

# Electric Cars 101

## Charlotte Energy Committee

MAY 23, 2018

*It's time.*

PLUG IN, VERMONT

Drive  
Electric  
Vermont

# Why Electric Transportation?



Clean Air

Energy

Affordability



Climate Change

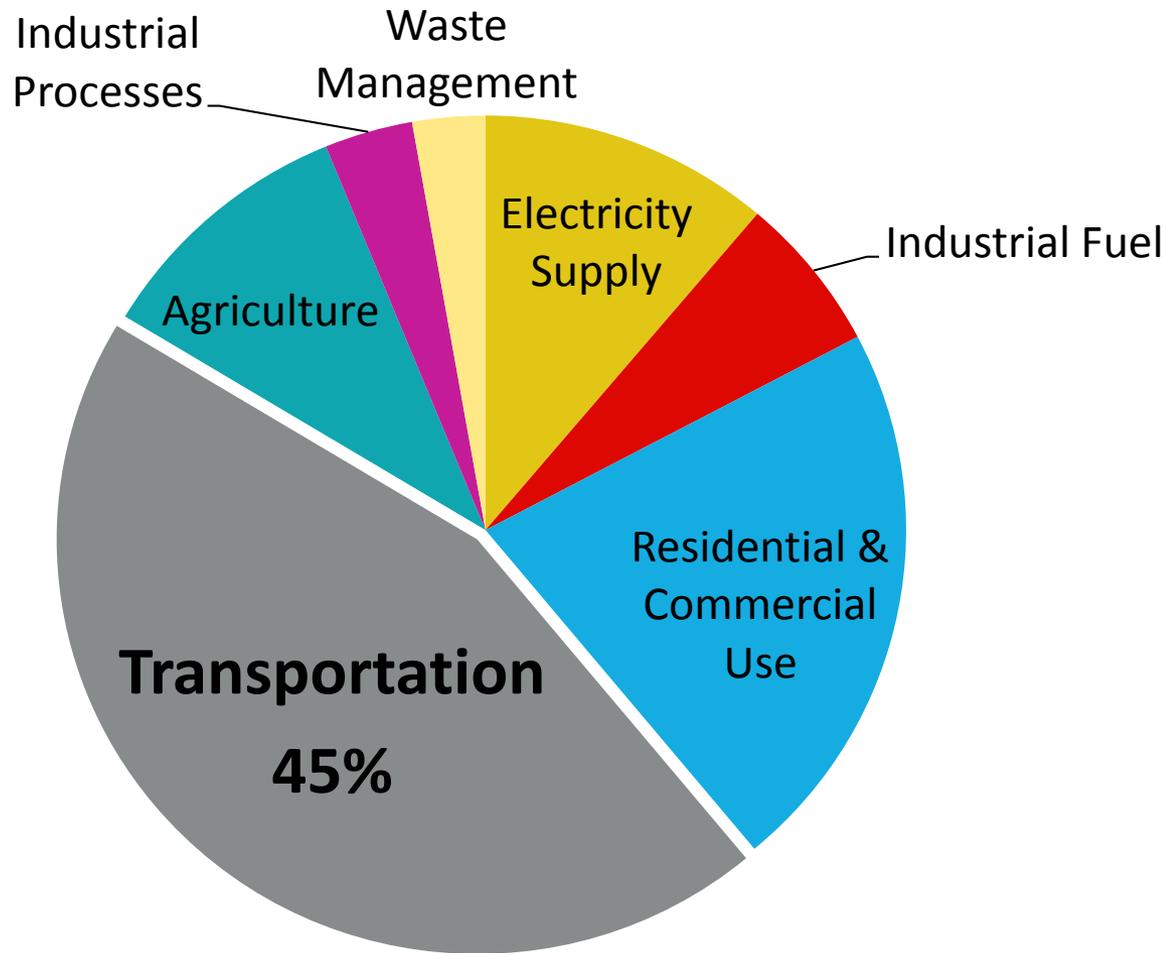


# Overview

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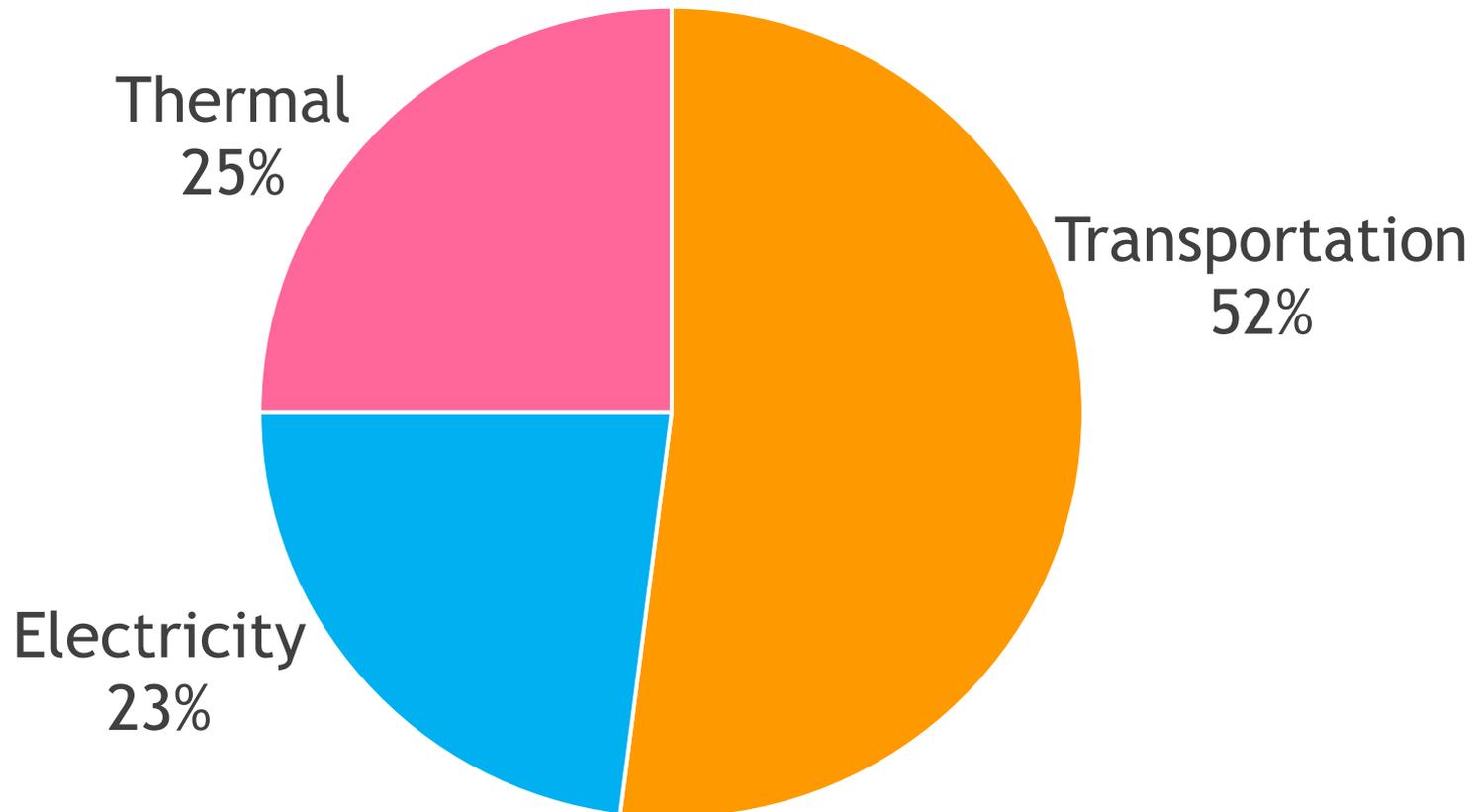
1. Plug-in Electric Vehicle Overview
  - a. Vehicle types
  - b. Charging
  - c. Market Trends
  - d. Purchase Considerations
  
2. State / Municipal Support
  - a. State Building Energy Code Requirements
  - b. Local plan language / Bylaw updates
  - c. EV charging development
  - d. Events and outreach

