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# Vehicle Electrification in Vermont

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SENATE COMMITTEE ON TRANSPORTATION, JANUARY 11, 2024

PATRICK Ó. MURPHY, SUSTAINABILITY + INNOVATIONS PROJECT MANAGER, AGENCY OF TRANSPORTATION

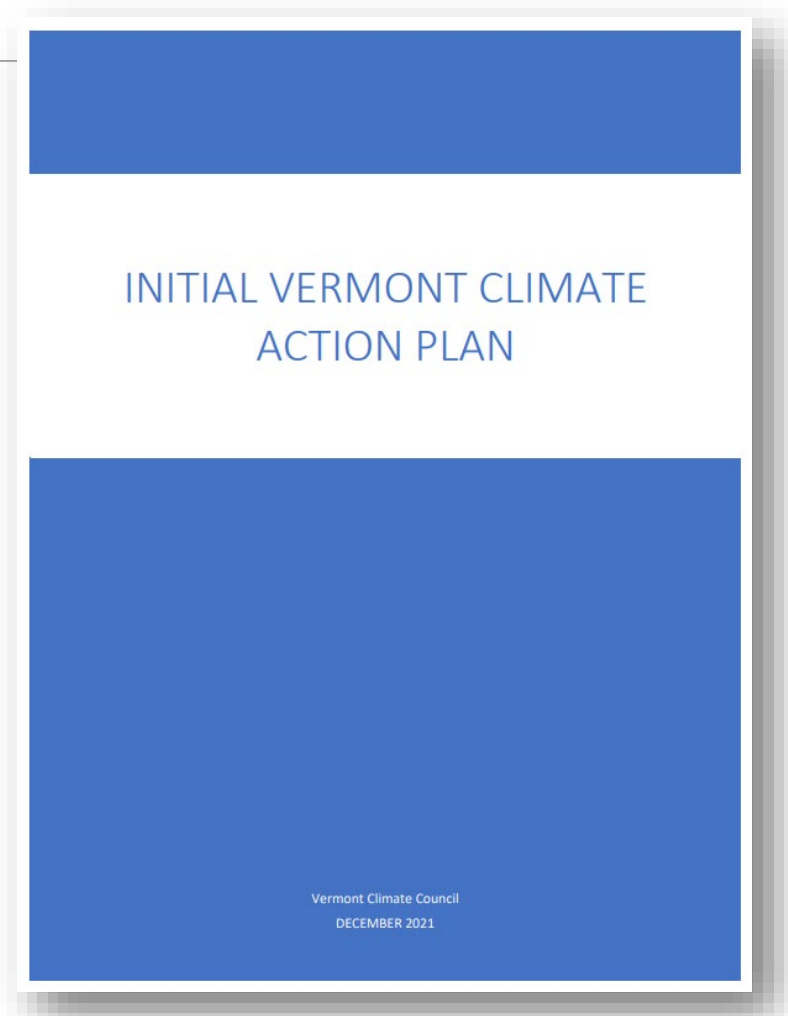
# Climate Action Plan

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Initial plan finalized in December 2021

## EV Adoption Goals:

- **27,000** PEVs by **2025** (17% of sales)
- **126,000** PEVs by **2030** (68% of sales)
  
- 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.



# CAP – Pathway 1 – Light Duty Electrification

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## 1) Technology Forcing ZEV Regulation (100% by 2035)

### 2) EV Purchase Incentives

- a) New & used EVs and electric bicycles, designed for equity
- b) Expand to fleets
- c) Continue MileageSmart and Replace Your Ride
- d) Vehicle Efficiency Purchase and Use Tax Adjustment

### 3) EV Charging Investment

- a) Continue support for DCFC and Level 2
- b) Public, workplace and multifamily priorities
- c) Direct the PUC to consider EV charging rates

## 4) Transportation Climate Initiative (TCI)

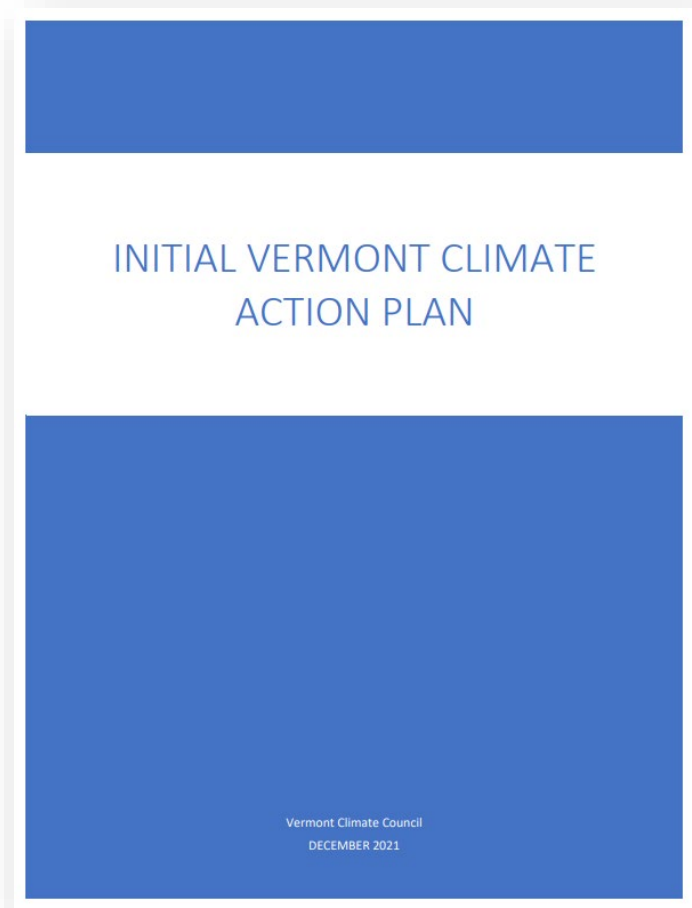
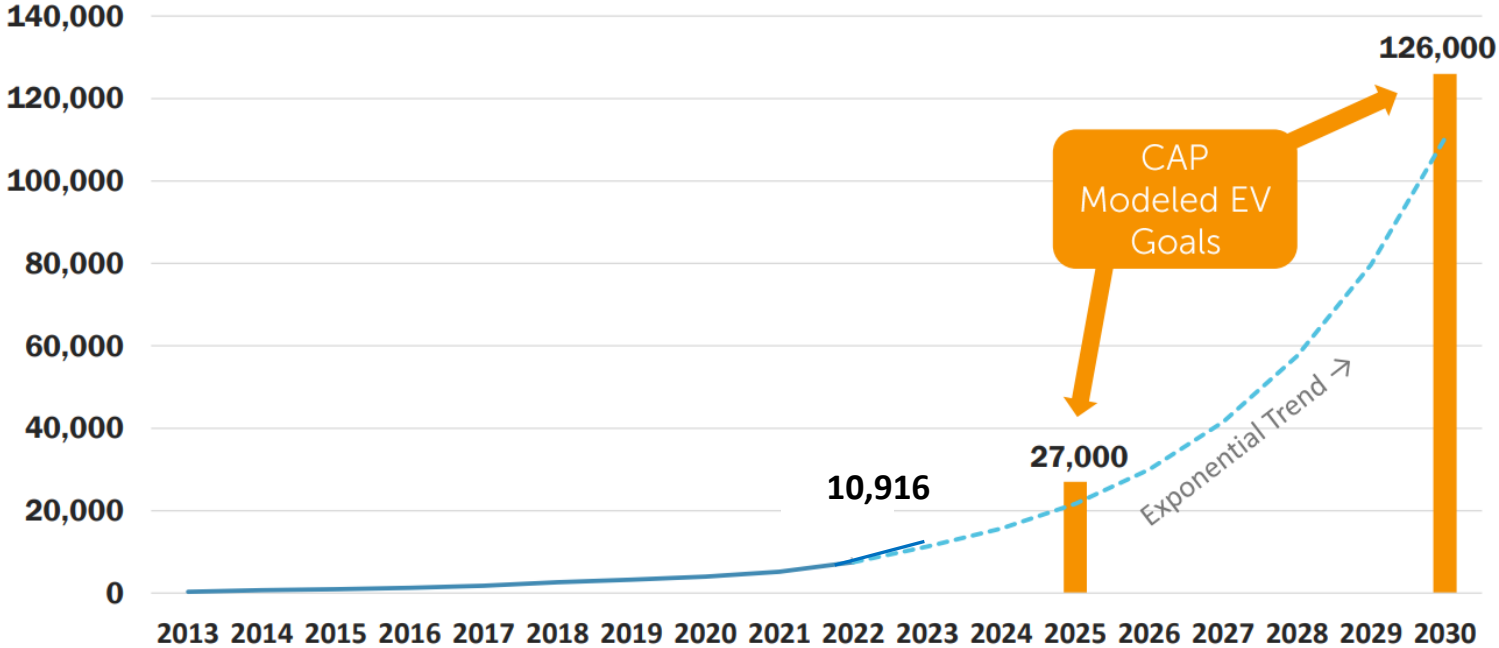
## 5) EV and VMT reduction Outreach and Education

Electrify 27,000  
vehicles by 2025

126,000 by 2030

# EV Adoption in Vermont

How many vehicles does Vermont need to electrify?



