



Planning for Electric Vehicles

Essex Planning Commission
December 11, 2014

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Overview

- Electric Vehicle Overview
- State Supportive Programs
 1. Zero Emission Vehicle (ZEV) program
 2. Incentives
 3. Drive Electric Vermont
- CCRPC Planning Work
 1. EV charging location prioritization and installation guidebook
 2. Local bylaw updates
 3. Fleet vehicle applications



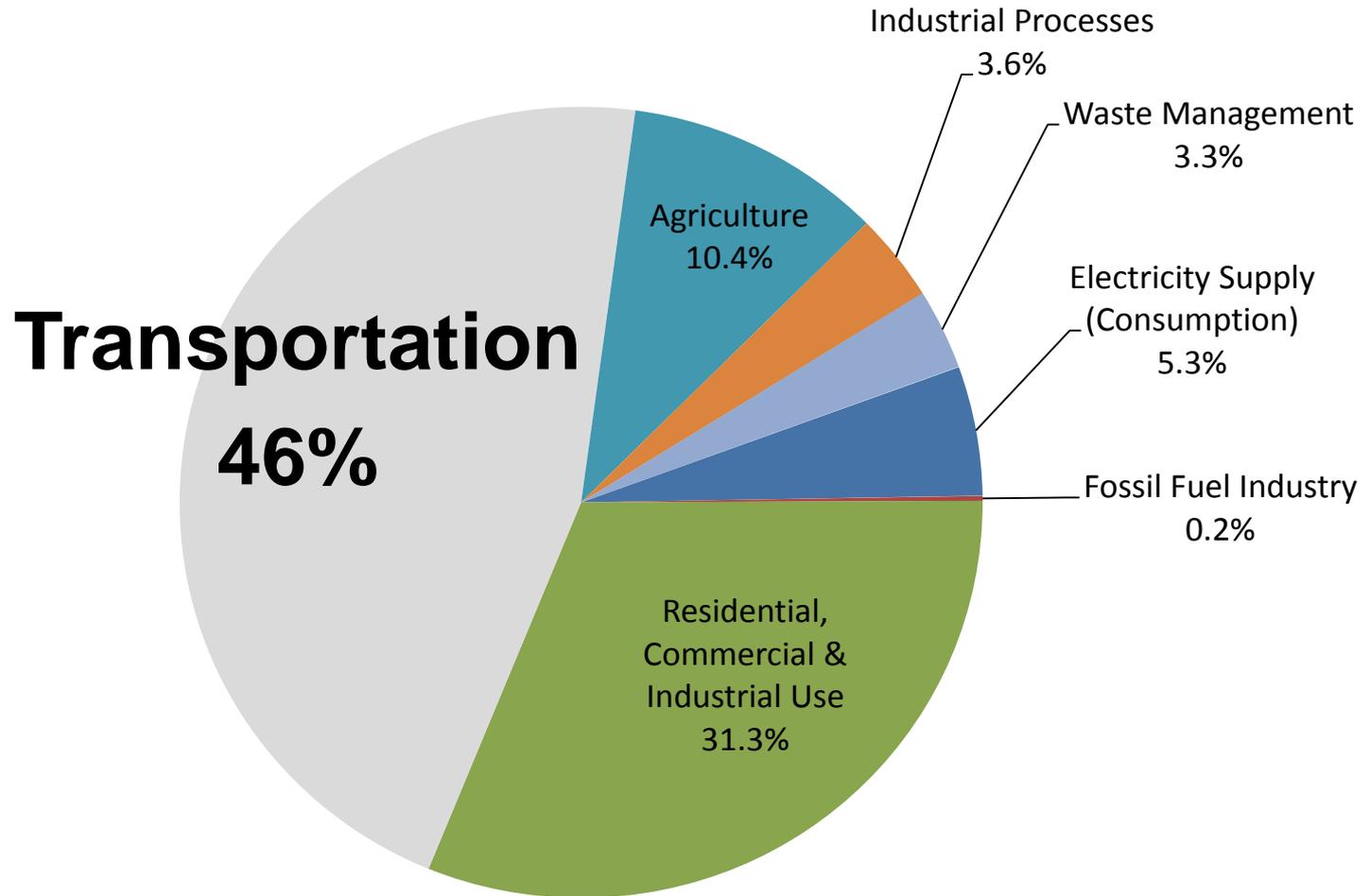


**A SUSTAINABLE FUTURE
FOR CHITTENDEN COUNTY**

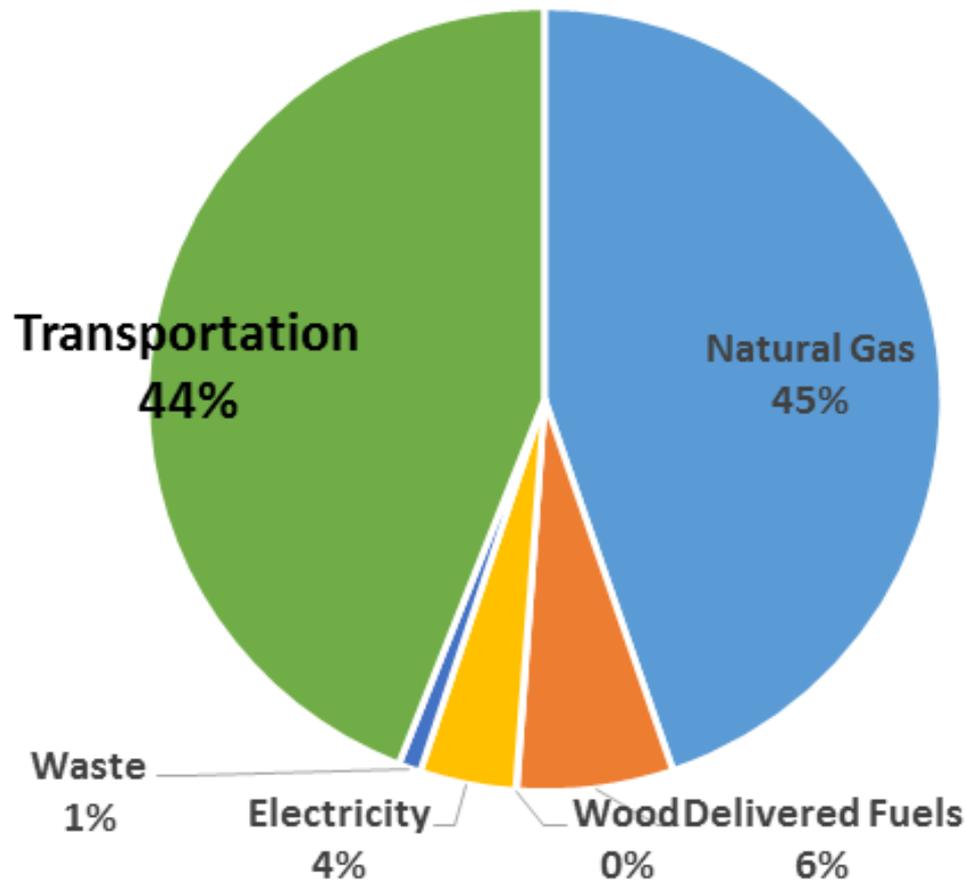
Action 3.2.2.4.b

- *Decrease greenhouse gas emissions to support the State's goal of reducing greenhouse gas Emissions 50% from 1990 levels by 2028.*
- *Reduce fossil fuel consumption in the transportation sector*

