemic)	-1,400	331,000	91,000

# GHG Reduction Strategies: 2030 Effects

Strategy	CO <sub>2</sub> Reduction (2030 metric tons)	% of 2030 Gap Closed	Estimated Cost Through 2030 (\$M)
Bicycle and pedestrian network expansion	220	0.1%	55.7
Transit service expansion	690	0.1%	44.0
Micromobility	1,420	0.3%	7.9
Travel demand management	80	0.0%	2.8
Transit vehicle electrification	4,260	1.0%	31.5
Land use	5,660	1.4%	NA <sup>a</sup>
Broadband expansion	5,300	1.3%	191.7
Advanced Clean Fleets	35,700	7.7%	79.3
Feebates	19,800	4.8%	NA <sup>b</sup>
Combined Effects			
Transportation investment and services	6,500	1.6%	\$141.8
Transportation + land use + broadband	17,600	4.3%	\$333.5
Transportation + land use + broadband + ACF + feebates	73,000	17.8%	\$412.8

# GHG Reduction Strategies: 2050 Effects

Strategy	CO <sub>2</sub> Reduction (2050 metric tons)	% of 2050 Gap Closed	Estimated Cost Through 2050 (\$M)
Bicycle and pedestrian network expansion	70	0.1%	231.3
Transit service expansion	90	0.1%	60.0
Micromobility	870	0.9%	30.4
Travel demand management	10	0.0%	10.7
Transit vehicle electrification	17,000	17.0%	110.3
Land use	900	0.9%	0
Broadband expansion	850	0.8%	191.7
Advanced Clean Fleets	112,000	112%	461.8
Feebates	2,800	2.8%	0
Combined Effects			
Transportation investment and services	18,400	18%	\$443
Transportation + land use + broadband	20,600	21%	\$634
Transportation + land use + broadband + ACF + feebates	147,300	135%	\$1,091

# Public and Stakeholder Outreach – Round 2 Input

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# Public Engagement Round 2 (July/August)

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- Virtual public meetings
- Focus groups
  - Community-based organizations, including equity/environmental justice groups
  - Business community
  - Transportation and freight industry
  - Environmental groups
  - Regional planning and public transportation
- Online survey
- Online comments



# July Stakeholder Focus Groups

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Stakeholder Group	Comments
<b>Businesses</b>	<ul style="list-style-type: none"><li>➤ Look at biofuels &amp; sustainable aviation fuel</li><li>➤ Land use reform needed (Act 250, expanded use of credits, removal of density restrictions) but legislature needs to take on</li><li>➤ Concern re: sustainability of funding for investments (transit, EV &amp; e-bike incentives, etc.)</li><li>➤ Direct EV investment and partnerships to support tourism and economic development (e.g., mountain resorts)</li></ul>
<b>Freight and rail transportation</b>	<ul style="list-style-type: none"><li>➤ ZEV technology not available - not affordable – no demand</li><li>➤ Environmental, economic, and technical challenges with electrification</li><li>➤ Likely to be expensive to scale freight mode shift and/or new technology</li></ul>