# Ranking the States: Climate and Equity Action

**TABLE 2: STATE SCORES AND RANKINGS**

		State Planning (17 points possible)			Vehicle Electrification (31 points possible)						Reducing VMT Through Expanded Transportation Choices (34 points possible)					System Maintenance (7 points possible)	Procurement (11 points possible)					
RANK	STATE	Transportation GHG reduction targets	Equity criteria in transportation project scoring	Compensation for community participation in transportation planning process	Charging Ports		Rebates for low-income buyers	Rebates for used EVs	Advanced Clean Cars Rules	Advanced Clean Trucks Rule	State funding for transit	Federal funds used for transit and bicycle/pedestrian projects	Vehicle-miles traveled reduction goal	Smart growth policy	Incentive to locate affordable housing near transit	Bicycle/pedestrian safety	Funding for road repair and maintenance	Buy Clean: Environmental product declarations	Buy Clean: carbon intensity ceiling for construction materials	Achievement of Disadvantaged Business Enterprise (DBE) goal	Minimum women-owned business targets for state-funded projects	Total Score
1	California	6	6	5	5.0	3.6	5	4	6	6	1.0	10.0	5	4	4	1.8	6.5	3	3	0	2	86.9
2	Massachusetts	6	6	5	1.9	3.2	0	0	6	6	3.4	3.7	5	4	4	2.8	6.9	0	0	3	2	68.9
3	Vermont	6	0	0	4.2	5.0	5	4	6	6	0.3	8.2	5	4	4	3.4	6.9	0	0	0	0	68.0
4	Oregon	6	3	0	2.7	1.9	2.5	2	6	6	0.2	5.1	5	4	4	3.2	5.9	3	0	3	0	61.1
5	Washington	6	3	5	2.7	2.0	0	4	6	6	0.7	4.4	5	4	4	2.6	5.1	0	0	0	2	62.5
6	New York	6	0	0	1.3	1.8	0	0	6	6	5.0	5.9	5	4	4	1.5	6.8	3	3	0	2	61.1
7	Colorado	6	3	5	3.3	2.7	0	0	3	0	0.0	1.2	5	4	4	2.1	6.6	3	3	3	2	56.9
8	New Jersey	6	0	0	1.7	0.9	0	0	3	6	2.4	2.1	5	4	4	3.0	6.1	3	3	3	0	53.2
9	Connecticut	6	0	5	2.3	1.4	5	4	3	0	1.3	1.2	5	4	4	2.2	6.7	0	0	0	2	53.1
10	Minnesota	6	6	5	1.0	0.9	0	0	3	0	1.4	4.6	5	4	4	3.8	5.9	0	0	0	2	52.6
11	Rhode Island	6	0	5	1.7	2.5	2.5	2	3	0	0.2	4.6	5	4	4	2.7	7.0	0	0	0	2	52.2
12	Maine	6	3	0	3.1	2.0	5	4	3	0	0.1	0.7	5	4	4	3.3	7.0	0	0	0	0	50.2
13	Maryland	6	6	0	2.9	2.2	0	0	3	0	2.9	4.2	5	4	4	1.9	5.4	0	0	0	2	49.5
14	Hawaii*	6	6	0	1.5	2.4	0	0	x	x	4.2	3.4	0	4	4	2.1	4.7	0	0	0	0	43.6*
15	New Mexico	6	3	5	1.7	0.7	0	0	3	0	0.0	4.1	5	0	4	2.1	5.8	0	0	3	0	43.4

National Resources Defense Council (NRDC) ranked Vermont 3<sup>rd</sup> overall  
 VT scored highest in nation for Vehicle Electrification

(NRDC: Getting Transportation Right - Ranking the States in Light of New Federal Funding (PDF))

# Clean Transportation Incentive Programs

- Incentive Program for New Plug-in Electric Vehicles (PEVs)
- MileageSmart (Used EVs/PHEVs/hybrids)
- Replace Your Ride (New or used PEVs, e-bikes, bikes, and shared mobility services)
- eBike Incentive Program
- Electrify Your Fleet Program

## Modification of Incentive Programs in 2023

With existing and additional flexibility provided by the legislature in the 2023 Transportation Bill (Act 62), the Agency adjusted Vermont's vehicle incentive programs in the following ways:

- Incentive Program for New PEVs:
  - Increased income thresholds for Households
  - Increased incentive amount for AEVs to \$5,000 for households with lower incomes
  - Increased base MSRP cap of eligible vehicles to \$52,500
- MileageSmart:
  - Created price cap of \$40,000 for used vehicles
  - Worked with Capstone on more affordability for households with lower incomes regardless of vehicle price
- Replace Your Ride:
  - Increased incentive amounts to \$5,000 for households with low incomes and added incentive for moderate income households
- eBike Incentive Program
  - Relaunched program using voucher system exclusively for households with low incomes
  - Increased incentives for e-cargo bikes and adaptive e-bikes
- Electrify Your Fleet Program
  - Designed and launched new grant program this fall providing up to \$2,500 to replace or avoid gas fleet vehicles with cleaner options

# Clean Transportation Incentive Programs

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## Adaptation of Incentive Programs for 2023 Flood

Within the additional flexibility provided by the legislature in the 2023 Transportation Bill (Act 62), the Agency adjusted Vermont's vehicle incentive programs to address flood impacts:

- Incentive Program for New PEVs: Created an additional \$1,000 incentive for the scrapping of a flood-damaged vehicle, regardless of its eligibility for Replace Your Ride
- MileageSmart: Provided automatic \$5,000 incentive for used vehicle, regardless of eligibility for Replace Your Ride
- Replace Your Ride: Waived non-statutory (administrative) drivability requirements to expand eligibility for flood-damaged vehicles 10-years or older



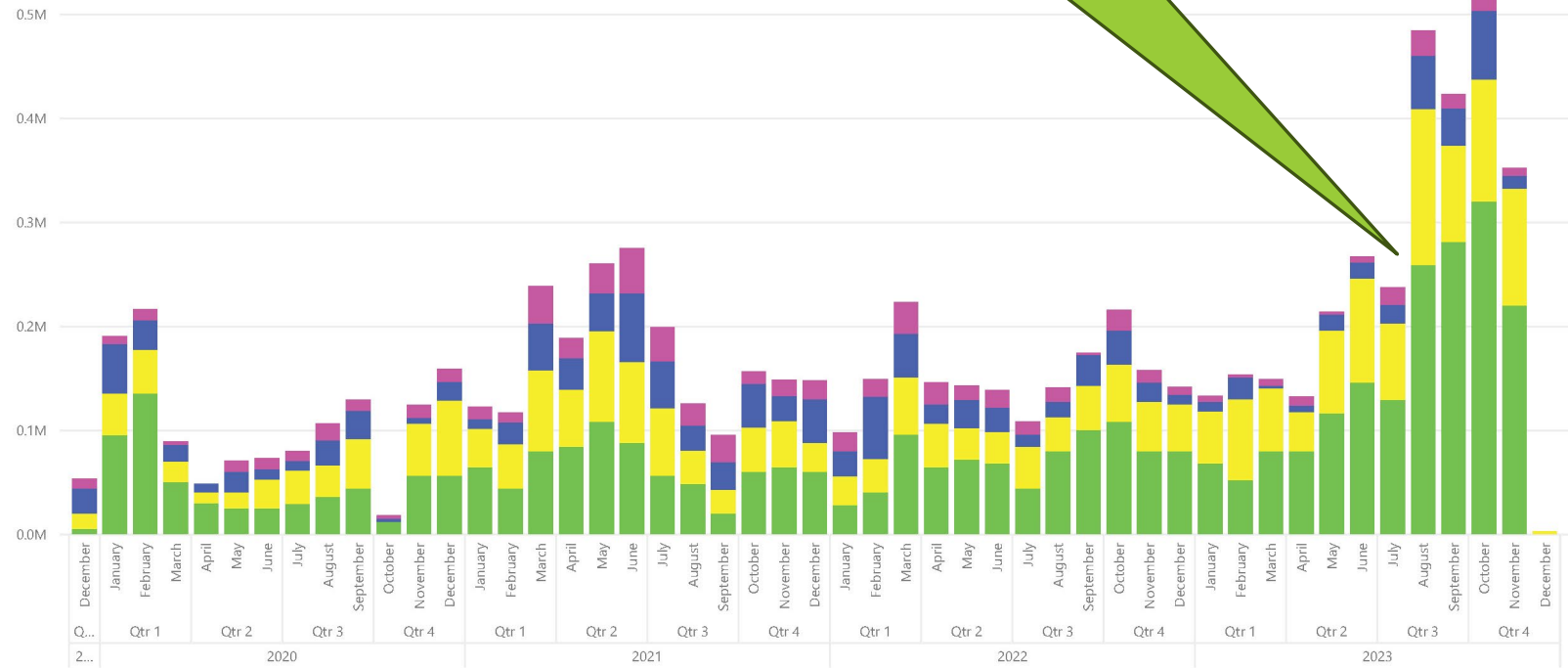
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# Incentive Program for New PEVs

New PEV Monthly Incentive Amount Issued

Incentive Class ● AEV - LI ● AEV - MI ● PHEV - LI ● PHEV - MI



Program Guidelines updated late July to reflect new changes



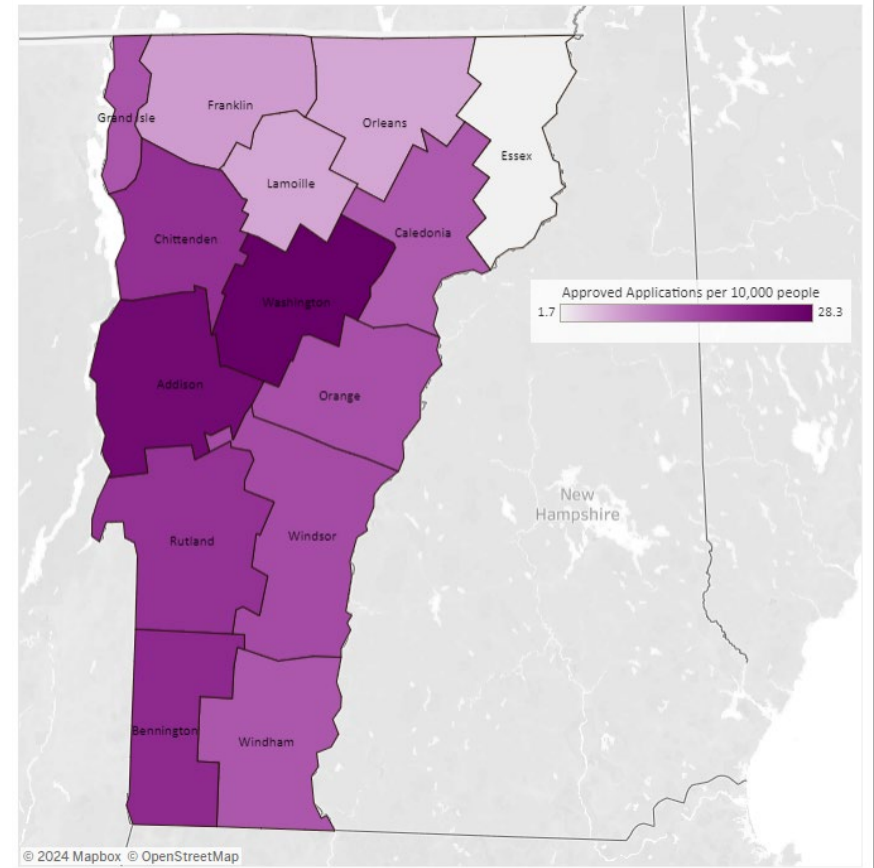
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## Incentive Program for New PEVs