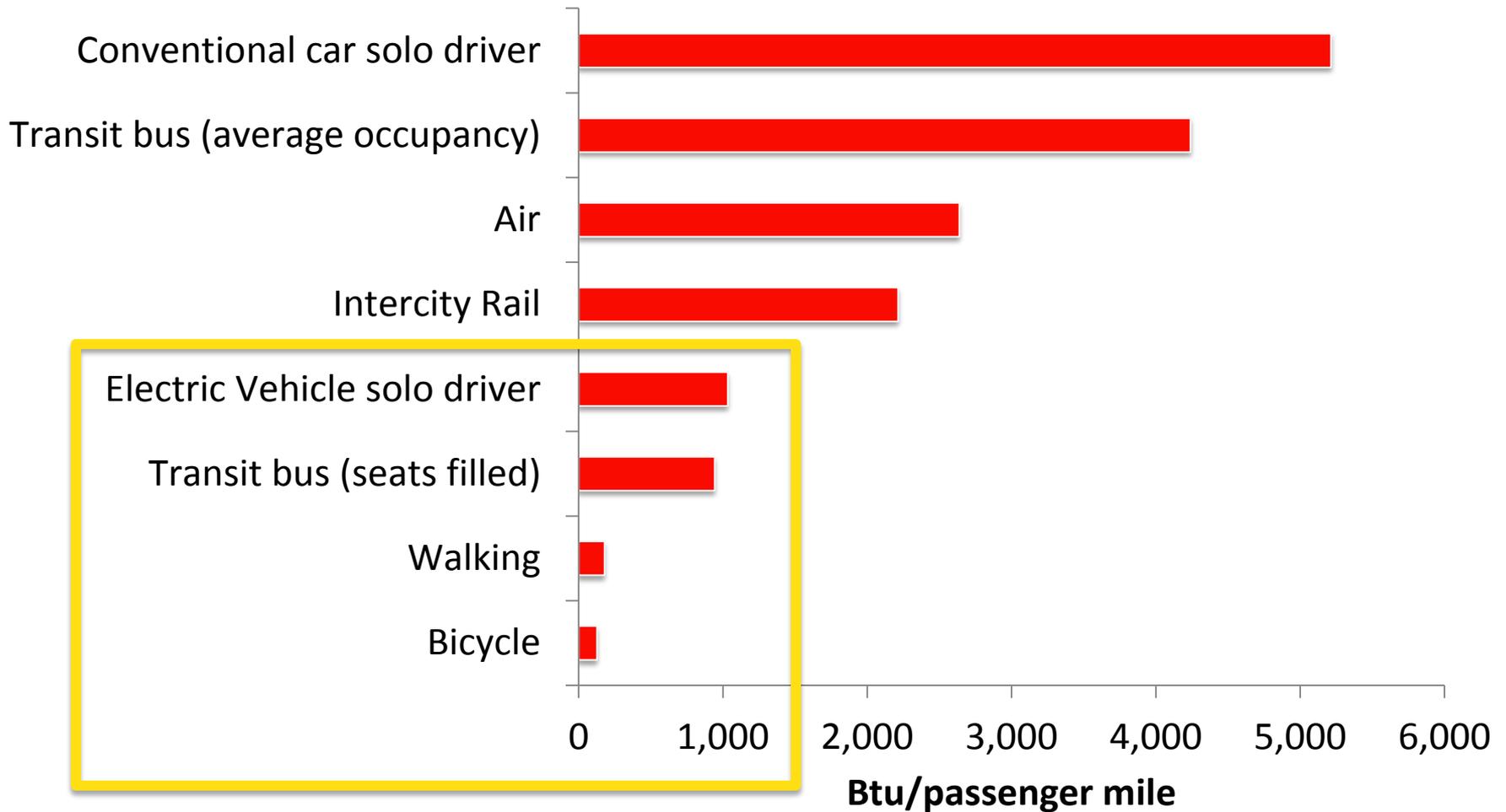
Vermont Greenhouse Gas Emissions 2011



Village and Town Greenhouse Gas Emissions, 2010

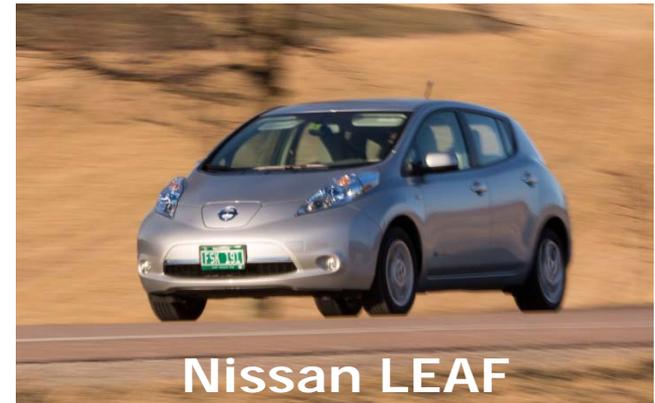


Transportation Efficiency



Introduction to Electric Vehicles

- All Electric Vehicle
 - Powered solely by electric energy stored in a battery
- Plug-in Hybrid Electric Vehicle
 - Powered by battery and gasoline for extended range