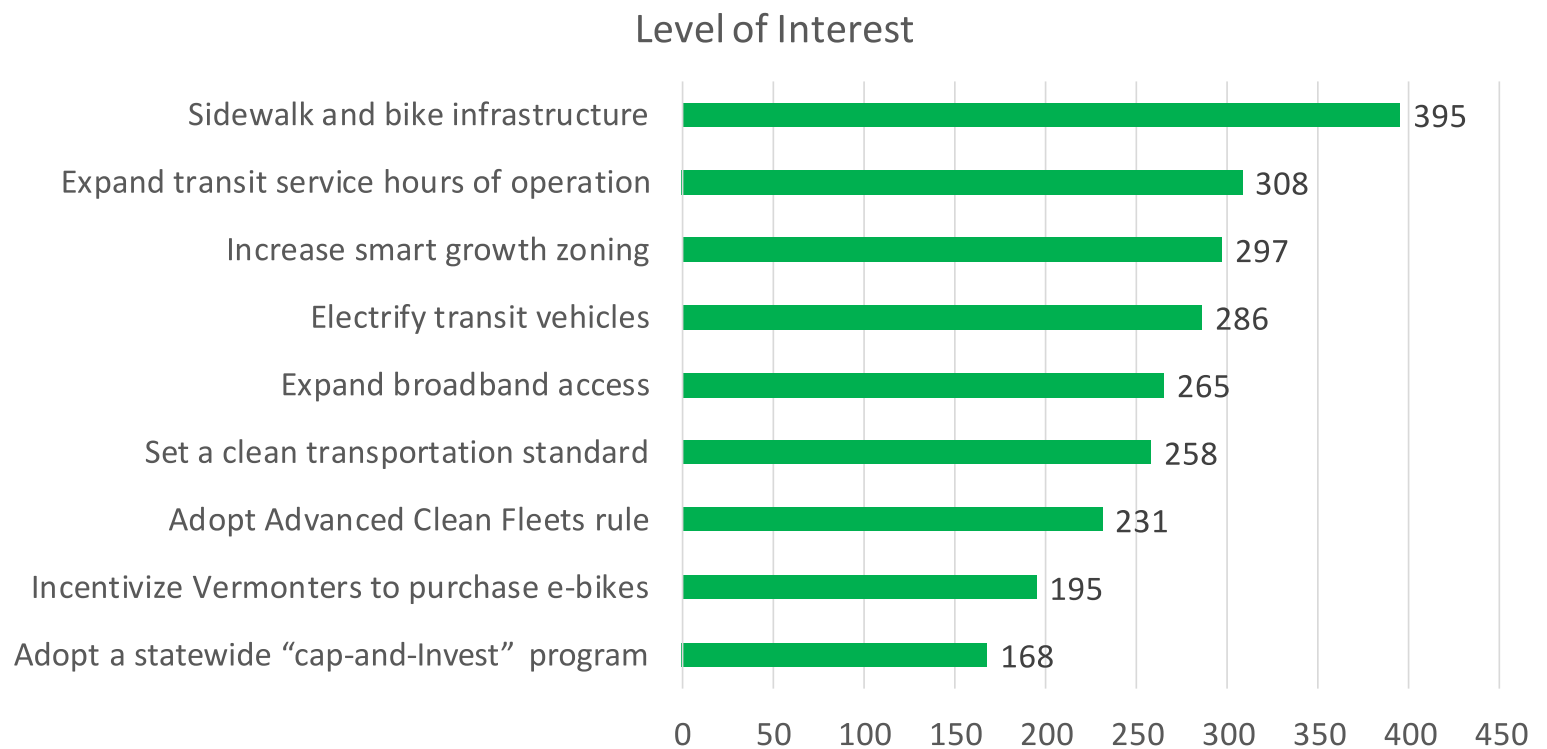
# July Stakeholder Focus Groups (cont'd)

Stakeholder Group	Comments
<b>Public transportation providers and regional planning agencies + Environmental interests</b>	<ul style="list-style-type: none"> <li>➤ Look expansively at transit – ridershare, carshare, micromobility</li> <li>➤ Focus on TDM, not highway expansion, in Chittenden County</li> <li>➤ Consider higher-impact, more controversial policies such as cap-and-trade, low carbon fuels, and/or feebates</li> <li>➤ Consider passenger &amp; freight rail mode shift, superuser incentives</li> <li>➤ Need more flexible road design options in town/village centers</li> <li>➤ Be sensitive to low-income needs in EV/fleet conversion incentives</li> <li>➤ Concern re: upstream emissions from EVs</li> <li>➤ Need statewide land use plan</li> <li>➤ Telework could increase travel</li> </ul>
<b>Community groups with an equity and/or environmental justice focus</b>	<ul style="list-style-type: none"> <li>➤ Cap-and-trade concerns: Limited effectiveness, equity issues</li> <li>➤ Need reliable/7-day public transit, bike/ped infrastructure, &amp; increased density</li> <li>➤ Equity/EJ communities are overcapacity, their needs are known from numerous planning/outreach efforts, need to be acted on</li> </ul>



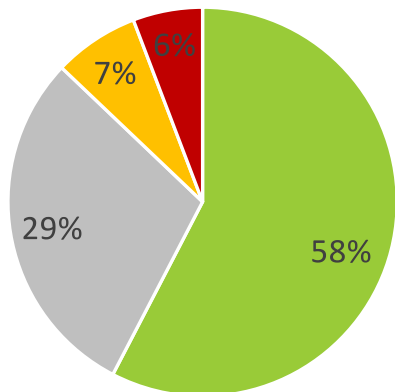
# Public Survey

~700 responses  
Average 353  
responses per  
question



# Public Survey & Comments

## Bike and Pedestrian Strategies (n=380)



- I love this and think we should do even more than proposed
- This seems right on target
- This seems too aggressive, this should be scaled back
- I don't think we should use this strategy at all