- **\$6.28 million** remaining in program funds (of \$12 million originally authorized in 2022)
- From August through the end of 2023, the number of applications and incentives issued nearly tripled.
- Increased to **88% for all-electric** vehicles and **70% of funding to households with lower incomes**
- Since August, leases make up the majority of incentive deals
- Prior projections suggested funding would last through the end of 2025, but current trend would exhaust funding before the end of CY2024

Number of Approved new PEV Applications per 10,000 people  
This map displays a standard value for comparison regardless of the county population.

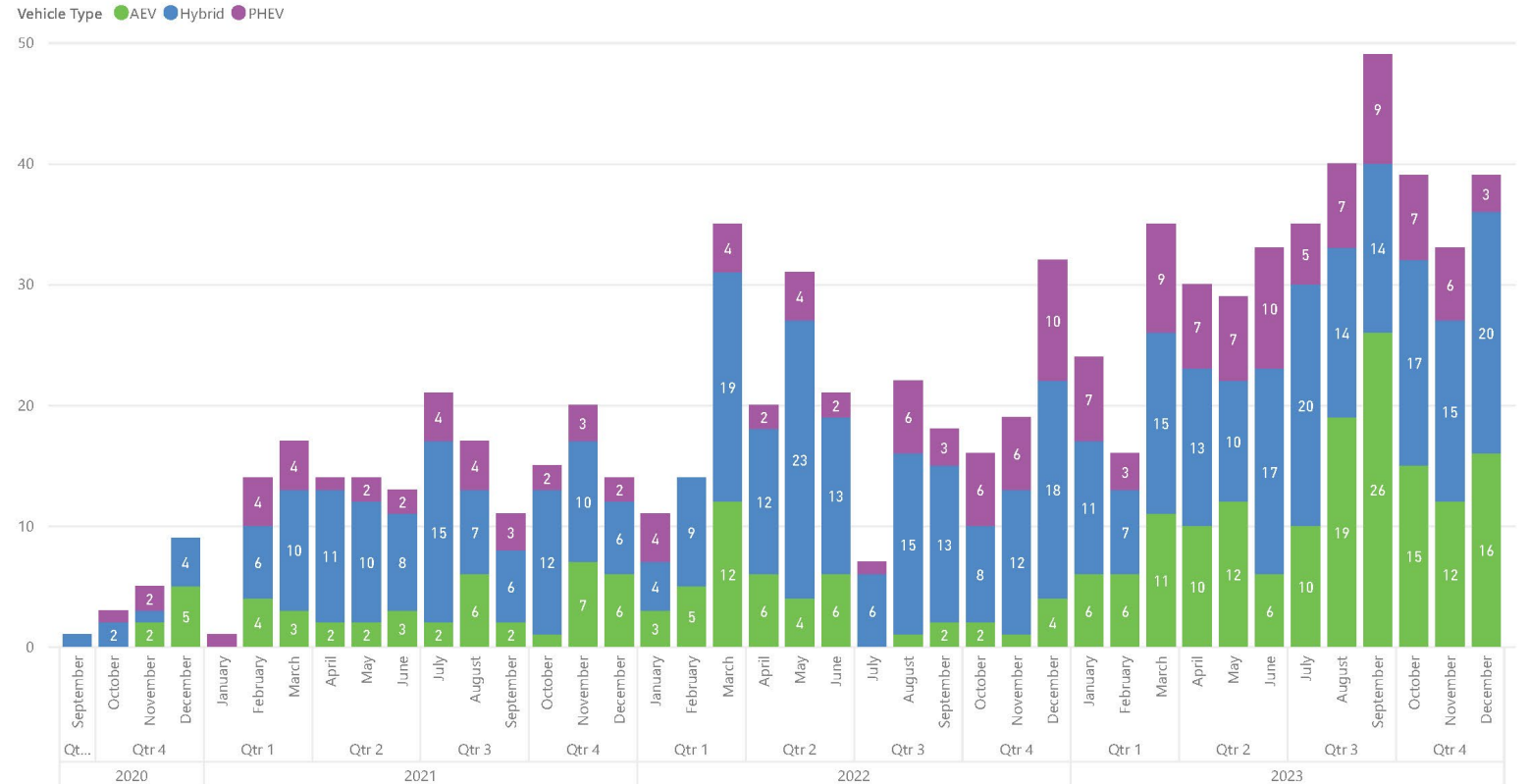


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MileageSmart Monthly Incentive Amount Issued



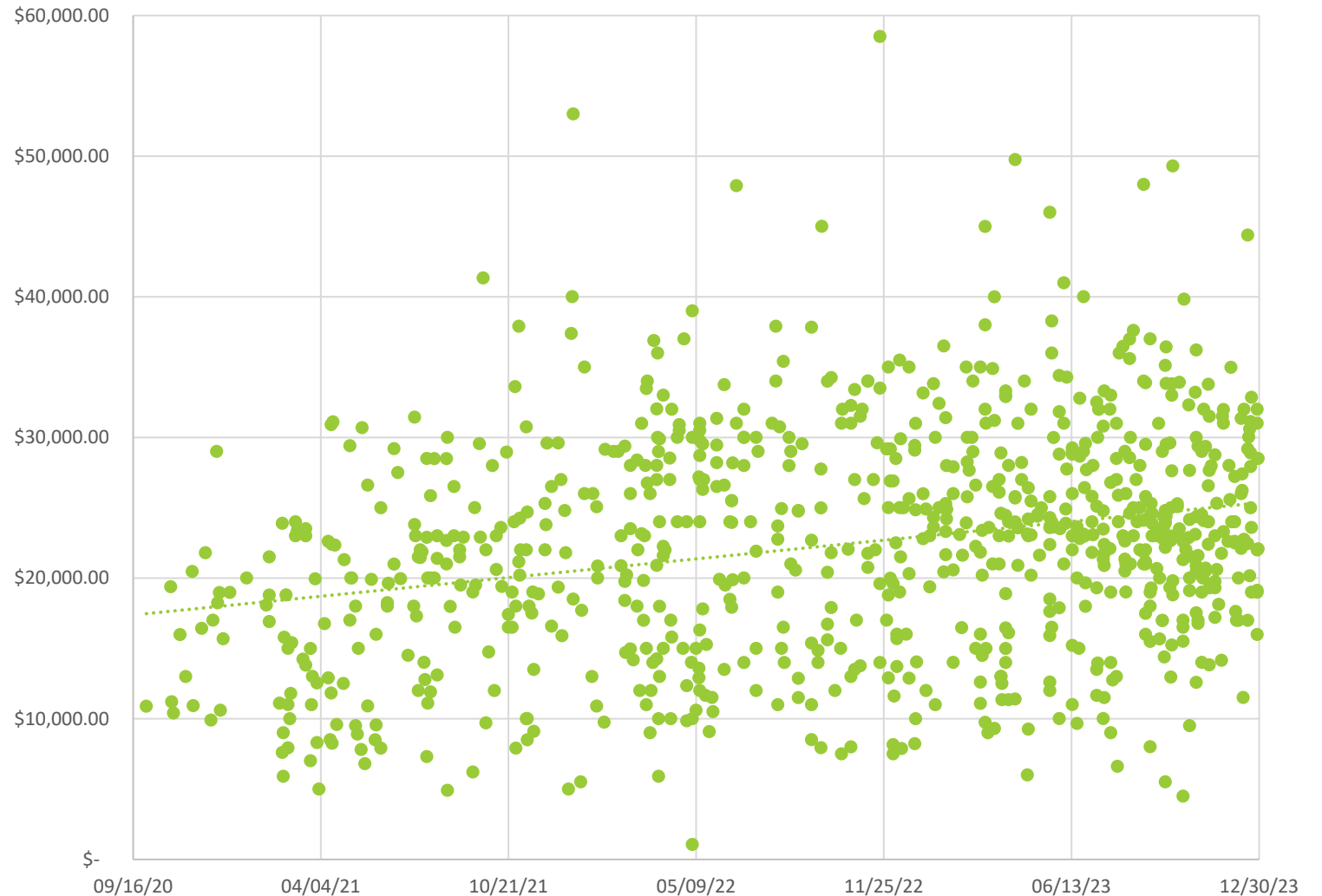
\$933,000 remaining for both incentives and administrative/delivery costs

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MileageSmart Purchase Price at Date of Purchase