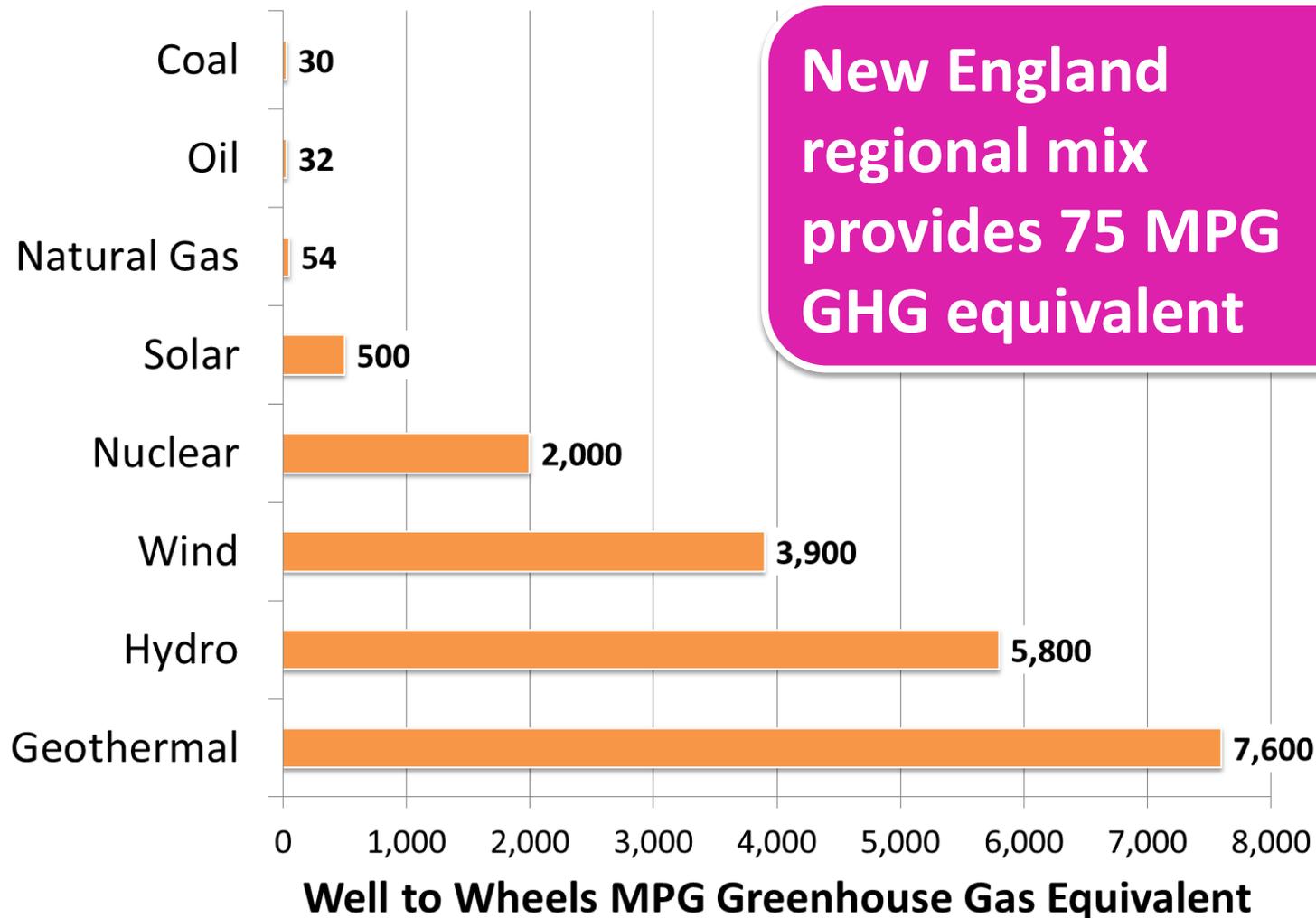


EV Benefits

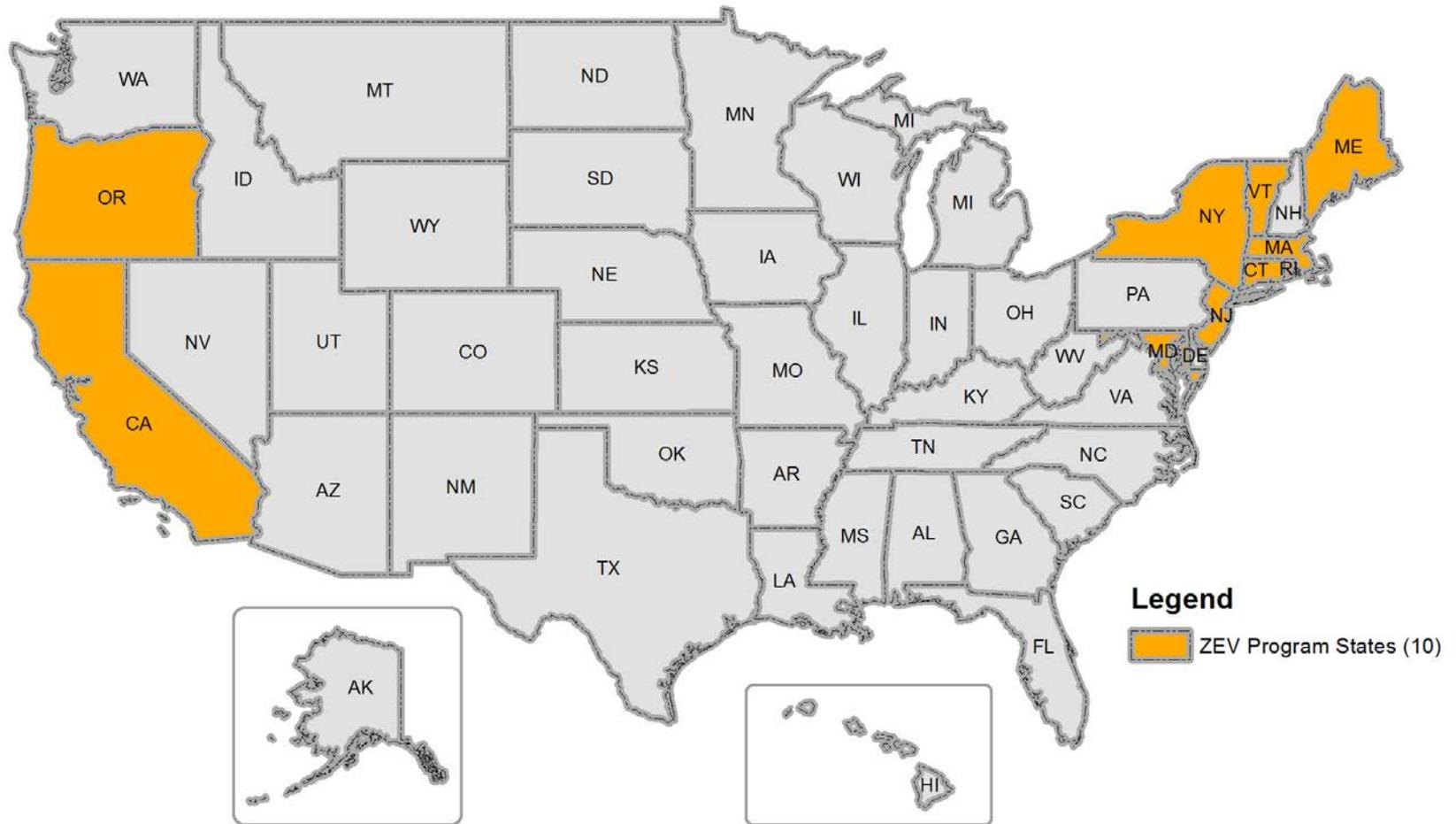
- Save money
- Great performance
- Luxury features
- Reduced emissions
 - AEVs have no tailpipe
 - “Well-to-Wheels” Benefits
 - Health Benefits
- Potential grid support services



Electric Vehicle Greenhouse Gas Emissions



Zero Emission Vehicle Program

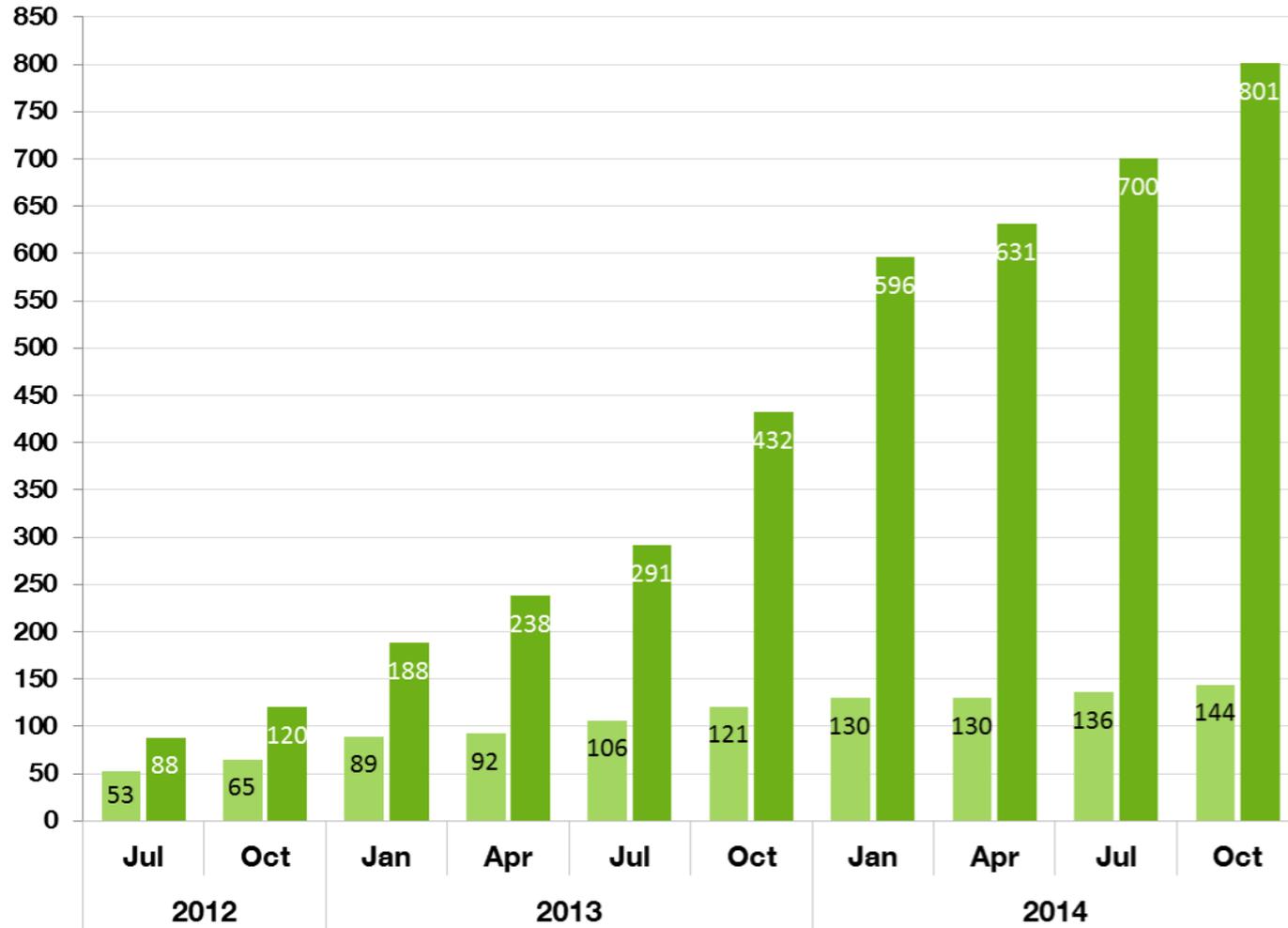


Vermont EV Programs



- Stakeholder group coordinating public-private investments
 - Vehicle and charging station outreach
- Pilot incentive program at point of purchase with dealer participation
- Downtown charging station grants
- State Infrastructure Bank low interest loans for charging
- Building energy code requirements