# Vermont Greenhouse Gas Emissions

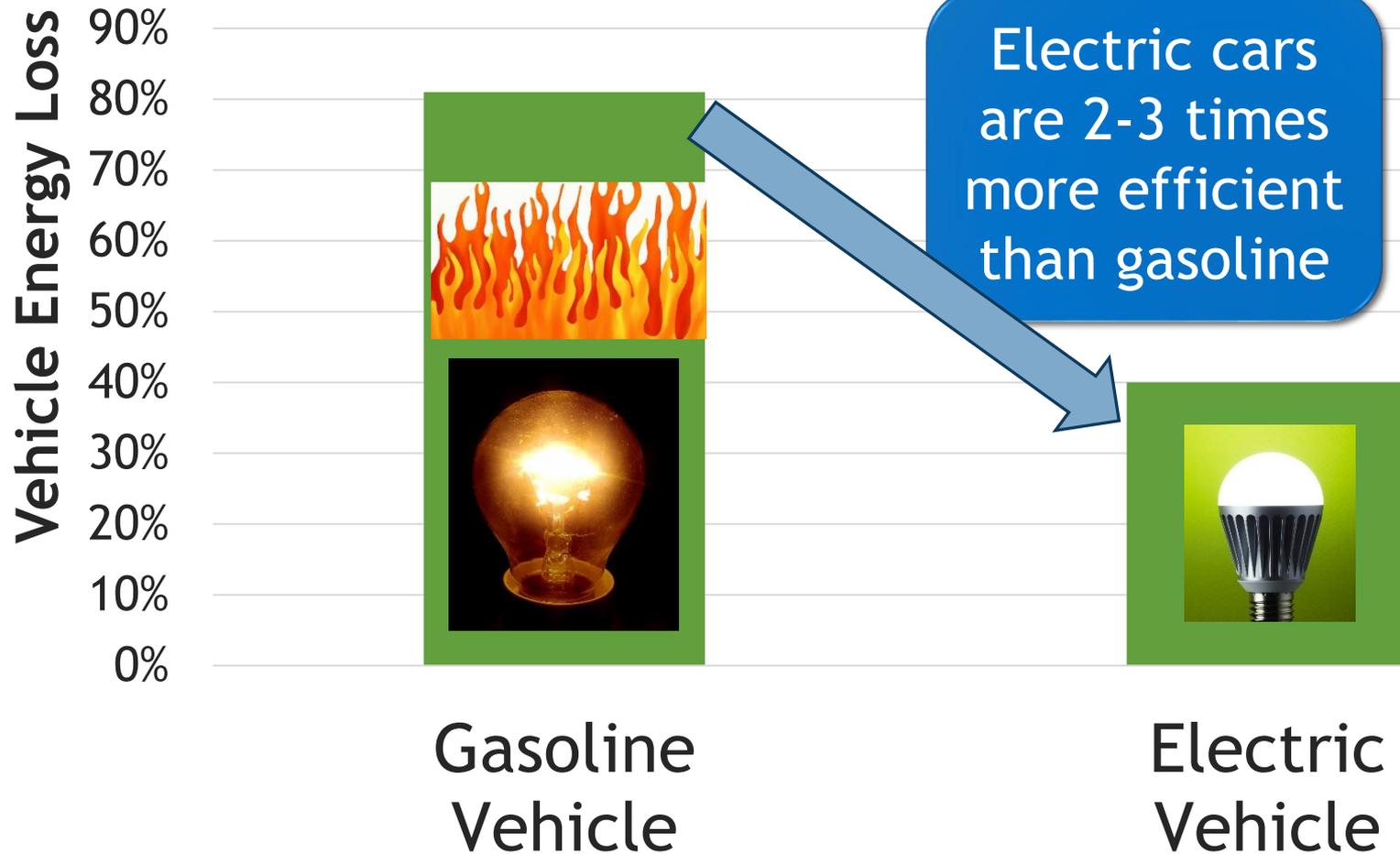


# Transportation Energy