### **THANK YOU REV2024 SPONSORS!**



### Vermont Transportation Electrification and Carbon Reduction Program

ARI LATTANZI, CLIMATE PROGRAMS ADMINISTRATOR

ENVIRONMENTAL POLICY AND SUSTAINABILITY

RENEWABLE ENERGY VERMONT CONFERENCE, OCTOBER 17, 2024



#### Vermont's historical GHG emissions and future requirements



**Source:** Vermont Agency of Natural Resources, "Vermont Greenhouse Gas Emissions Inventory and Forecast: 1990-2021," 2024. **Note:** A small amount of emissions from the "fossil fuel industry" category (i.e., fugitive emissions from fossil gas pipelines in VT), accounting for 0.4% of Vermont's overall emissions in 2021, does not show up on this graph.



# Transportation Emissions Baseline Forecast (MT CO2e)

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 (passenger and freight)	63,453	64,221	65,120	65,171
Aviation	99,502	100,702	102,104	102,188
Marine (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
Total	2,899,177	2,797,933	2,400,818	762,477



### VTrans Capital Program Evaluation

#### Count of Capital Program Database Projects

Project Type	Count
Aviation	9
Bike & Pedestrian Facilities	29
Interstate Bridges	15
Maintenance	3
Municipal Mitigation	16
Other	1
Park & Ride Lots	3
Paving	76
Rail	55
Rest Areas	6
Roadway Projects	71
State Highway Bridges	56
Town Highway Bridges	24
Traffic & Safety	28
Transportation Alternatives <sup>a</sup>	37
Total	429

GHG Emissions Impact of AOT Capital Program (MT CO2e)

Project Type	2025	2030	2050
Bicycle and Pedestrian	-560	-425	-68
Roadway Expansion	0	0	0
Traffic Operations	-1,925	-1552	-564
Transit	-19	-23	-4
Travel Demand Management	0	0	0
Park and Ride	-141	-107	-17
Total	-2,654	-2,115	-654



#### Gap Analysis

Vermont Transportation Emissions (MT CO2e)





#### GHG Reduction Strategies: 2030 Effects

Strategy	CO <sub>2</sub> Reduction (2030 MT)	% 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 <i>,</i> 660	1.4%	NA <sup>a</sup>
Broadband expansion	5 <i>,</i> 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



Carbon Reduction Program Implementation

~\$13 million out of ~\$32 million from FFY22-26 \$4.0m for Bicycle and Pedestrian Infrastructure

\$3.0m for Mobility & Transportation Innovation

\$2.9m for Public Transit Electric Sprinter Vans & EVSE

\$2.5m for Public Fleet Electrification & EVSE Repair\*

\$1.1m for VTrans Fleet Electrification & EVSE

\* Specifics still to be determined

Transportation GHG Reduction Requirement

Global Warming Solutions Act

90% reduction
 below 2005 by 2050
 126,000 EVs by
 2030

## Vermont needs EVs

How many vehicles does Vermont need to electrify?



2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030





AGENCY OF TRANSPORTATION

#### Funding

- Over \$25 million in state funding allocated for 5 Clean Transportation Incentive Programs since 2020
- New PEV, Replace Your Ride, and MileageSmart fully subscribed as of early October



#### WHAT WE KNOW

#### WHAT WE DON'T KNOW

Vehicle Type	Now	Usod	Total
Incentivized	INCVV	Useu	IUtai
1 - AEV	3,147	526	3,673
2 - PHEV	1,142	299	1,441
3 - HEV		551	551
4 - eBike	489		489
5 - Mobility Card			20
TOTAL	4,778	1,377	6,175

65% of incentives and 78% of funding to lower income Vermonters

- Which vehicles are replaced / avoided
- How incentives change travel behavior
- How long vehicles stay in VT
- > Household electricity supply
- EV / PHEV charging behavior
- > Barriers to access and adoption



#### CARBON REDUCTION

Research and Analyses



Smart Growth VMT and GHG Study

Evaluate how changes in built form and socioeconomics characteristics change VMT.