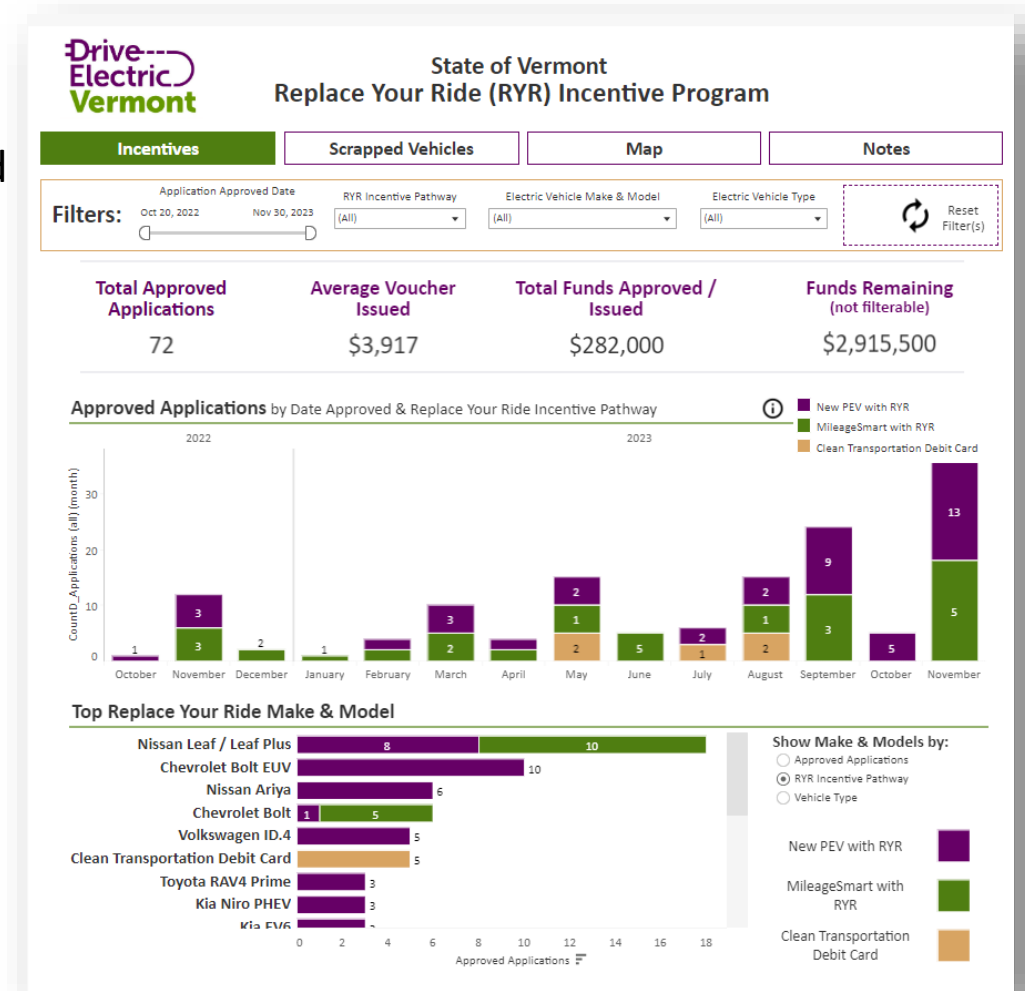


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# Replace Your Ride

- Gradual increase in applications and approved incentives after increased incentives enacted
- Use of the prepaid Clean Mobility Card increased in the past 6 months
- Dealers and scrapping partners still learning; more mobility partner and public outreach planned



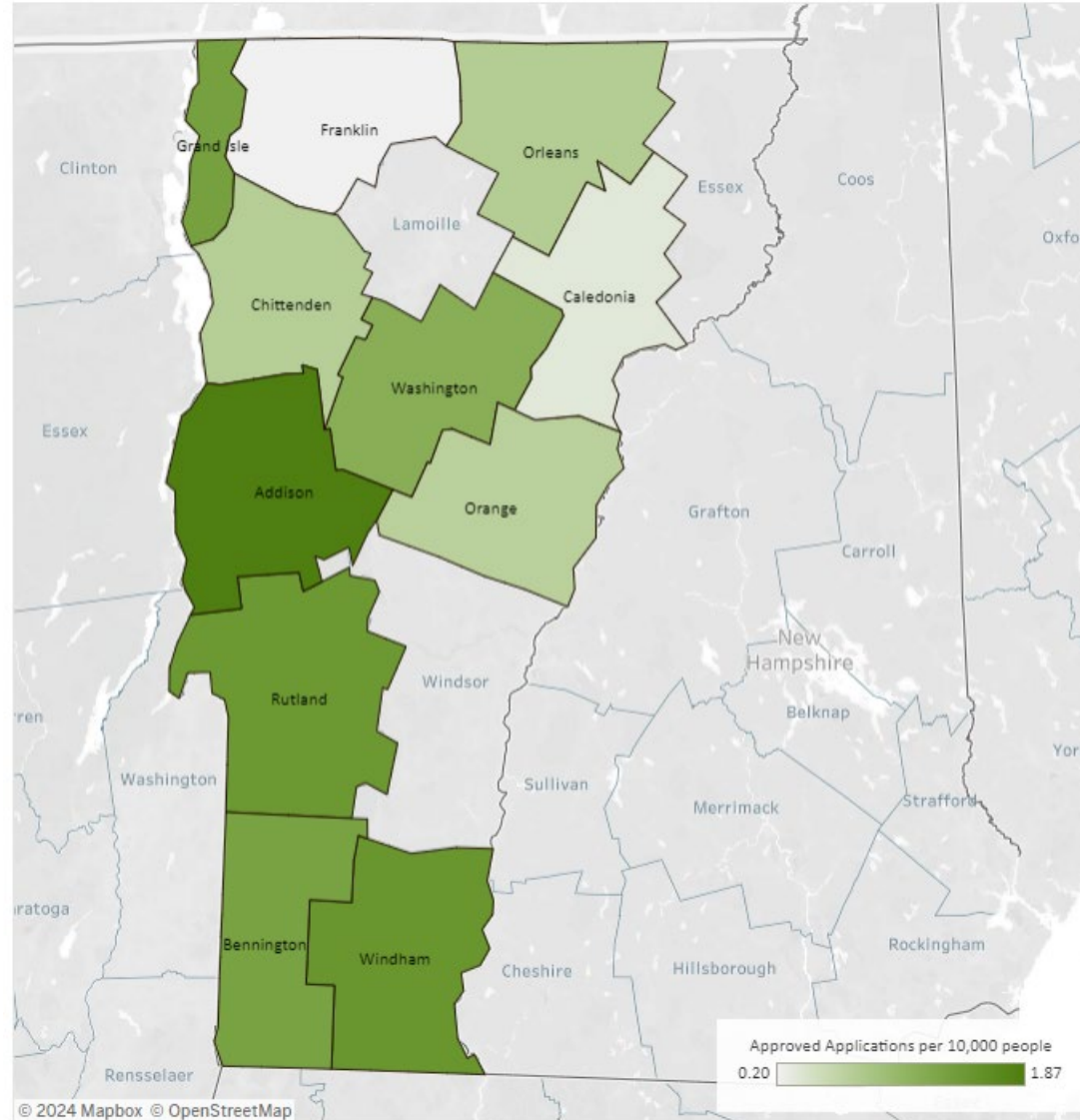
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## Replace Your Ride

**Number of Approved Replace Your Ride Applications per 10,000 people**

*This map displays a standard value for comparison regardless of the county population.*



**\$2.74 million** in funds remaining as of 1/1/2024

Last two months of program total more than the first thirteen:

58 incentives worth \$260,000 in Nov/Dec 2023

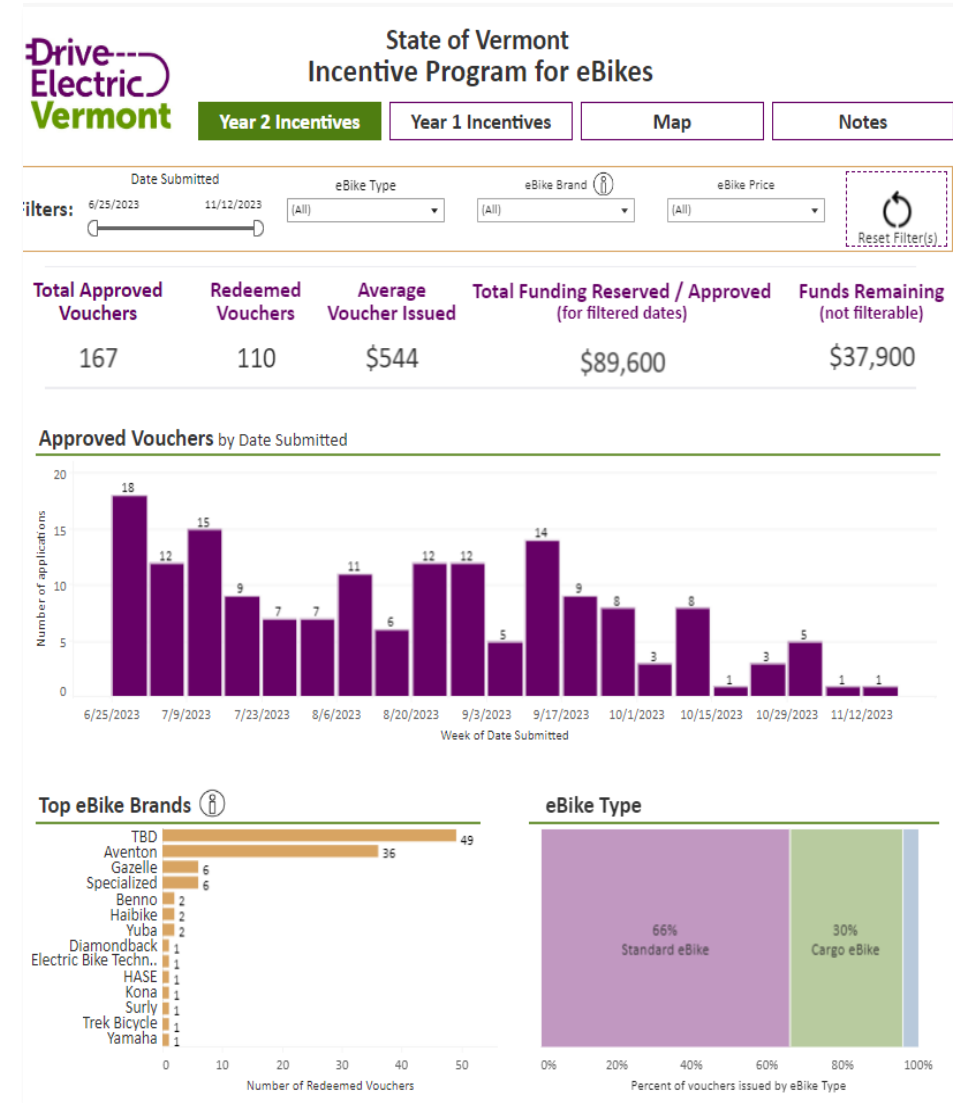
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- Electrify Your Fleet Program