Burden

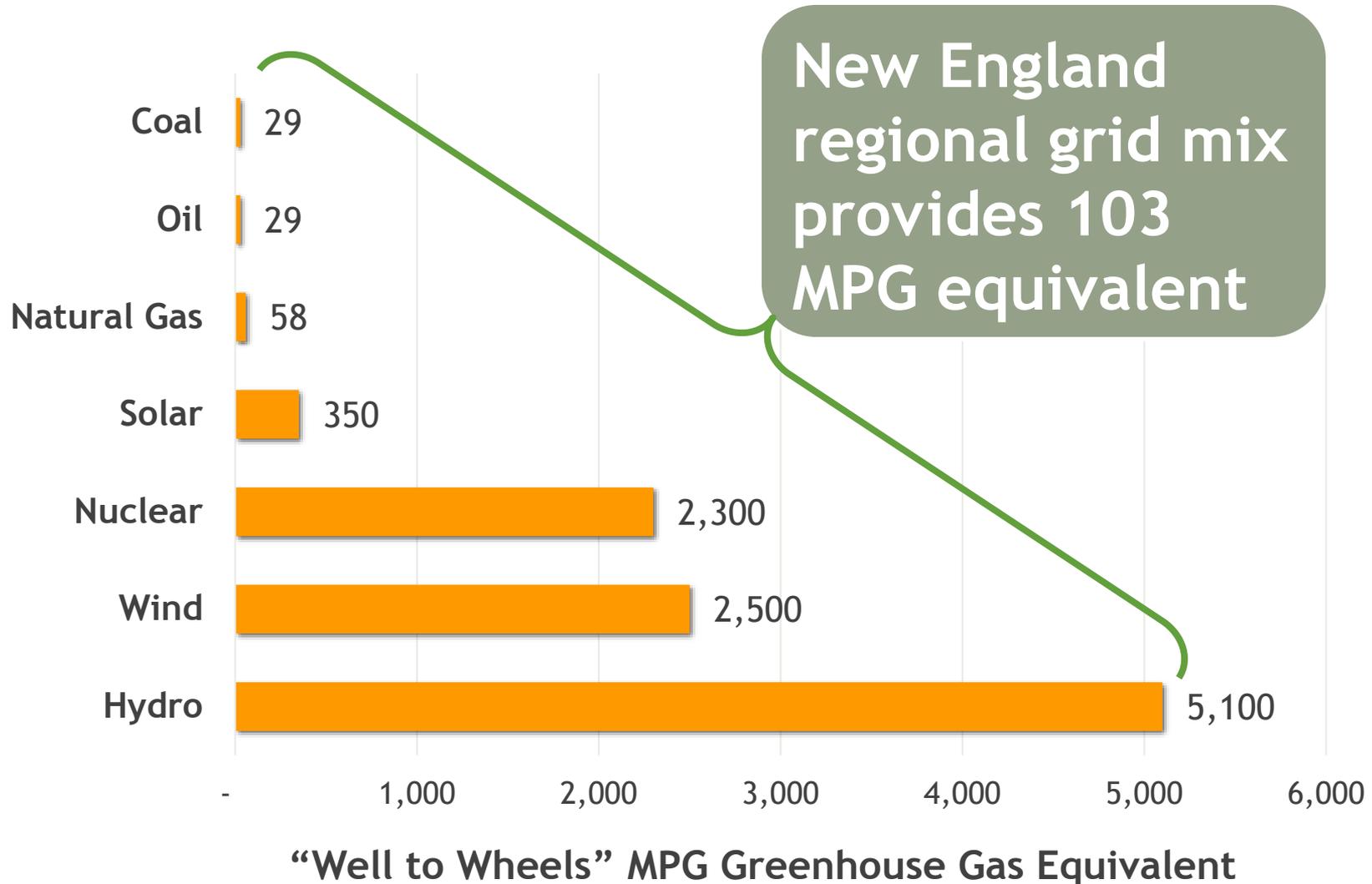
Total Energy Spending for Vermont Households