\$

VT Clean Transportation Incentive Programs GHG Reductions Assess cost efficacy and equity of incentive programs and generate recommendations for improvement



Transportation Carbon Policy Analysis Emission reductions and economic modeling to understand pros and cons of VT joining WCI or NYCI Estimated Funding Allocation

Federal Fiscal Year	Allocation
FFY 2022 NEVI	\$3.1 million
ARPA	\$2 million
FFY 2023 NEVI	\$4.5 million
FFY 2024 NEVI	\$4.5 million
FFY 2025 NEVI	\$4.5 million
Funds committed	\$700,000
Allocation included in initial RFP	\$17.9 million
FFY 2026 NEVI	\$4.5 million
Total Allocation	\$23.2 million

Priority #1: Build Out Alternative Fuel Corridors

**15 Priority Locations:** 

- 5 Standard Fast Charging Locations
- 9 High Availability Fast Charging Hub Locations

1 Active Location Opened April 23, 2024

Initial RFP for 14 Remaining Locations Closed Sept 23, 2024



Priority #2: Corridor and Community Charging

CFI Round 2: DCFC at 5 Corridor Locations:

Ports, Power, Parking
 Configurations for MHD/Fleet
 that exceed NEVI mins. (up to 8x
 350 kW ports)

Level 2 at Community Locations:

- State Parks and National Recreation Areas
- Multiunit Dwellings
- Workplaces
- Public Attractions



↑ MHD/Freight Charging along AFCs

↓ Level 2 Community Charging at State and Federal Recreational Areas



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#### Additional Slides for Reference

HOUSE/SENATE TRANSPORTATION COMMITTEE PRESENTATION - JANUARY 2023

Program Name	Eligible Vehicle	Eligible Recipient	Amount
MileageSmart	Used High Efficiency Vehicle 40+ mpge EPA rating as new AEV, PHEV, conventional hybrid Max \$40,000 purchase price	SNAP recipient Up to 80% State Median Income	\$5,000 for used AEV or PHEV, \$2,500 for used hybrid \$2,500 for used AEV or PHEV
New Plug-in Electric Vehicle	New AEV or New PHEV with 30+ miles of electric range (buy or lease) Base MSRP cap \$52,500	Lower income tier Moderate income tier	\$5,000 AEV, \$3,000 PHEV \$2,500 AEV, \$1,500 PHEV
Replace Your Ride	10+ year old ICE vehicle (to be replaced with new or used eligible AEV, PHEV or clean transportation options)	Lower income tier Moderate income tier	\$5,000 (can stack with above) \$2,500 (can stack with above)
eBike	Standard, cargo and adaptive electric bikes, MSRP cap \$4,000	Lower income tier	\$400 for standard ebike \$800 for cargo ebike \$800 for adaptive ebike
Electrify Your Fleet	AEV, PHEV, eBike, eMotorcycle, eSnowmobile, electric ATV/UTV Base MSRP caps	Municipality, business, nonprofit	\$2,500 standard \$5,000 for mobility nonprofit

Income Guidelines	Lower Income	Moderate Income	Programs
Supplemental Nutrition Assistance Program	SNAP Recipient		<ul> <li>MileageSmart</li> </ul>
Household Income	Up to 80% of State Median Income		
	Adjusted Gross Income		
Tax Filing Status	Lower Income Tier	Moderate Income Tier	
Individual filing as single	\$60,000 or less	\$60,001 up to \$100,000	New PEV
Individual filing as head of household	\$75,000 or less	\$75,001 up to \$125,000	<ul> <li>Replace Your Ride</li> <li>eBike (lower income tier only due to rebate essentiality data)</li> </ul>
Individual filing as qualifying widower/ surviving spouse	\$90,000 or less	\$90,001 up to \$150,000	
Married filing jointly	\$90,000 or less	\$90,001 up to \$150,000	
Married filing separately	\$60,000 or less	\$60,001 up to \$100,000	