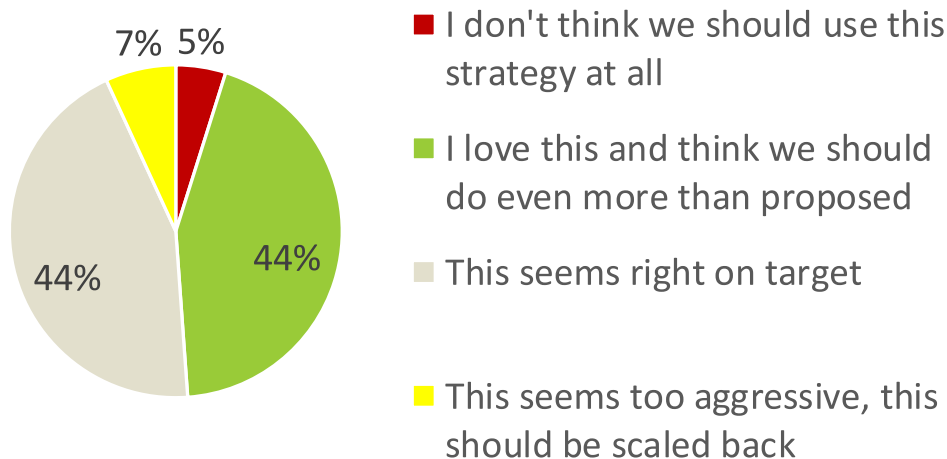
### Concerns & Considerations

- Cost of investment
- Only seasonally effective
- Primarily benefits Chittenden County
- Need infrastructure before e-bikes

# Public Survey & Comments

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## Transit Strategies (n=350)



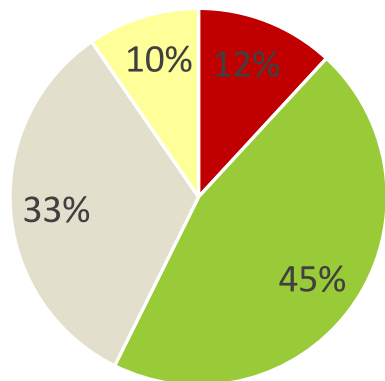
### Concerns & Considerations

- Primarily benefits Chittenden County, rural areas hard to serve (consider non-traditional service options)
- Interest in ski area service, fare free policy, 20-minute headways

# Public Survey & Comments

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## EV Strategies (n=354)



- I don't think we should use this strategy at all
- I love this and think we should do even more than proposed
- This seems right on target
- This seems too aggressive, this should be scaled back

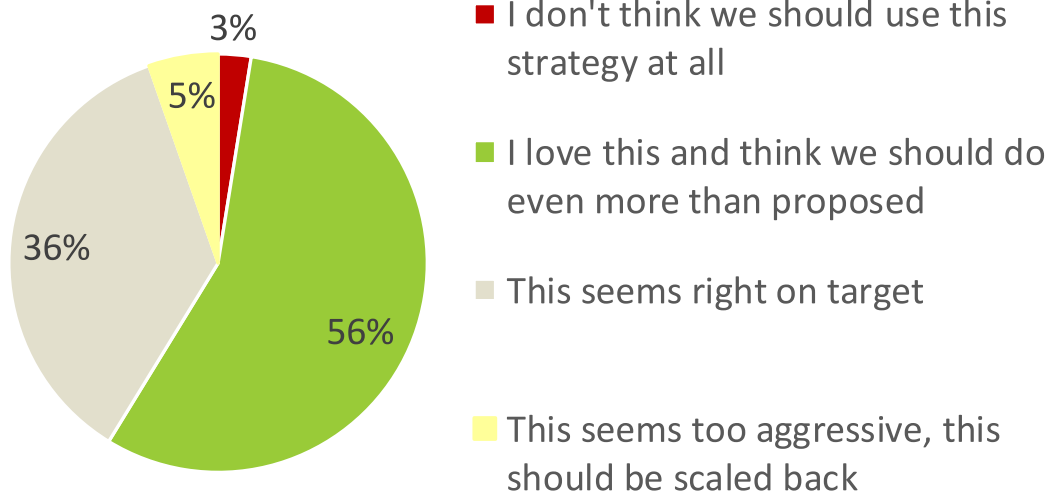
### Concerns & Considerations

- Also need to transition to clean power
- Also need to reduce vehicle travel
- Lifecycle EV impacts
- Challenges with rapid transition (economic, feasibility)