VERMONT ELECTRIC VEHICLE REGISTRATIONS



 Vermont Communities with EV Owners

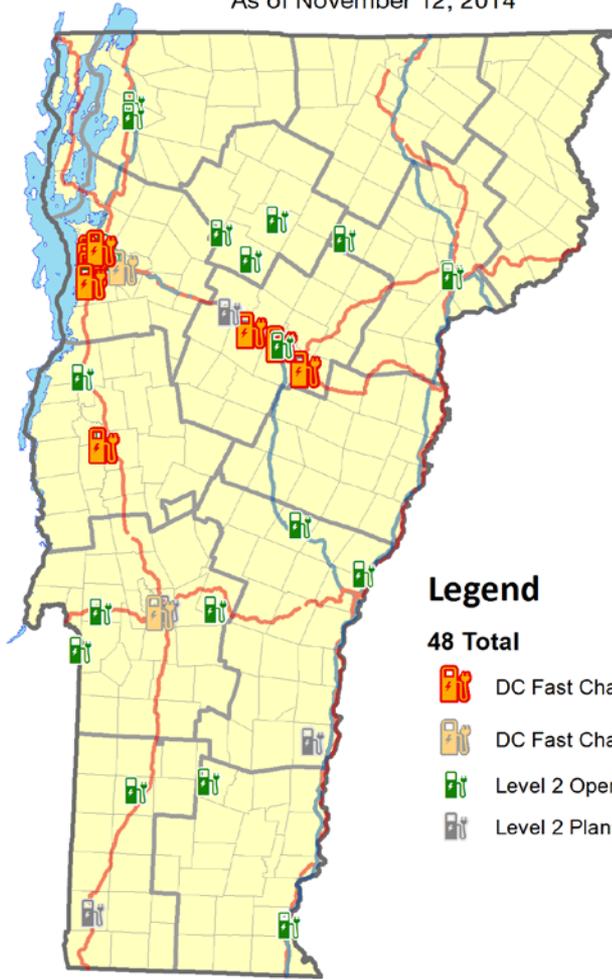
 Total Passenger EVs in Vermont

Source:
VT Agency of Natural Resources;
VT Dept of Motor Vehicles

EVs in Vermont

Public Electric Vehicle Charging Locations

As of November 12, 2014



Legend

48 Total

-  DC Fast Charging Operational (9)
-  DC Fast Charging Planned (2)
-  Level 2 Operational (32)
-  Level 2 Planned (5)

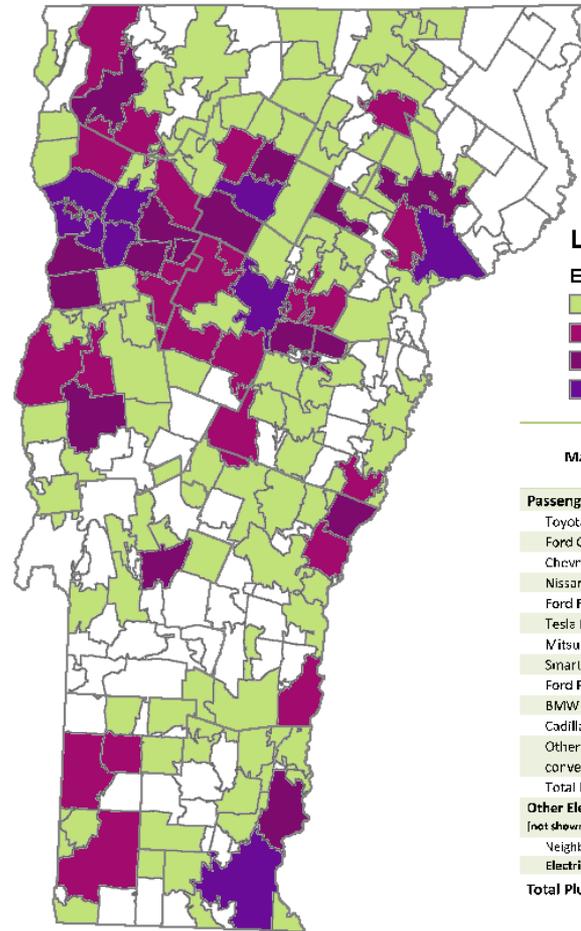


Data Sources:
 US Department of Energy Alternative Fuel Vehicle Station Locator - <http://goo.gl/ETSCO>
 ChargePoint
 Green Mountain Power

11/12/2014

Electric Vehicles Registered in Vermont

As of October 2014



Legend

EV Registrations in Zip Code

-  1 - 4
-  5 - 9
-  10 - 19
-  20 - 47

Make & Model	Number Registered Statewide
Passenger Cars	
Toyota Prius Plug-in	261
Ford CMax Energi	160
Chevrolet Volt	119
Nissan Leaf	92
Ford Fusion Energi PHEV	87
Tesla Roadster and Model S	30
Mitsubishi iMIEV	27
Smart Electric Drive	7
Ford Focus Electric	7
BMW i3	2
Cadillac ELR	1
Other (e.g., after-market conversions)	8
Total Passenger Cars	801
Other Electric Vehicles (not shown on map)	
Neighborhood Electric Vehicles	70
Electric Motorcycles and Mopeds	13
Total Plug-in Vehicles	884

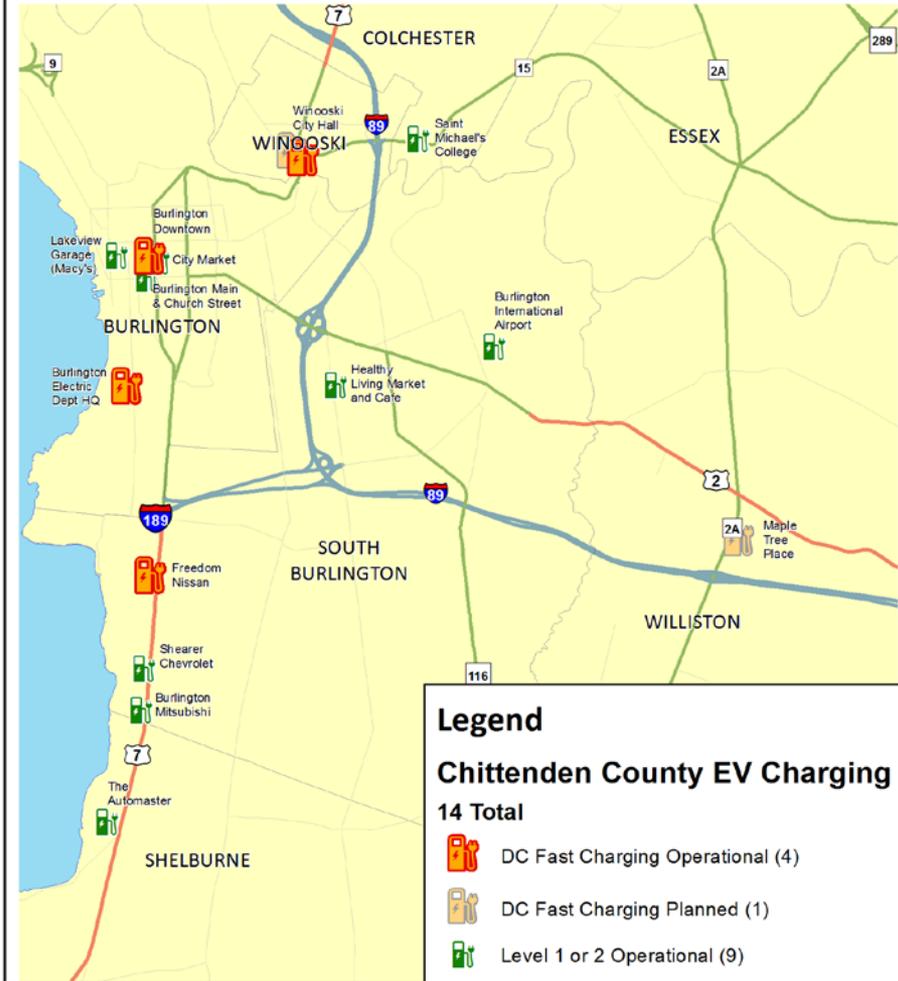
Data Source:
 Vermont Dept of Motor Vehicles vehicle registration database as of 9/27/2014.
 Data processed by Vermont Agency of Natural Resources Dept of Environmental Conservation. EVs distinguished by fuel type, model and/or VIN.