### Research Project Objective

Determine how to improve the cost effectiveness and equity of Vermont's clean vehicle incentive programs



### Project scope: Evaluation

Evaluate performance of clean vehicle incentive programs

Use household level data





### Project scope: Evaluation

Evaluate performance of clean vehicle incentive programs

- Use household level data
- Account for vehicle type, use, and GHGs of electricity used





### Project scope: Evaluation

Evaluate performance of clean vehicle incentive programs

- Use household level data
- Account for vehicles type, use, and GHGs of electricity used
- Evaluate outcomes across incentives
  - cost effectiveness (\$/GHG reduced)
  - who / where incentives are received
  - high impact households





### Project scope: Recommendations

Create recommendations to improve clean vehicle programs:

Modify, add, or remove programs



Target incentive design and outreach to high impact vehicles



Identify and address barriers to vehicle electrification



### Implementation

How will recommendations be used?

- Use findings to better promote incentive programs + modify program guidelines
- Project impacts of Mileage Based User Fee on Vermont households
   + inform rate setting (2026 implementation)







#### Rural Drivers' Gasoline Use and Benefits of Switching to EVs

Carlos and

Rob Sargent - Coltura REVermont REV Conference October 17, 2024

#### About COLTURA

MISSION: To improve climate, health, and equity by accelerating the shift beyond gasoline to cleaner alternatives.







Actual and forecast US gasoline consumption from 2013 through 2030. Source: EIA 2023.



GASOLINE SUPERUSERS 3.0

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## Super User

# Light User

COLTURA

AID

GASOLINE SUPERUSERS 3.0

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#### Impact of Switching to an EV

Severo's Gasoline

Vera's Gasoline





#### Impact of Switching to an EV - Annual \$ Savings

Severo's Annual Savings



Vera's Annual Savings





GASOLINE SUPERUSERS



Source: EPA 2021 Inventory of U.S. Greenhouse Gas Emissions and Sinks.





Superusers Consume 10.4% of the World's Gasoline

Gasoline consumption by country/region, with US Superusers denoted in red. Source: EIA 2021-2022, Coltura analysis.

**Top 10% of US drivers** use nearly as much gasoline as China







US private light-duty drivers sorted by decile based on their gasoline consumption. The Top 10% of gasoline consumers burn 35% of the gasoline — more than the bottom 72% combined. Source: Coltura Census-Level Gasoline Model.

Superusers: top 10% of drivers use 35% of gasoline





Distribution of drivers between Superusers and non-Superusers between rural and non-rural census tract. Source: Coltura Census-Level Gasoline Model.




Distribution of drivers (left) and gasoline consumption (right) of rural and non-rural Americans. Source: Coltura Census-Level Gasoline Model. **COLTURA** 



Distribution of drivers (left) and gasoline consumption (right) of rural Superusers, rural non-Superusers, and non-rural drivers. Source: Coltura Census-Level Gasoline Model.



Rural Superusers tend to have lower incomes





Distribution of household income of rural and non-rural Superusers. Source: Coltura Census-Level Gasoline Model.



## Rural Superusers' gasoline burden

## High gasoline burden for low-income rural Superusers



Average share of household income spent on gasoline for rural Superusers and rural non-Superusers by income bracket. Source: Coltura Census-Level Gasoline Model.





## Top 10 states in terms of rural Superuser share





### Top 10 states by number of rural Superusers

Top 10 states for <u>numbe</u>r of Rural Superusers



- While Superusers are just 14.3% of Vermont drivers, collectively they use 41% of the state's gasoline (99 million gallons/year).
- Vermont Superusers each burn an average of 1,874 gallons of gasoline a year – 4.2x more than other drivers.