# Public Survey & Comments

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## Land Use and Teletravel (n=354)

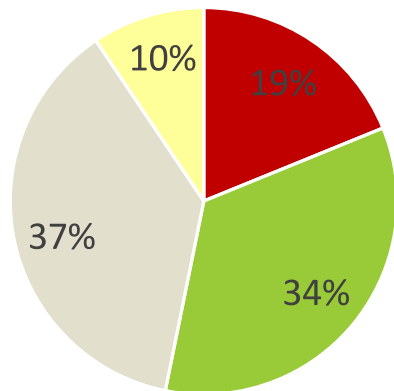


### Concerns & Considerations

- Act 250 (strengthen, weaken, reform?)
- Coordinate with affordable housing policies/supply to address housing shortage
- Cost vs. benefit?
- VTrans purview?

# Public Survey & Comments

## Cap and Invest (n=329)



- I don't think we should use this strategy at all
- I love this and think we should do even more than proposed
- This seems right on target
- This seems too aggressive, this should be scaled back

### Concerns & Considerations

- Lack of public understanding – how it would work & who would bear burden
- Need equitable cost structure
- Regional approach is essential
- Potential for loopholes
- Not fast enough impact?
- Need for further development

# Strategy Document

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# Carbon Reduction Strategy Outline

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## Main Body

- Executive Summary
- Purpose of the Strategy
- Strategy Development Process
- Evaluation of Strategies and Scenarios
  - Baseline forecast
  - Capital Program Impacts
  - Gap Analysis
  - Additional strategies & combined effects
  - Uncertainties & co-benefits
- Recommended Strategies

## Appendices

- Committee and Focus Group Participants
- Greenhouse Gas Inventory and Forecast
- Capital Program Analysis
- Strategy Analysis
- 2050 Modeling Results
- CRP Eligible Activities



# Recommendations

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# Recommended Strategy Categories

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1. Expand **transportation capital program investment and services**, as feasible consistent with available funding.
2. Expand programs and incentives to encourage **compact land use and teletravel**.
3. Support maximum conversion of Vermont's vehicle fleet to **zero-emission vehicles**.
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 required emissions levels while also providing a funding source for additional investments as described in other strategies.
5. Center **equity** in carbon reduction.
6. Measure and report **progress**.

# Transportation Capital Program



## Current Activities

- \$13M/yr bike/ped facilities
- \$40M/yr transit support
- \$150k/yr e-bike subsidies
- \$800k/yr TDM program

## Recommendations

- Expand and enhance pedestrian and bicycle infrastructure
- Support micromobility
- Expand transit service
- Expand TDM
- Electrify bus fleet
- Support efficient traffic operations
- Low-carbon material specs

## Considerations

- Need sustainable funding
- Need innovative service for rural/ small communities
- Seasonality
- Coordination with land use

# Land Use & Tele-Travel



## Current Activities

- Downtown and Village Center tax credits
- Sales tax reallocations
- Broadband expansion

## Additional Opportunities

- Expand tax credits & sales reallocations
- Smart Growth zoning incentives
- Expanded broadband
- Support for zoning/subdivision updates
- Adopt Multimodal Highway Guidance
- Act 250/state designation reform

## Considerations

- Caution re: regulation of private land
- Support affordable housing/ increase in housing supply
- Transportation priorities and design standards to support walkable communities
- Teletravel impacts uncertain

# Zero-Emission Vehicles



## Current Activities

- ACC2 and ACT rules
- Drive Electric Vermont/ EV incentives
- Federal infrastructure & incentives funding
- Utility incentives & EV rates

## Additional Opportunities

- Build out public charging network to serve growing EV population
- Additional ZEV and charging incentives/ support
- Explore super-user incentives

## Considerations

- Affordability – need income-targeted incentives
- Availability – truck technology not there yet, supply chain issues
- Life-cycle emissions and environmental impacts

# Additional Strategies for Further Evaluation and Development



## Strategies

- Advanced Clean Fleets
- Clean Transportation Standard
- Cap-and-Invest
- Feebates

## Considerations

- Potential impact on economic and business climate
  - Need regional approach
  - Mitigate negative household and industry impacts
- Detailed program design and/or further impact evaluation needed

# Advanced Clean Fleets

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- Rule adopted in CA in April 2023
- Strengthens ACT rule and expands to cover fleets
- Considerations:
  - How many fleets and vehicles will be subject to the regulation?
  - What concerns do fleet owners and operators have about the proposed rule?
  - Neighboring states status, potential unintended consequences?
  - Additional supporting policies or programs to maximize benefits?