# eBike Incentive Program

eBike Program redesigned to achieve several improvements:

- Direct funds exclusively to households with low incomes (rebate essentiality)
- Direct more funding to local businesses in Vermont
- Expedite reimbursement process for both shop owners and recipients through PEX card system
- Increase incentive amounts for cargo and adaptive ebikes for more accessibility and GHG reductions

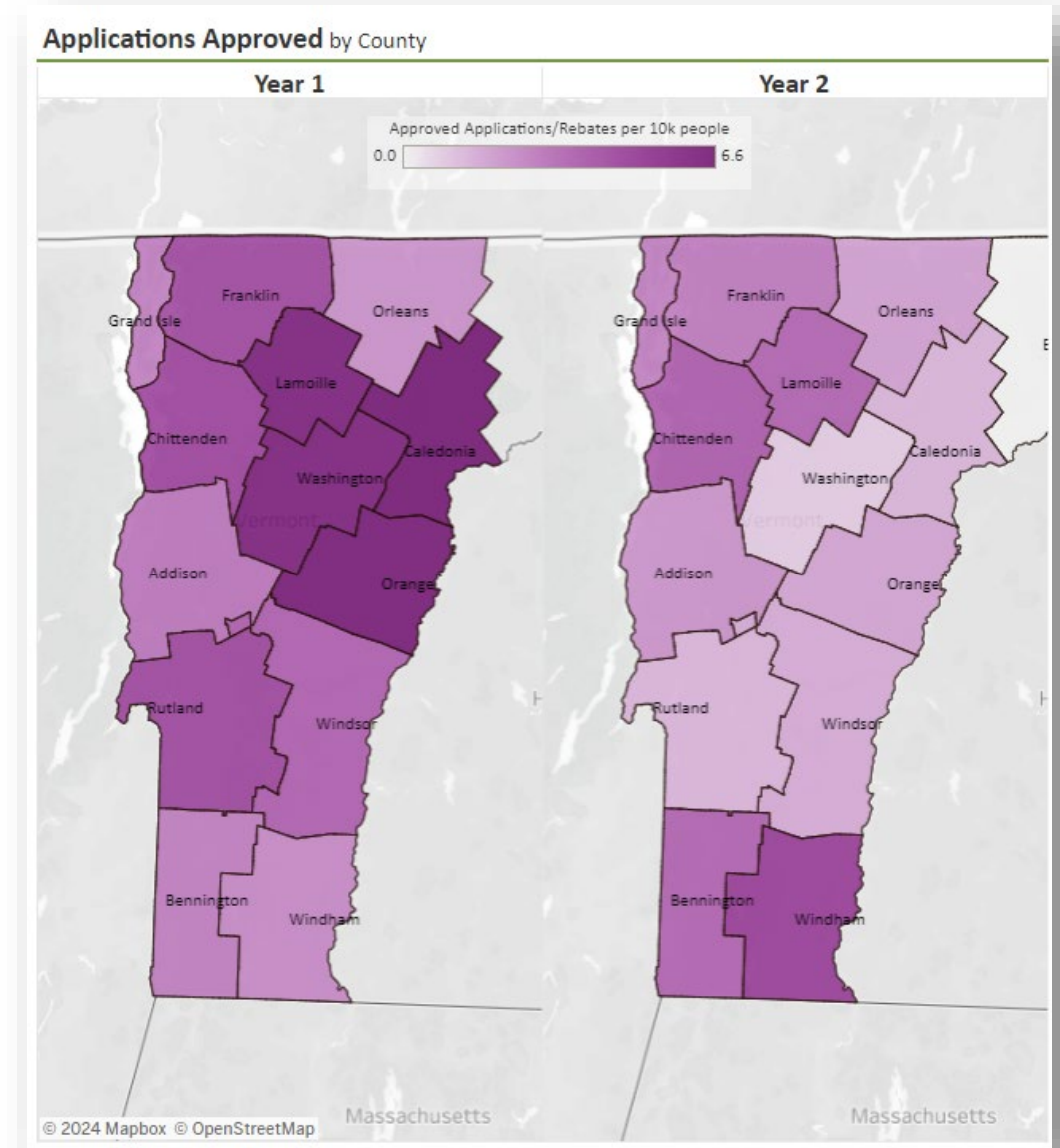


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## eBike Incentive Program

- **\$36,000** in program funds remaining
- 2<sup>nd</sup> annual eBike survey will close soon
- More analysis needed on shift in geographic participation (e.g. local bike shop availability? Less recreational, more need-based transportation?)
- Review national and VT-specific survey data from Portland State University when it becomes available



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# Electrify Your Fleet Incentive Program



Open to all businesses, nonprofit organizations and municipalities in the State of Vermont

From \$2,500 to \$5,000 off the cost of a new electric vehicle (Battery Electric trucks or cars, Plug-in hybrids, electric motorcycles, e-bikes, or electric snowmobiles)

Grantee to demonstrate how lease(s) or purchase(s) will reduce greenhouse gas emissions from fleet

Forty percent (40%) of funds available on a first-come, first-served basis to applicants who are from, or who primarily serve, historically underserved communities

For more info: [Electrify Your Fleet Program | Agency of Transportation \(vermont.gov\)](#)



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## Electrify Your Fleet Program

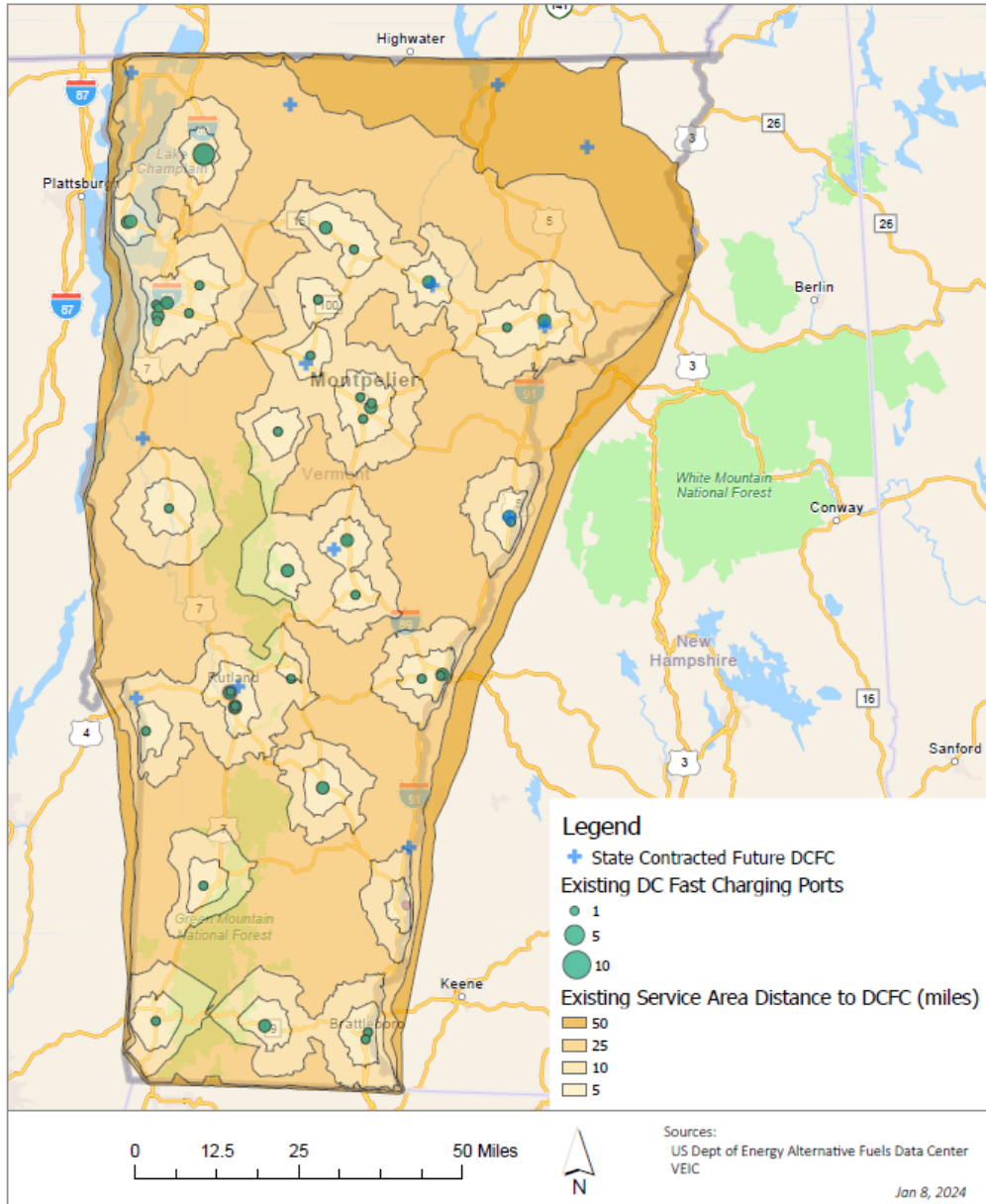
- \$500,000 appropriated. Launched in-house as a grant program
- 14 complete applications, 7 incomplete: Municipalities, businesses, nonprofits and trade association
- Two applications have been withdrawn, two are ineligible (mobile food cart battery replacement and electric ATV)
- Interviews have been conducted with 9 applicants and 5 applications for combined \$37,500 in funding have been sent to grants and contracts section to prepare grant agreements, with one fully executed.