## "Gasoline Superusers" are the top 10% of light-duty vehicle drivers in the U.S. in terms of gasoline consumption. In Vermont there are 53,000 Gasoline Superusers.





Vermont Superuser households spend on average \$8,651 annually on gasoline, representing 12.8% of their income, versus other households at 5.1%.



Superusers <-> Non-Superusers



39% of Vermont Superuser households earn below the state median income of \$72,190 and spend on average 21.3% of their income on gasoline.



Vermont Superusers by County



#### Vermont gasoline consumption (2011 - 2021)



#### **Prioritizing Superusers' Switch to EVs**

#### **Climate Benefits:**

- A Vermont Superuser switching to an EV has 4.2x the climate impact of other drivers switching, on average.
- Switching all Vermont Superusers to EVs would cut Vermont's transportation carbon emissions by 20.6%, and its total carbon emissions by 10.6%.

#### **Equity Benefits**

- Switching to an EV would save low/mid income Vermont Superuser families on average \$347 a month on fuel (gasoline savings minus electricity expenditures) and hundreds more on maintenance.
- These monthly savings are often sufficient to cover the monthly payments on the EV.

#### **Policies for helping Superusers switch to EVs**

- Target EV education and outreach to Superusers, focusing on the huge savings they could realize by switching to an EV.
- Modify Vermont's EV incentives to prioritize low/mid income Superusers.
- Expand the Burlington Electric Department pilot (targeting EV incentives to drivers using more than 1,000 gallons of gasoline/year to switch to EVs) to all utilities.

For demos of more gasoline data and insights available for your state, visit Coltura's Gasoline Data Insights and Gasoline Consumption Map.



## **Gasoline Data Center**





Sec. Ball

# Thank you!

Rob Sargent, Coltura Rob@coltura.org

# Appendix



TOP RURAL SUPERUSER MODELS				
Make/Model	Percent of all Rural Superusers Driving Vehicles	Percent of Rural Drivers with Vehicle Who Are Superusers		
Ford F150	8.7%	19.0%		
Chevrolet Silverado	8.1%	18.6%		
Ram 1500	4.4%	18.6%		
GMC Sierra	2.4%	14.3%		
Jeep Cherokee	2.1%	14.1%		
Chevrolet Impala	1.7%	16.2%		
Chevrolet Tahoe	1.6%	23.6%		
Toyota Tacoma	1.6%	17.6%		
Ford Fusion	1.5%	10.5%		
Toyota Tundra	1.5%	23.3%		
Chevrolet Malibu	1.5%	10.2%		
Toyota Camry	1.4%	8.8%		
Ford Explorer	1.4%	14.5%		
Jeep Wrangler	1.4%	16.3%		
Chevrolet Equinox	1.3%	11.3%		
Honda Accord	1.2%	9.4%		
Dodge Charger	1.2%	20.4%		
Chevrolet Traverse	1.1%	17.8%		
Ford Escape	1.1%	7.7%		
GMC Yukon	1.1%	25.2%		











# Rural counties by <u>number</u> of Superusers





*CO2 emissions from various transportation sources, with the red column indicating the emissions displaced if all rural Superusers switch to EVs. Source: EIA, Coltura analysis.* 



	<image/>	<image/>
Monthly Fuel	\$457	\$163
Monthly Maint. and Repair	\$667	\$200
Payment on Loan		\$442
Total Monthly Cost	\$1,124	\$785

Assumptions: 40,000 miles/year, Gas \$3.70/gallon, Electricity 17/KwH, Interest Rate 6.63%, Bolt EUV Cost \$33,000, Trax Mileage 200,000, Trax Trade-In \$4.000. Federal credit of \$7.500. Trax Maintenance = 20 cents/mi. Bolt Maintenance = 6 cents/mi.