# Light Duty Vehicles

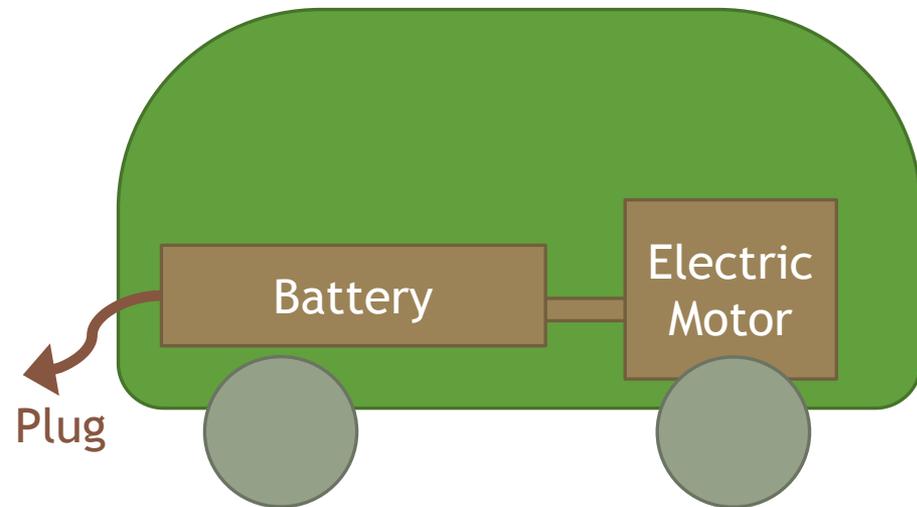


# EV Greenhouse Gas Emissions



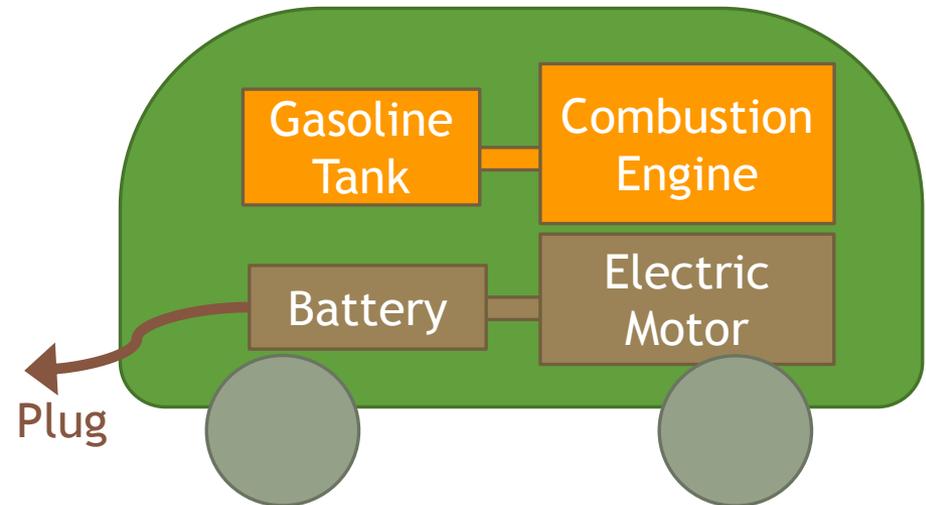
# Types of Plug-in Vehicles

## All Electric



70 - 300+ Mile Range on Battery

## Plug-in Hybrid



15 - 80 Mile Range on Battery  
+  
300 or More Miles on Gasoline

# All-Electric Vehicles in Vermont

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Compact to Full Size

Many Automakers

- Nissan
- Tesla
- Chevrolet
- Volkswagen
- Mitsubishi
- + others



# Plug-in Hybrid Vehicles in Vermont

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Wide range of models