10/6/2014

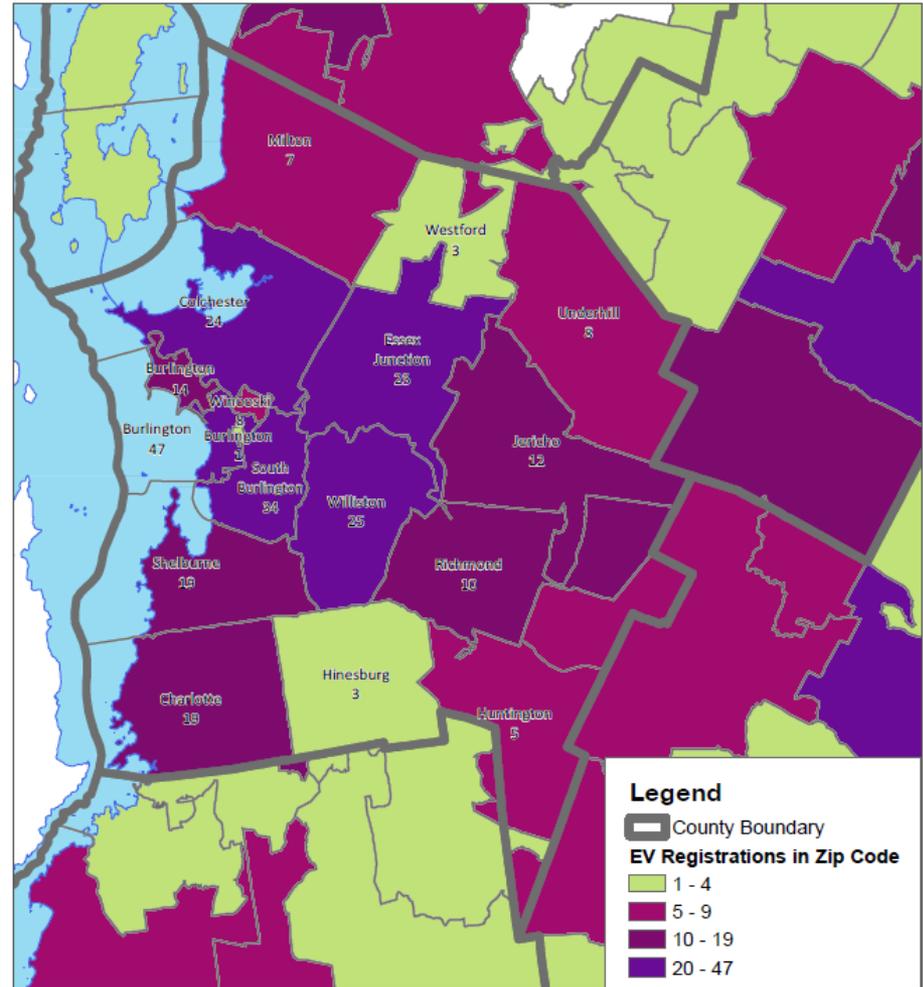
EVs in Chittenden County

Public Electric Vehicle Charging Locations

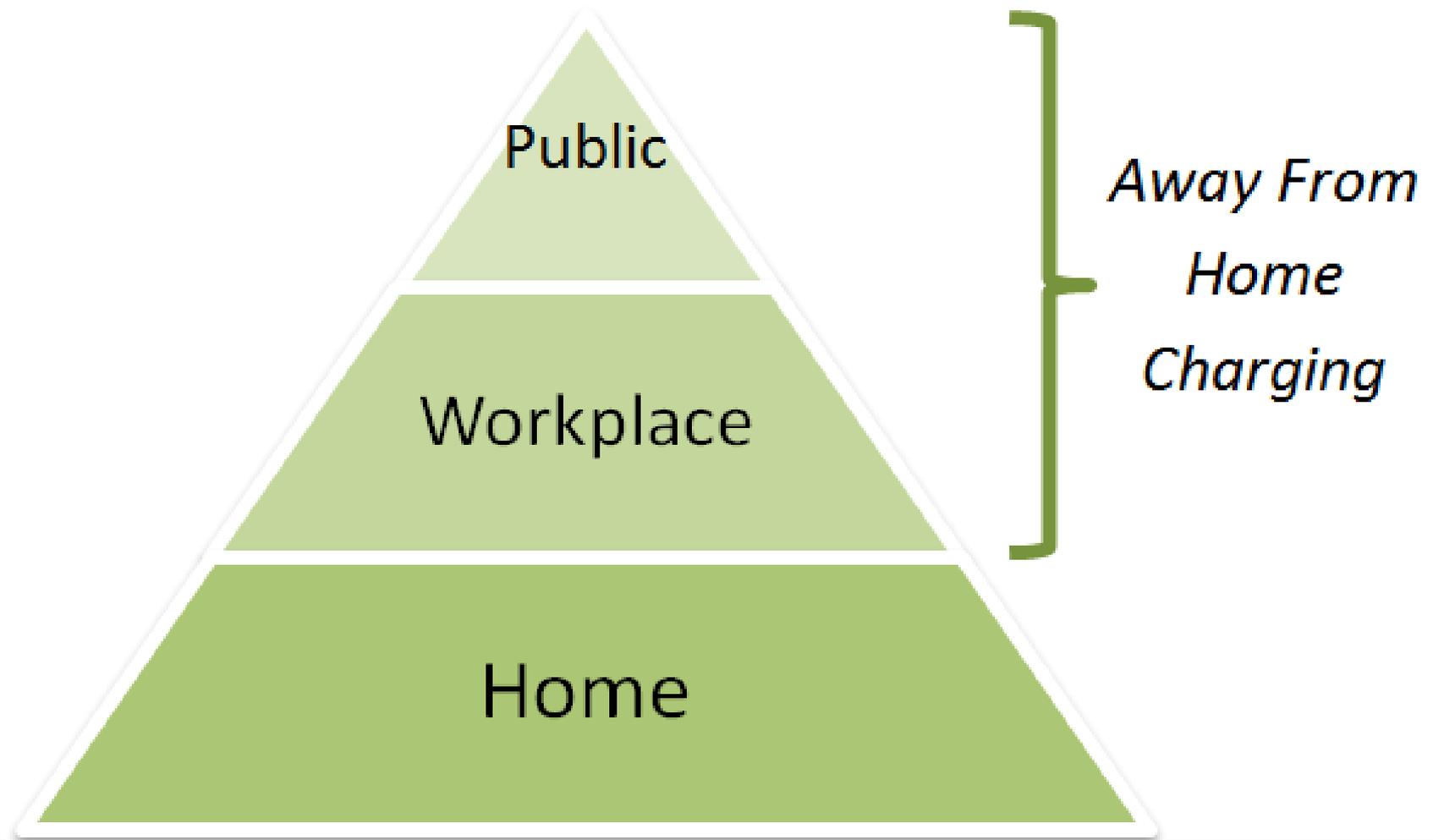


Chittenden County Electric Vehicle Registrations

As of October 2014



EV Charging



Charging Equipment

Level 1 charging
120V



Level 2 charging
208/240V



DC fast charging
480V

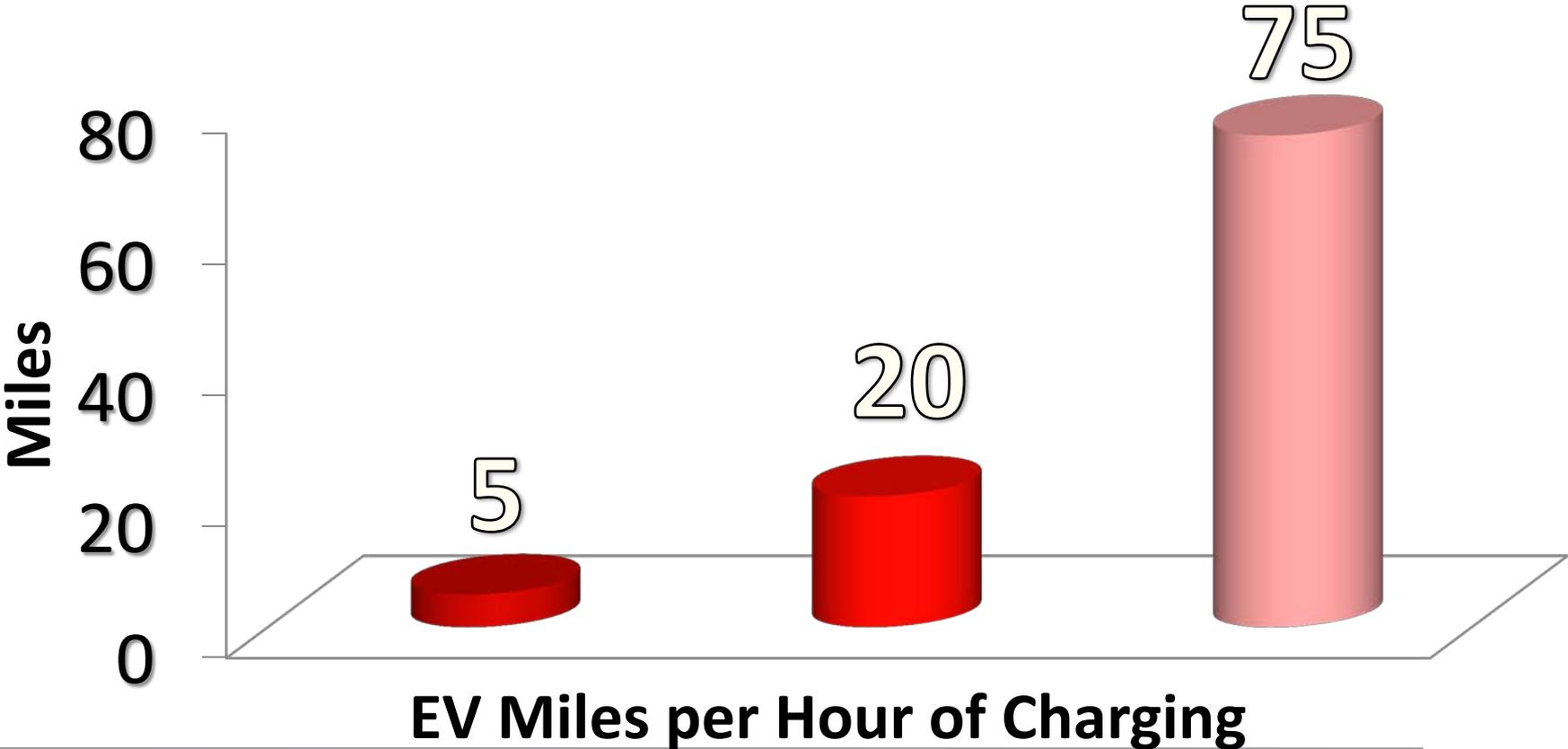


Charging Speed

Level 1 charging
120V

Level 2 charging
208/240V

DC fast charging
480V



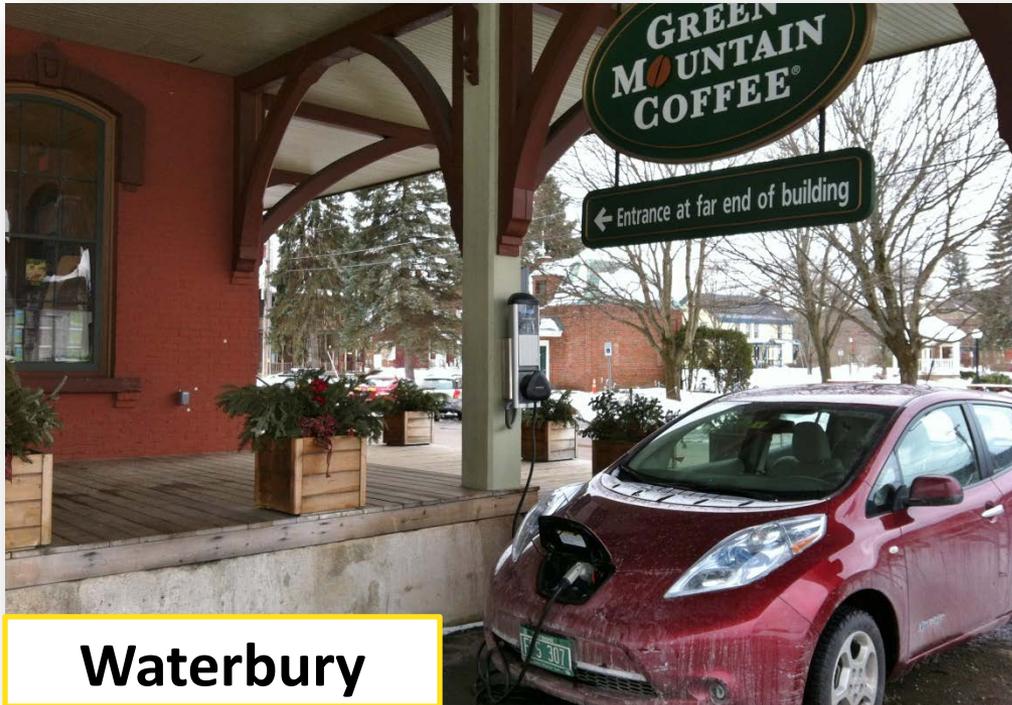
Charging Site Selection Criteria

	Level 1	Level 2	DC Fast
Charge Duration	6-10 hours	1-3 hours	15-30 minutes
Typical Users	<ul style="list-style-type: none"> Employee parking Long term commuter parking 	<ul style="list-style-type: none"> Commercial area Shopping Business 	<ul style="list-style-type: none"> Long trips Convenience
Desirable Characteristics	<ul style="list-style-type: none"> Security Transit Service Workplaces 	<ul style="list-style-type: none"> Transit service Sidewalks Shopping, services, etc. 	<ul style="list-style-type: none"> Amenities at the charging site (food, coffee, Wi-Fi)
Priority Locations	<ul style="list-style-type: none"> Park and ride lots Long term parking Communities where EV ownership is more prevalent 	<ul style="list-style-type: none"> Parking in downtowns, village centers, shopping centers 	<ul style="list-style-type: none"> Near high volume roadways

Charging Station Installation Costs

	Level 1	Level 2	DC Fast
Charge Duration	6-10 hours	1-3 hours	15-30 minutes
Equipment	\$30 – 900	\$600 – 9,000	\$15,000 – 60,000
Installation	\$200 – 450	\$1,000 – 12,000	\$10,000 – 25,000
Total	\$230 – 1,350	\$1,600 – 21,000	\$25,000 – 85,000