# Monthly cost savings of switching to EV



#### Superuser Monthly Cost Comparison



Assumptions: 40,000 miles/year, Gas \$3.70/gallon, Electricity 17/KwH, Interest Rate 6.6396, F-150 Lightning Cost \$54,000, F-150 Mileage 200,000, F-150 Trade-In \$7,000, Federal credit of \$7,500, F-150 Maintenance 20 cents/mi. F-150 Lightning Maintenance = 6 cents/mi.

# Monthly cost savings of switching to EV

🚫 COLTURA

# Top rural counties for EV share

#### Top 10 rural counties by EV share (minimum 500 EVs)

<u>No.</u>	<u>County</u>	<u>EV share</u>
1	Blanco, TX	12.7%
2	Clear Creek, CO	10.6%
3	San Juan, WA	6.2%
4	Crook, OR	5.9%
5	Eagle, CO	4.8%
6	Pitkin, CO	4.3%
7	Addison, VT	3.8%
8	Grimes, TX	3.5%
9	Elbert, CO	3.3%
10	Schuyler, NY	3.3%

#### Top 10 rural counties by number of EVs

<u>No.</u>	<u>County</u>	Number of EVs
1	Humboldt, CA	2,126
2	Nevada, CA	1,943
З	Eagle, CO	1,865
4	Litchfield, CT	1,622
5	Bastrop, TX	1,480
6	San Benito, CA	1,476
7	Cayuga, NY	1,404
8	Flathead, MT	1,361
9	Mendocino, CA	1,345
10	Crook, OR	1,334



How to help Rural Superusers switch to EVs

# Recommendations

- Set gasoline reduction goals
- Focus government and utility EV/EV charging incentives on rural Superusers
- Focus government and utility EV outreach/education on rural Superusers
- Engage rural communities and stakeholders in EV policymaking
- Invest in rural charging infrastructure
- Study rural areas with high EV share





How to help Rural Superusers switch to EVs



# **Vermont EV Policy**

INCREASING ACCESS TO ELECTRIC VEHICLES AND CHARGING

Photo Credit: John Howard

© Plug In America

#### Plug In America



**Education** 



Advocacy



Research

#### **Overarching Strategies**



# Agenda

- **01** Rural Transportation Electrification
- **02** Vermont EV Landscape
- **03** Vermont EV Policies
- **04** State EV Policy Opportunities
- **05** EV Policy Opportunities in Vermont

## Rural areas are home to

- 20% of U.S. population
- 70% of lane miles traveled
- 70% of roads

## **Rural Drivers**

- Have longer commutes
- Drive more
- Spend more on transportation
- Are more likely to buy a used car

Rural households have

- More pickup trucks and SUVs
- More AWD and 4WD vehicles
- Requirements for payload and towing





#### VMT per Household (avg annual)

Urban Suburban Rural

## CHALLENGES

- Electricity can be more expensive.
- Possible lack of 3-phase power for fastcharging.
- Less exposure to EVs.
- Longer distances between EV chargers.
- Low utilization of chargers.
- Cold weather and off-road

performance.

• Access to repairs



## **OPPORTUNITIES**

- Most rural residents live in single-family homes.
- Charging can spur economic development.
- Opportunities for more savings on fuel and maintenance.
- No need to go to the gas station.
- Cold weather performance.
- EV/c offer expertupities for regilience



## Vermont EV Landscape

- Vermont is ranked 11<sup>th</sup> in the U.S. for EV market share at 11.35%.
- In quarter 2, market share increased by
  3.4 percentage points, the fourth largest
  increase in the nation.
- Vermont is one of the 8 states that has installed NEVI funded chargers.
- Vermont is ranked 5<sup>th</sup> in the U.S. for highest portion of EVs registered (2.57%).
- Vermont is 1<sup>st</sup> in the nation for number of



#### Vermont EV Landscape

- Encourage and enable EV purchases.
- Electrify Fleets.
- Increase charging infrastructure.
- Support utility EV investments.
- Guide states toward fair EV road user fees.
- Prioritize equity.
- Amplify consumer education.