DMV Enforcement Electric Motorcycle

# Vermont DC Fast Charging Availability

Distance to existing non-Tesla Locations as of January 2024



## Annual EVSE Map Report

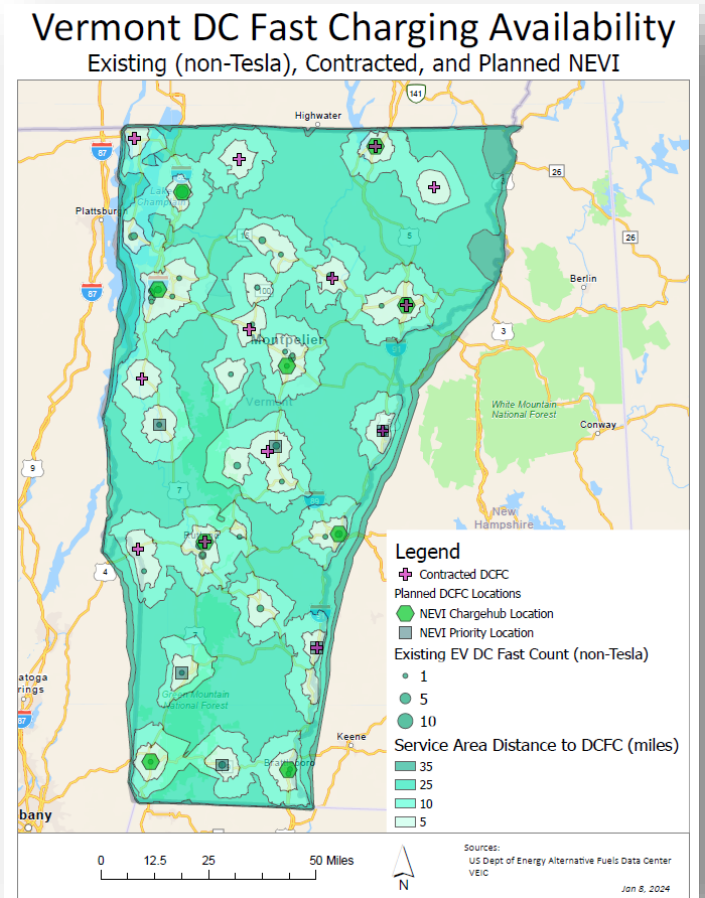
New locations funded by Agency of Commerce and Community Development now installed; some online, others at various stages

Continued challenges with supply chain, necessary electrical infrastructure upgrades, willing site hosts

Significant DCFC investments on the horizon with NEVI, ARPA, CFI and CRP

# DC Fast Charging Future

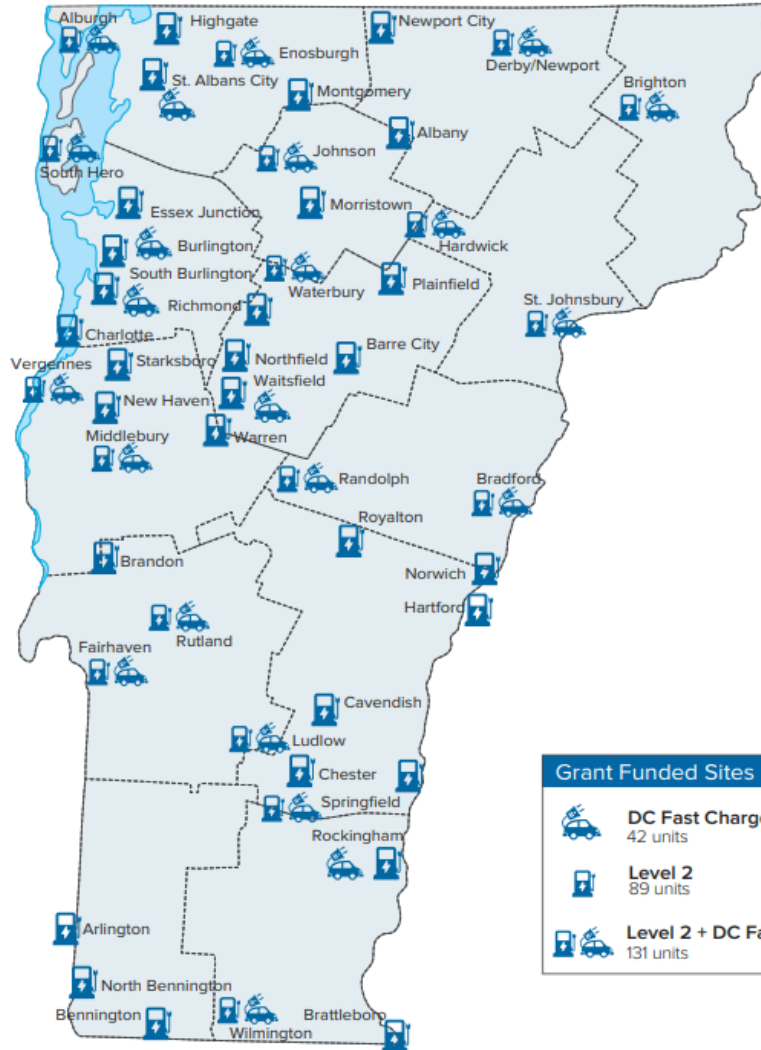
- **Vermont National Electric Vehicle Infrastructure (NEVI) Plan** update approved in September 2023 by FHWA unlocking \$4.55 million in FFY2024
- **Inflation Reduction Act (IRA)** reinstates and expands EV charging tax credits to enable more projects throughout the state
- **Carbon Reduction Program** to allow more flexible investments on important, but non-designated corridors
- **Federal competitive grants** to further build out corridors and communities alike : [News · Joint Office of Energy and Transportation \(driveelectric.gov\)](https://www.driveelectric.gov/news/joint-office-of-energy-and-transportation)
- **Medium- and heavy-duty electrification planning** and possible federal designations for electric freight corridors (TBD)



# Funding Timeline

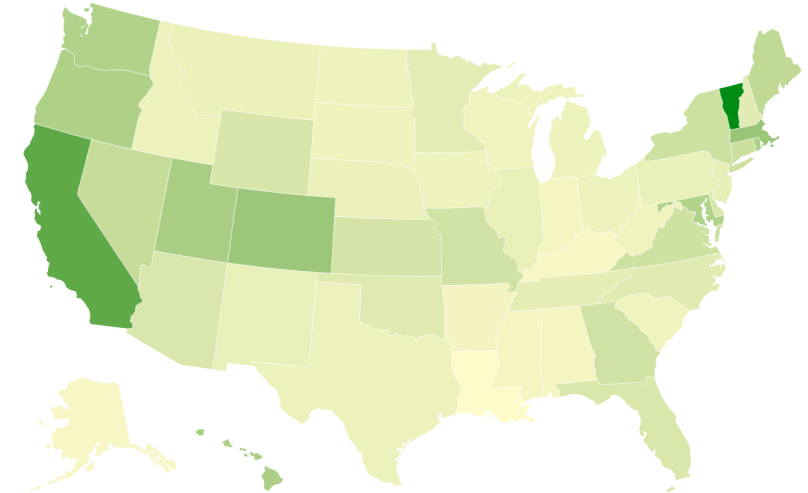
- 2014: VT launches Electric Vehicle Supply Equipment (EVSE) Program with \$200k
- 2017: VW Settlement, \$2.8 million
- 2019: ~ \$1 million for 75 Level 2 + 5 DC Fast Chargers
- 2020: \$1.7 million to Blink for 11 locations
- 2021: \$750k in capital funds to Norwich Technologies for 6 locations
- 2022: \$1 million to residential charging for multiunit housing
- 2023: \$10 million in state funds for community charging
- \$21.2 million in NEVI formula funds through 2026 + \$2 million in ARPA funds
- Charging Fueling Infrastructure Grants/Competitive Gap-filling Grants

# Public EVSE Investments in Vermont



## Alternative Fueling Station Density Across the U.S.

EV Chargers Per 100,000 Residents  
8.3 139.7



Ranking based upon EV charger density per capita; a rank of 1 is the best, most-dense.  
Source: CoPilot • Created with Datawrapper