Popular Automakers

- Toyota
- Chevrolet
- Mitsubishi
- Ford
- BMW



# Other Electric Options

## Electric Buses



## Electric Motorcycles and Bicycles



## Off-road equipment



# Recent arrivals

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**2017**

**Chevrolet Bolt**



**2018**

**Tesla Model 3**



**Chrysler Pacifica Hybrid**



**30+ additional  
models in next 5  
years**

# EVs in Vermont Conditions

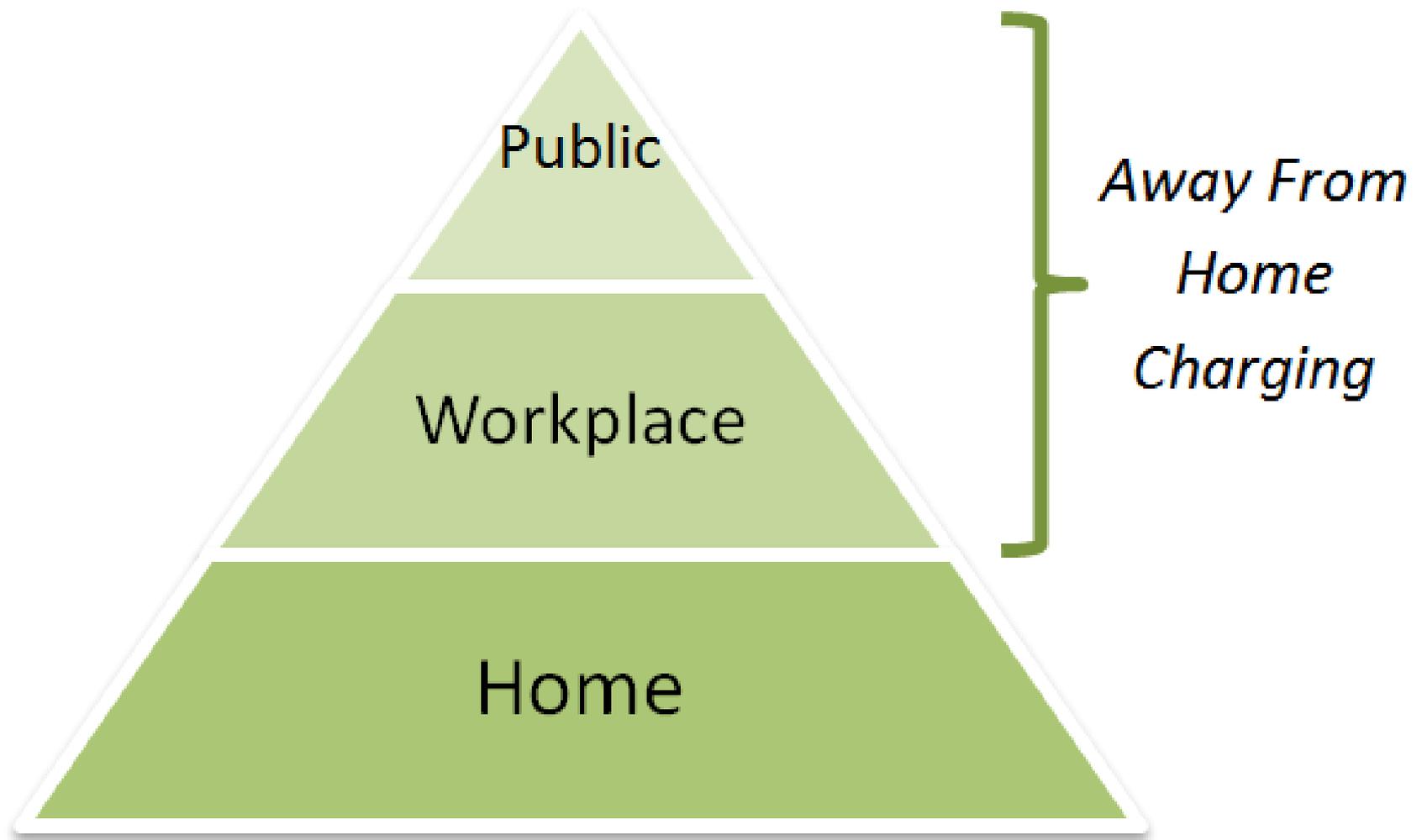
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Cold weather reduces electric range 20-40%