## Achi**EV**e:

Model Policies to Accelerate Electric Vehicle Adoption

Presented by the Sierra Club, Plug In America, FORTH, and the Electrification Coalition



Adopting ZEV Standards	$\checkmark$
Direct Sales Legislation	$\checkmark$
Vehicle Rebates or Tax Credits	$\checkmark$
Used EV Incentives	$\checkmark$
Public and Private Fleet Incentives	$\checkmark$



#### **EV Policies – Infrastructure**

Corridor Programs	$\checkmark$
Charging Infrastructure Funding and Financing	$\checkmark$
EV-Ready Building Codes and Ordinances	$\checkmark$
EV Charging Incentives for Multifamily Housing	$\checkmark$



#### **Vermont EV Policies**

- Charge Vermont
  - Workplace Charging
  - Public Attractions
  - Multifamily Housing Charging
- Electrify your Fleet Program
- EV Incentives
  - New Vehicles
  - Replace Your Ride Incentives
  - MileageSmart High-Efficiency
    Used Vehicle Program
- Robust Utility Programs
  - EV TOU Rates



#### **State EV Policy Opportunities**

- Right-to-Charge Laws
- Utility Regulatory Reform
- Battery Management Laws
- Rural Education and Outreach
  - Ride and Drive Events
  - Rural Carsharing
  - EV Trial and Demonstration Opportunities


#### **Right-to-Charge Laws**

- Importance of home charging.
- Renter provisions are key for equity in both urban and rural areas.
- Possible expansion of low-level charging incentives for multifamily housing with fewer than four units.

#### Examples:

<u>Washington State:</u> Tenants can install their own EV charging stations.

<u>Illinois:</u> Electric Vehicle Charging Act vests tenants of rental properties with similar rights and obligations of owners.



### **Utility Regulation Reform**

Consistency across Vermont

#### Goals:

- Consistent EV rates and incentives
- Grid and driver-friendly EV time-of-use rates and managed charging options
- Consistent treatment of infrastructure buildout
- Support dig once approach for future growth
- Demand Charge Mitigation



#### Developing a Circular Economy for EV Batteries



#### Example:

New Jersey's Electric and Hybrid Vehicle Battery Management Act

### **Rural Outreach and Education**

• Ride and Drive Events

#### Examples:

- National Drive Electric Week
- Drive Electric Earth Month
- Coordinate with County Fairs
- Include
  - Electric tractors
  - Pickup trucks
  - UTVs/ATVs/snow machines
  - Lawn equipment



#### **Rural Outreach and Education**

Rural Carsharing Opportunities

#### Examples:

MioCar:

 San Joaquin Valley, California. Incomequalified users can use car for as little as \$4 per hour.

### SiLVERS:

 St. Louis Vehicle Electrification Rides for Seniors Project
Non-emergency electric rides for seniors.

#### E-Farms:

 Program lends electric tractors, pickup trucks, UTVs, lawn mowers to farmers.



#### **Rural Outreach and Education**

- EV Trial and Demonstration Opportunities
  Examples:
- GMP & Motor:
- Monthly payment includes vehicle cost, insurance, maintenance, and charger incentive.

**Rural Reimagined:** 

- Building an EV Ecosystem in Appalachia
- DOE –funded program that allows participants to borrow an EV for FREE for 2-6 week test drives.
- Includes F-150 Lightning, Chevy Bolt EUV, Ford Mustang Mach-e, Volkswagen ID.4



#### Key Takeaways

#### Vermont is an EV policy leader

- ACC II/ACT Adoption
- Direct Sales
- Energy Codes
- Charge Vermont
- Electrify your Fleet Program
- EV Incentives
- Robust Utility Programs

#### Vermont Policy Ideas to Build Rural EV Adoption

- Right-to-Charge Laws
- Utility Regulatory Reform
- Battery Management Laws
- Rural Education and Outreach
  - Ride and Drive Events





## **Questions?**

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