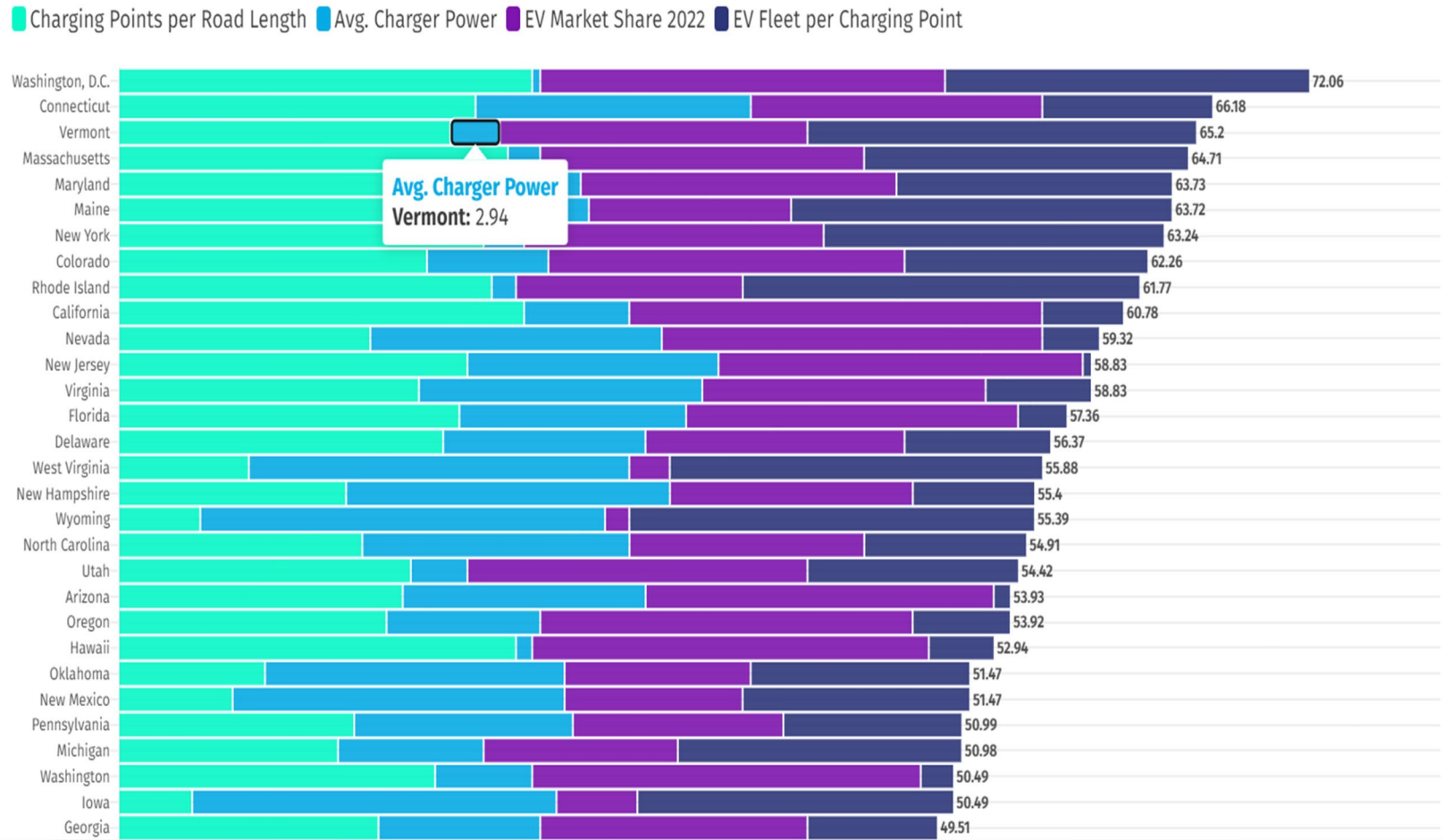
Grant Funded Sites	
	<b>DC Fast Charge</b> 42 units
	<b>Level 2</b> 89 units
	<b>Level 2 + DC Fast Charge</b> 131 units

# Increasing EV Charging Standards

- Minimum of four (4) ports in each location; up to eight (8) in proposed Chargehubs
- Minimum capacity to supply 150kW per port simultaneously ; many will be 175-180kW up to 350kW in Chargehubs
- Maximum 50-mile distance between fast charging locations; State goal aims for no more than 25 miles
- Minimum of 97% uptime requirements, simpler payment methods, more accessible and convenient

## EV Index Ranking United States

EV market and charging infrastructure maturity on multiple dimensions since 2020 – presented by HERE Technologies and SBD Automotive.



Vermont ranks #3 overall in EV charging ecosystem behind DC and CT, but received low marks for higher powered charging: [EV Index | HERE](#)

# Alternative Fuel Corridors

## FHWA Designation

### Submitted nominations for Electric Freight Corridors in 7<sup>th</sup> Round

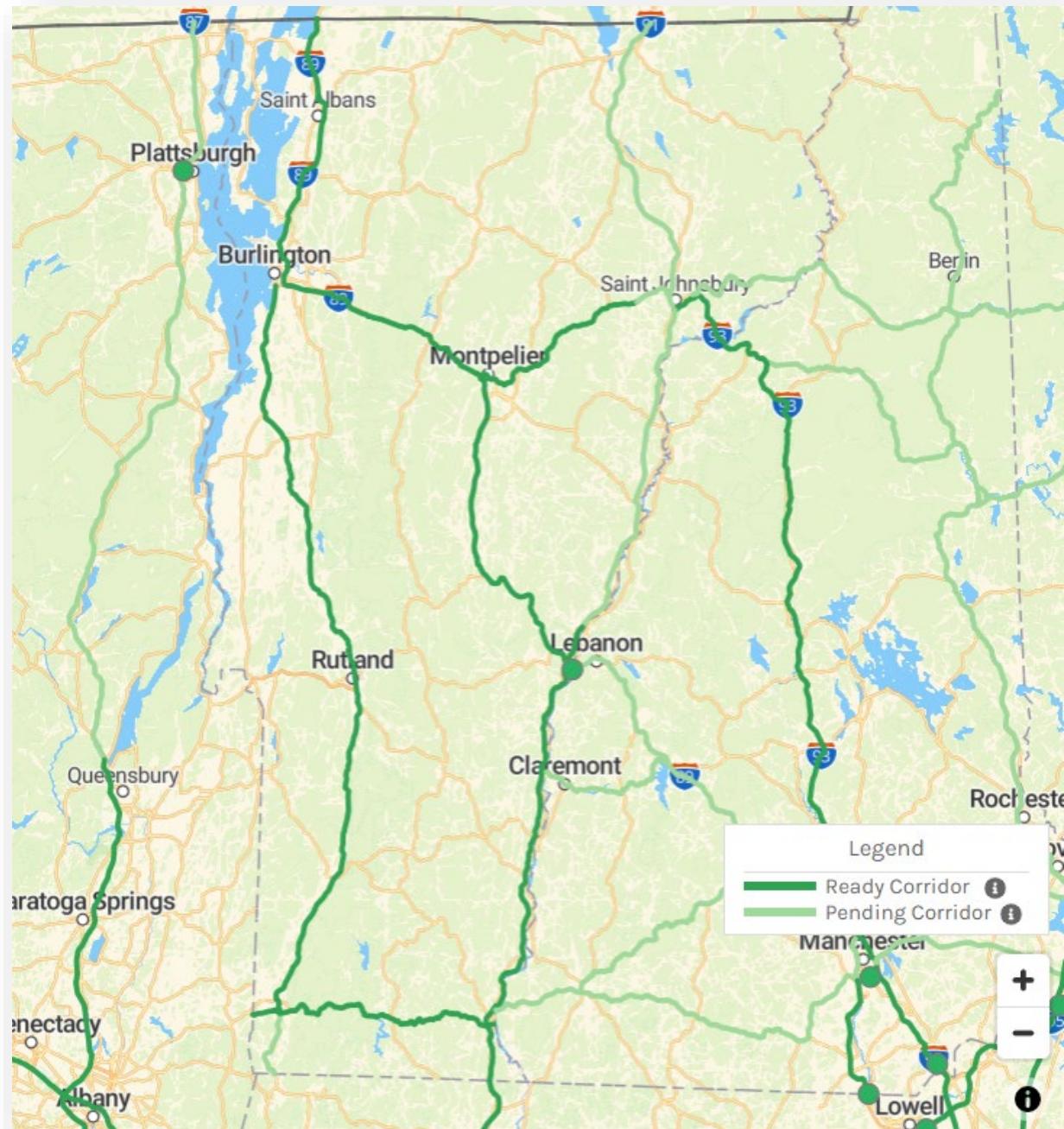
- Stations within 50 miles of the next on the highway system and within 1 mile of an exit
- Site power capability should be no less than 600 kW (supporting at least 150 kW per port simultaneously across 4 ports).

## VT Corridor-Ready:

- I-89, 91; VT Routes 9, 2, 7

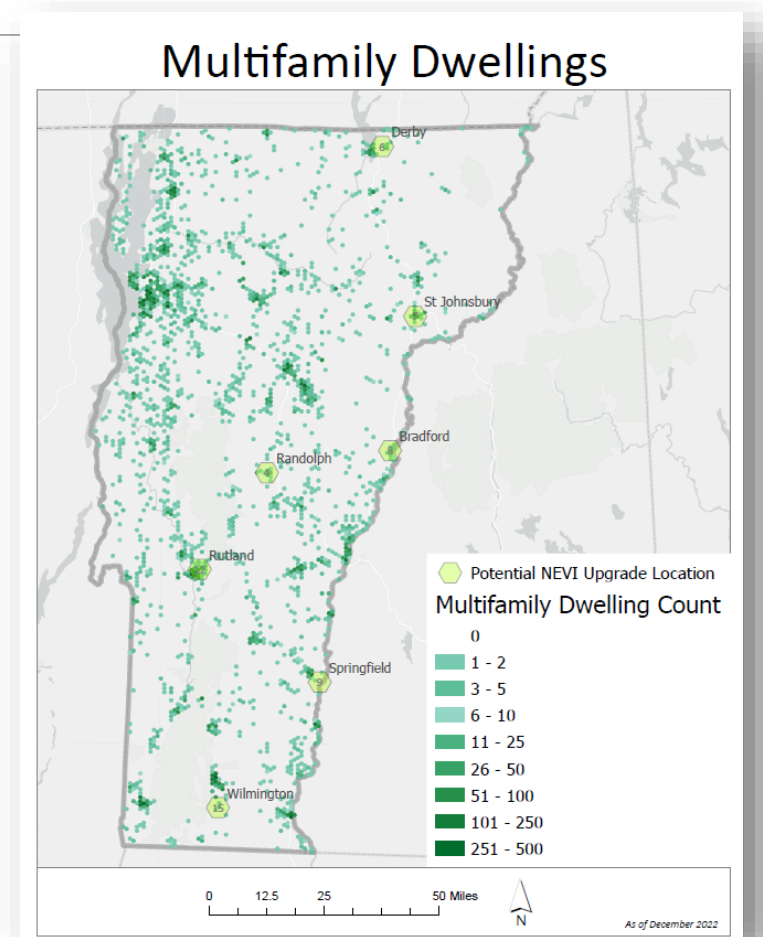
## VT Corridor-Pending:

- US-2: Between Danville and VT/NH border
- US-7: Between Bennington and VT/MA border



# General Location Prioritization Factors

- Highway traffic volumes
- Travel services and other employment
- Walkability
- Environmental justice factors related to income and race
- Multifamily housing units
- 3-Phase power availability
- Proximity to federally designated EV corridor
- Distance to qualifying EV charging location with four 150kW DCFC ports
- Gaps in charging availability



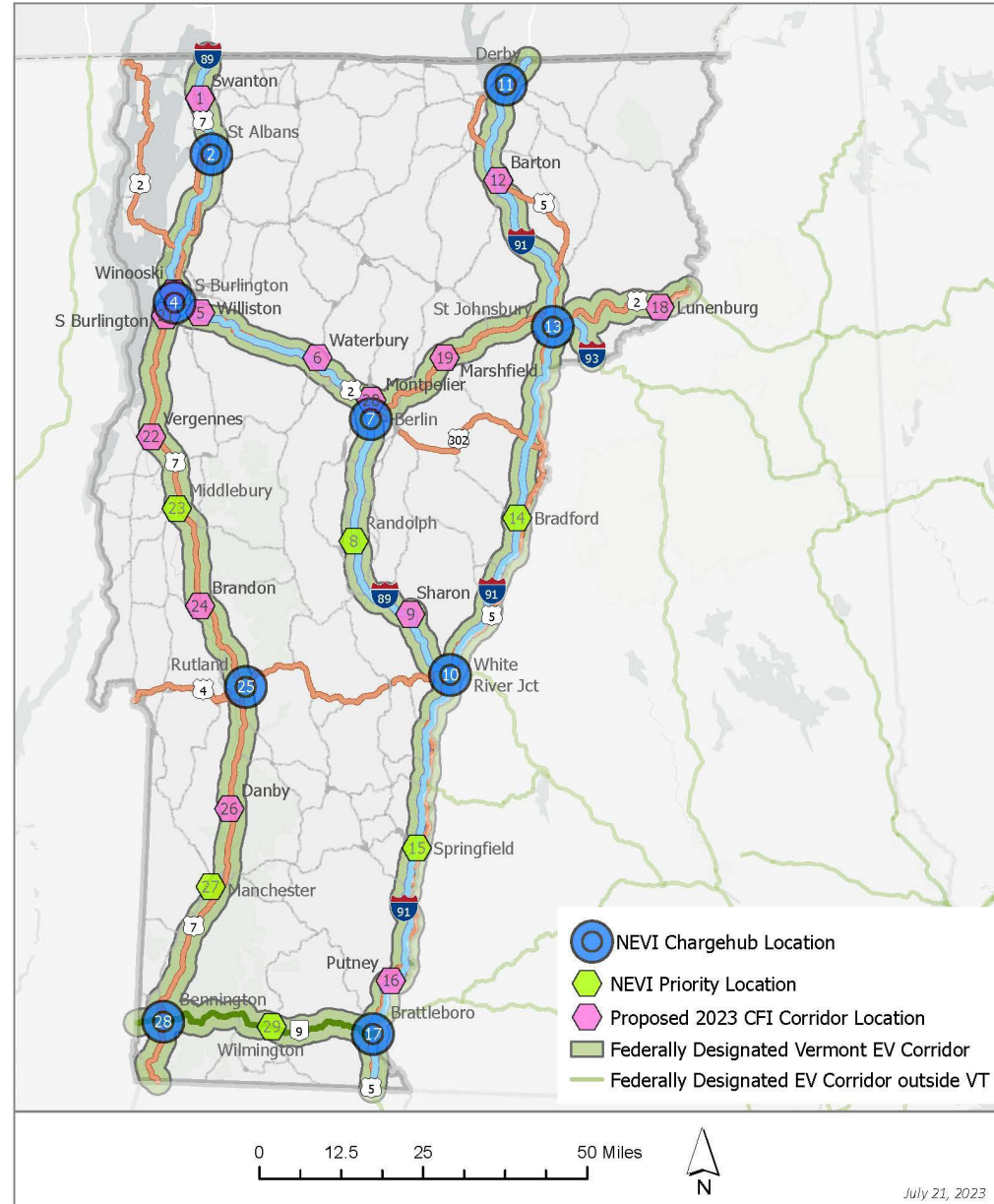
# National Electric Vehicle Infrastructure (NEVI) Program

## Priorities:

1. Equity and access; Broad geographic coverage
2. Greater redundancy for mainstream adoption
3. Preparation for EV freight—Chargehubs to include up to 8 ports, with 350kW stations and pull-through parking configurations

1<sup>st</sup> NEVI-funded site to be completed in Bradford early 2024

## Vermont NEVI Priority Areas



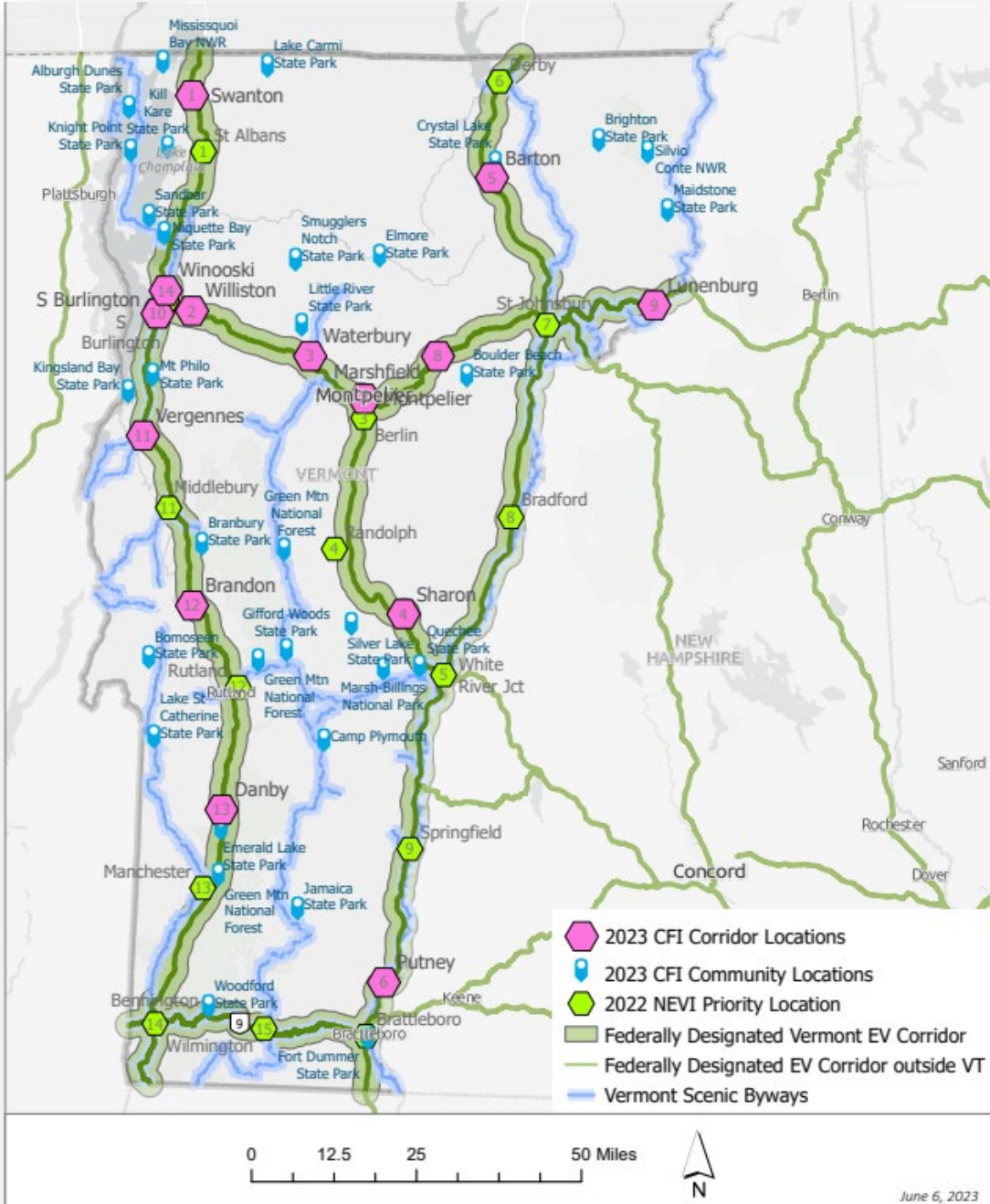


# Charging and Fueling Infrastructure Grant

## Competitive Federal Grant:

- 1. Support tourism and outdoor recreation economy
- 2. Fill in network gaps not covered by Alt Fuel Corridors
- 3. Resiliency in more remote/rural areas

**\$22.4 million** request for 14 Fast charging locations and 32 public lands with Level 2 charging = **Total of 184 new charging ports**



# Next Steps

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- Contract to upgrade existing and planned locations to meet NEVI requirements
- Issue RFQ for entities qualified to install, own, and operate EV charging facilities
- Issue RFPs for further buildout of Alternative Fuel Corridors
- Design and launch grant program to replace and upgrade inoperable stations as efficiently as possible with Carbon Reduction Program funds
- Conduct Public Engagement for NEVI and future Charging and Fueling Infrastructure Grants, planning for off-corridor investments
- Continue to evaluate and re-develop statewide plans, exploring new nominations for corridors, funding opportunities, participatory processes to direct and increase benefits for communities



# Contacts

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