# Clean Transportation Standard

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## Program Design Considerations

- Covered fuels
- Credit-generating mechanisms
- Rate of carbon intensity (CI) standard decline
- Life-cycle CI factors
- Market considerations to limit instability and facilitate compliance

## Potential Impacts

- Program can be designed with a CI cap consistent with state GHG targets
- Administrative costs funded through credit market transactions
- California LCFS has not been a major driver of fuel prices
- Some renewables provide cost savings
- Opening renewables market can help hedge against oil price and supply swings



# Cap-and-Invest

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## Program Design Considerations

- Covered emissions sources
- Rate of cap decline
- Reserved allowances for certain industries
- Market considerations to limit instability and facilitate compliance
- Use of offsets
- Distribution and use of revenues
- Linkage with existing programs/markets

## Potential Impacts

- Program can be designed with a carbon cap consistent with state targets
- Administrative costs funded through credit market transactions
- California program may be increasing fuel prices by \$0.25 - \$0.30 / gallon
- CA revenues are being reinvested to benefit consumers

# Feebates

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## Program Design Considerations

- Fee/rebate schedule
  - Breadth of scale
  - Treatment of ZEVs
  - Cars vs. light-duty trucks
  - New vs. used vehicles
  - Simple vs. complex
  - Periodic adjustments
- Process and responsibility for collecting fees and disbursing rebates
- Communication & education

## Potential Impacts

- Costs for program design and ongoing administration
- Some winners, some losers (overall zero-sum)
- Equity concerns related to people who need larger vehicles for personal or business reasons

# Additional Recommendations

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## Center Equity in Carbon Reduction

- Coordinate with implementation of the Transportation Equity Framework Report
- Provide transportation services that help meet basic mobility needs
- Provide incentives that recognize the full set of costs consumers
- Consider recycling revenue into low-income relief

## Measure and Report Progress

- Annual updates reporting on key drivers of emissions
- Post-implementation surveys of projects and programs

# Implementation

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

# CRP Allocation by Urbanized Area Size

- 65% of Carbon Reduction Program funding must be distributed to urbanized areas in proportion to population

Urbanized Area Size	Urbanized Areas	Population (2020)	Percentage of funding
Size 50,000 – 200,000 population	Burlington	118,032	11%
5,000 – 49,999 population	Barre—Montpelier, Bennington, Brattleboro, Lebanon, Middlebury, Milton, Rutland, St. Albans, Springfield	99,881	11%
Less than 5,000 population		405,434	43%
Use anywhere in state			35%
Total		643,077	100%

# Proposed Use of State-Directed Carbon Reduction Program Funds

Project Type	Target % of state-directed funding
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%
Transit and micromobility services and incentives (e.g., microtransit, shuttles, e-bike incentives)	33%
Fleet conversion, including conversion of transit buses and/or AOT heavy equipment to electric and/or other zero emission technology, and supporting infrastructure	33%

## Considerations:

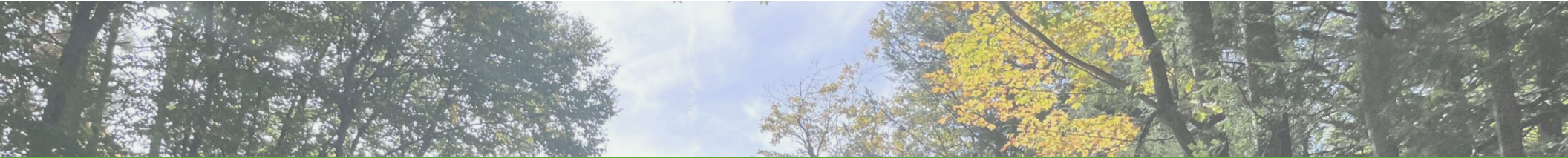
- Cost-effectiveness
- Co-benefits
- Stakeholder/public support
- Alignment with CAP and LRTP
- Immediate need/opportunity

Total anticipated state-directed funding: ~\$30M

# Additional Short-Term AOT Actions

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- Consider CRS in next LRTP update
- Revise project scoring criteria (VPSP2) to more explicitly consider GHGs



# Discussion





# Thank You!

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