Public EV Charging Equipment



Waterbury

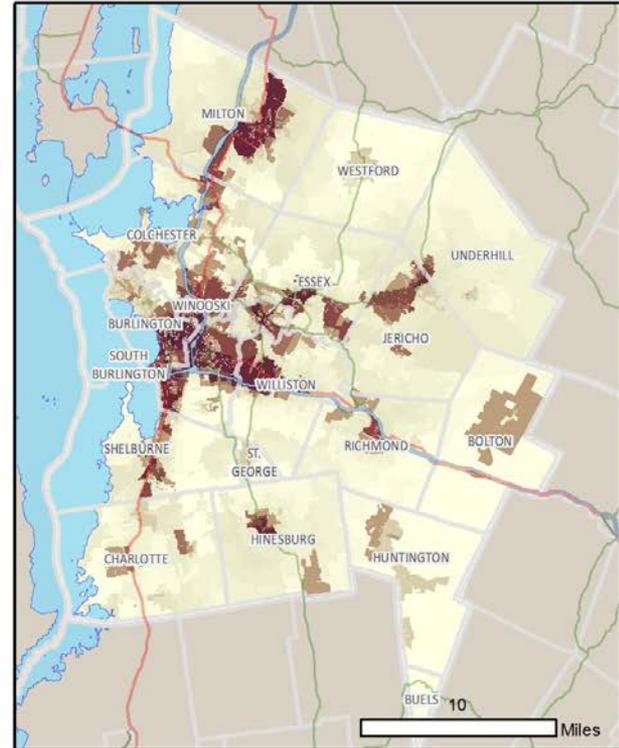
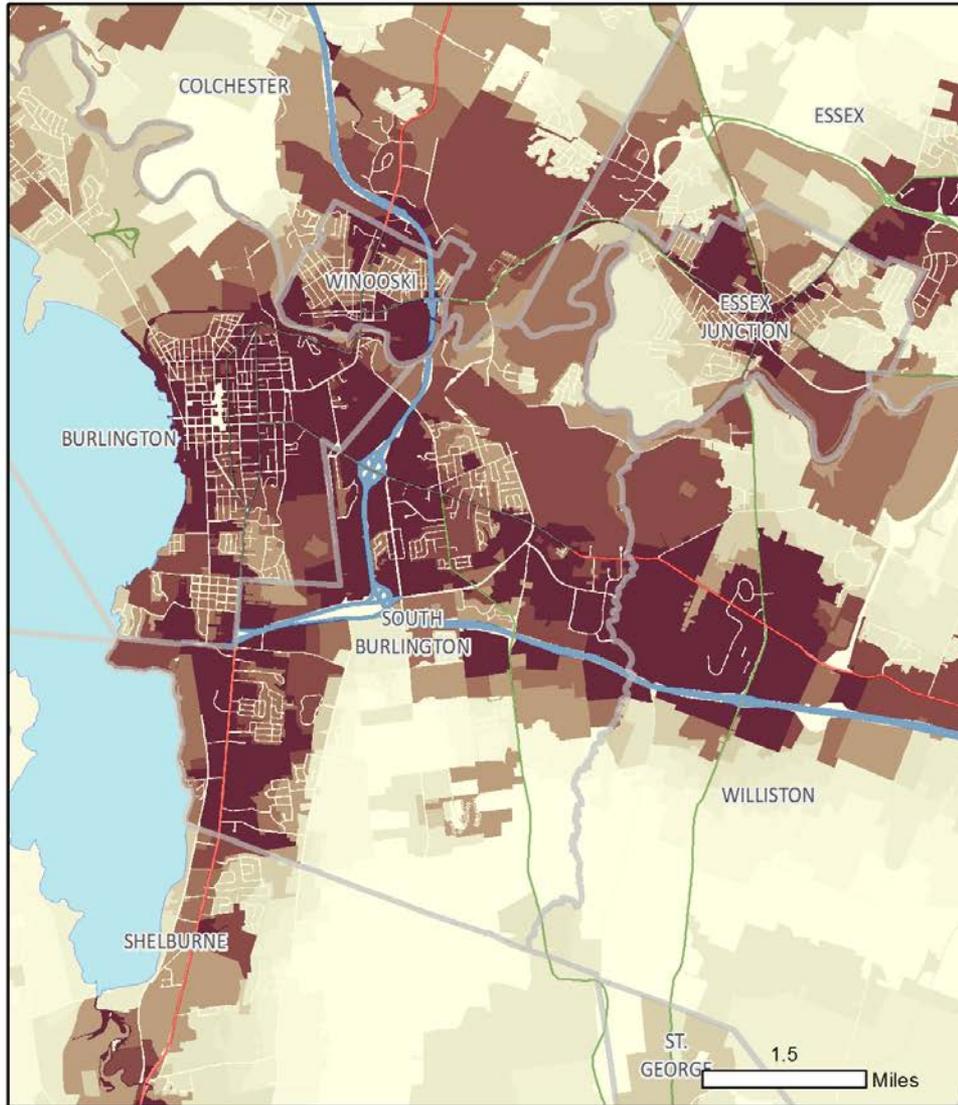


S Burlington



Montpelier

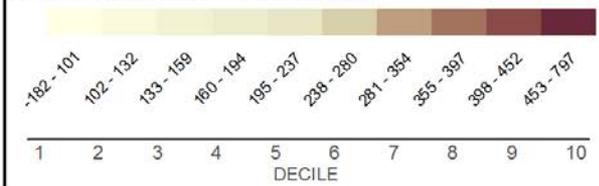
Chittenden County Priority EV Charging Locations



Legend

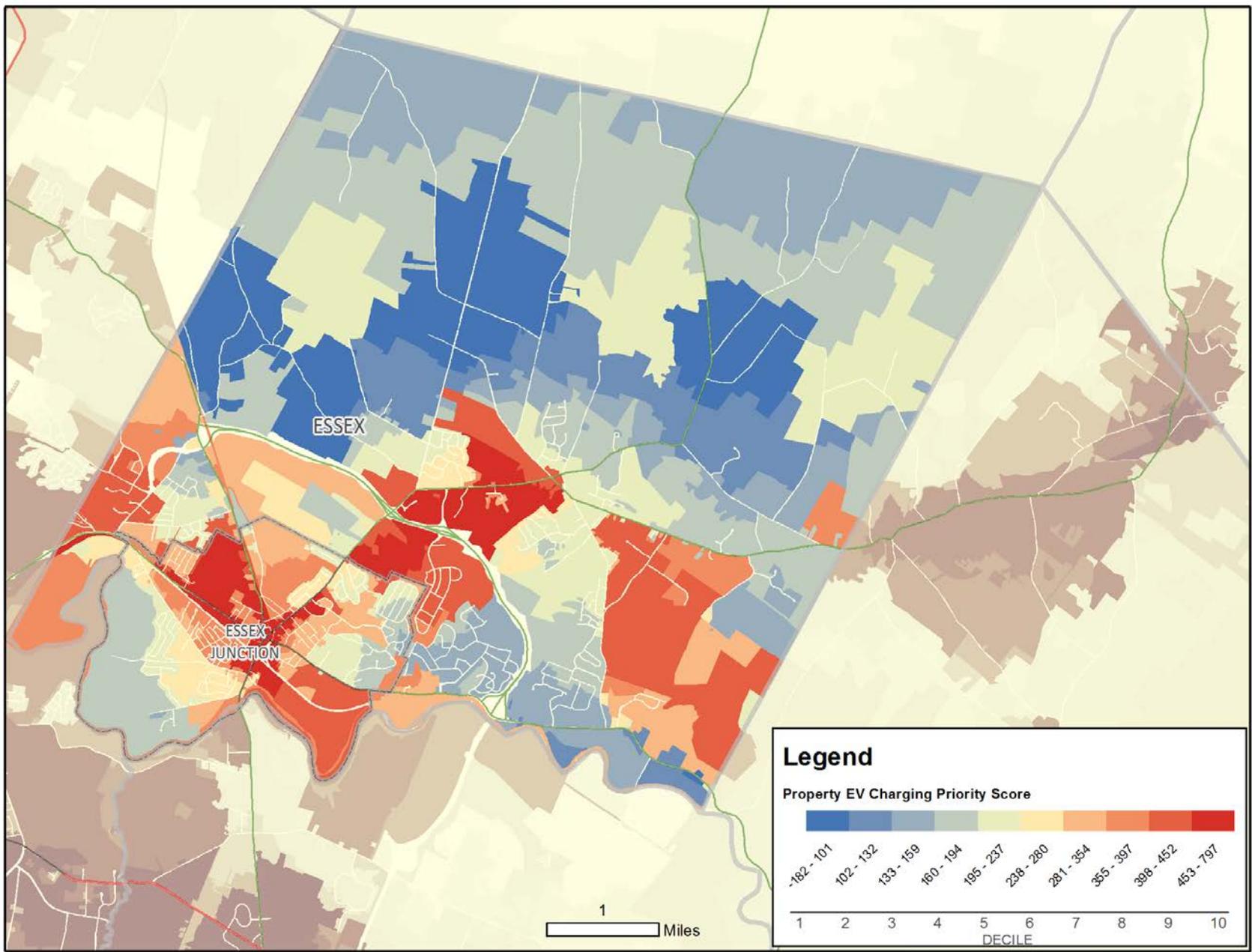
Prioritization Score

See calculation methodology for details



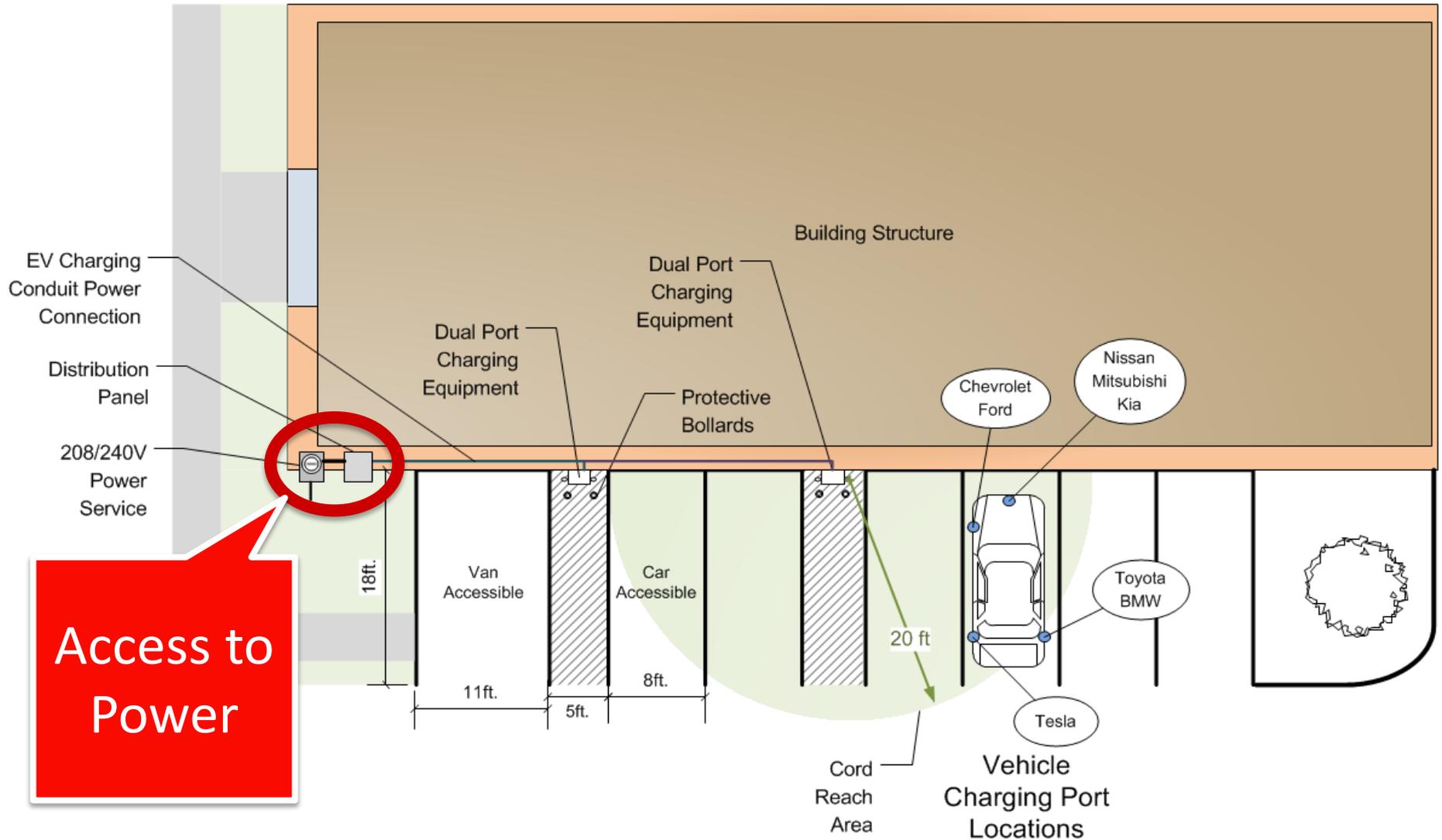
20110128_CCRPC_Map10_PrioritizationScore

Essex Priority EV Charging Locations



1 Miles

Charging Station Planning



Chittenden County EV Activities

- Updating EV charging installation permit requirements for homeowners and businesses
- Meeting with town officials to discuss streamlined permitting and optional local requirements
- Supporting local property owners in developing workplace and public charging
- Data requirements for fleet EV analysis
- Suggest policy language for the energy element of town plans that recommends adoption of bylaw updates related EV charging

Building Energy “Stretch Code”

- Required to meet Act 250 Requirements
- Updated residential stretch code effective Dec 2015
 - Electric Vehicle Charging. For multifamily developments of 10 or more dwelling units, 4% of parking spaces (rounded up to the nearest whole number) shall have a socket capable of providing either a level 1 or level 2 charge within 5 feet of the centerline of the parking space.
 - Level 1 requires one 120V 20 amp grounded AC outlet, or equivalent, for each EV space
 - Level 2 requires one 208/240V 40 amp grounded AC outlet, or equivalent, for each EV space
- Similar commercial stretch code being finalized

Town of Essex EVSE Permitting

- Single Family Residential
 - > \$1,000 or larger than 100 Sq Ft building permit required, processed administratively
- Multi-Family Residential / Commercial / Public
 - Accessory structure exemption if less than 100 Sq Ft
 - Planning commission approval required with 30 day appeal period
 - Building permit also required with 15 day appeal period prior to construction

Potential Model Language

- **Accessory Structure** – codifying EV charging under 100 Sq Ft as an accessory use will streamline permitting
- **Parking** – spaces set aside for EV charging should be included in the calculation of parking requirements.
- **Signage** – wayfinding and parking restriction signage should be treated similar to other small traffic control device permit procedures
- **Fee collection** – charging station owners should be free to set pricing for charging services as market conditions warrant without affecting the land use classification of the property.
- **Definitions** – unified definitions of EV-related issues will help property owners and municipal staff apply the recommended language

Additional Resources

- CCRPC EV Planning
 - <http://www.ccrpcvt.org/ev-planning-resources/>
- Drive Electric Vermont
 - <http://driveelectricvt.com>
 - <https://www.facebook.com/DriveElectricVT>
- National EV websites
 - <http://www.afdc.energy.gov/fuels/electricity.html>
 - <http://goelectricdrive.com>
 - <http://www.pluginamerica.org>
 - <http://www.electricdrive.org>
 - <http://www.greencarreports.com/>