# EV Charging

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# Charging Equipment

## Level 1 Charging

120V

5 miles range / hr



## Level 2 Charging

240V

10-20 miles / hr



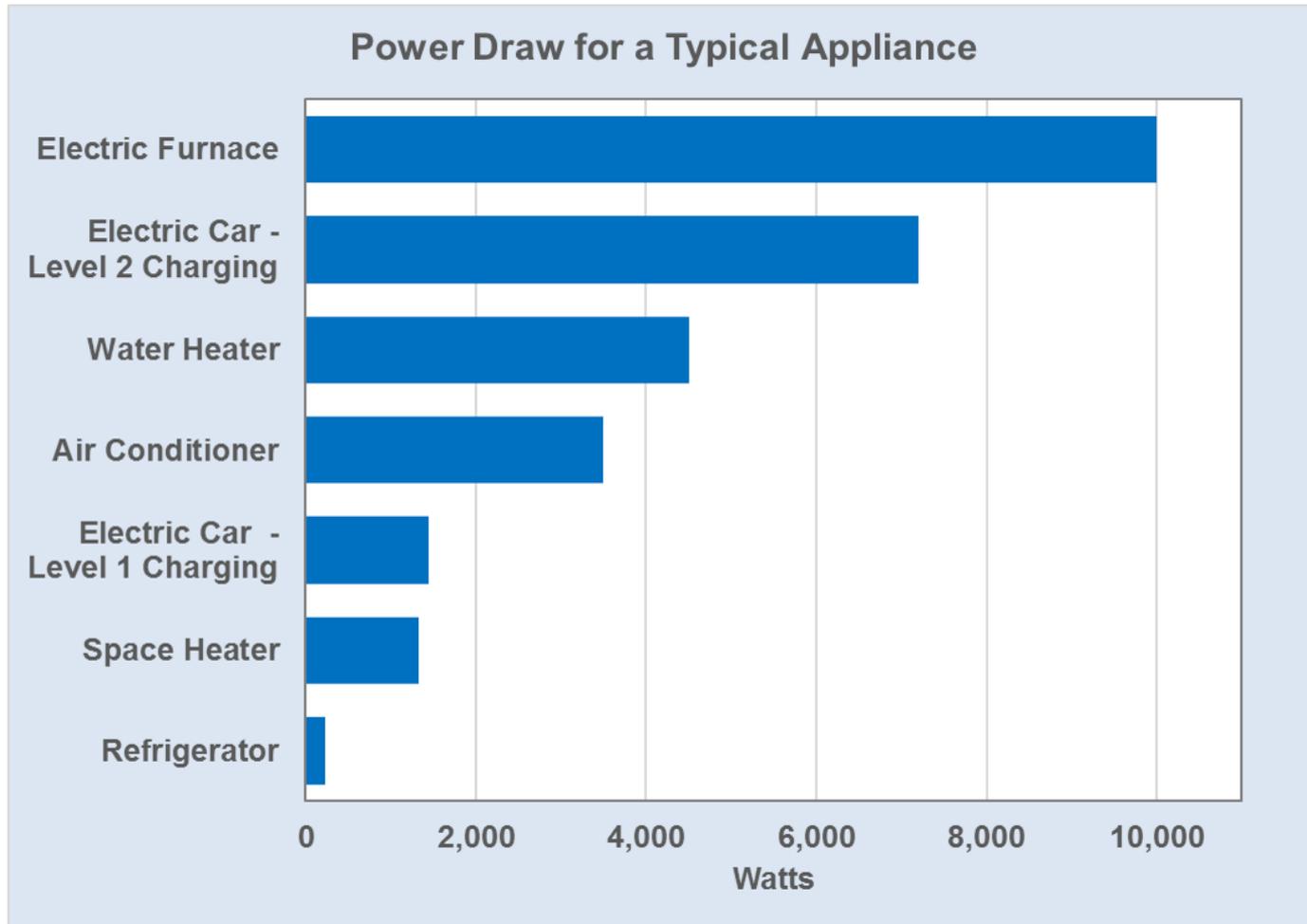
## DC Fast Charging

480V

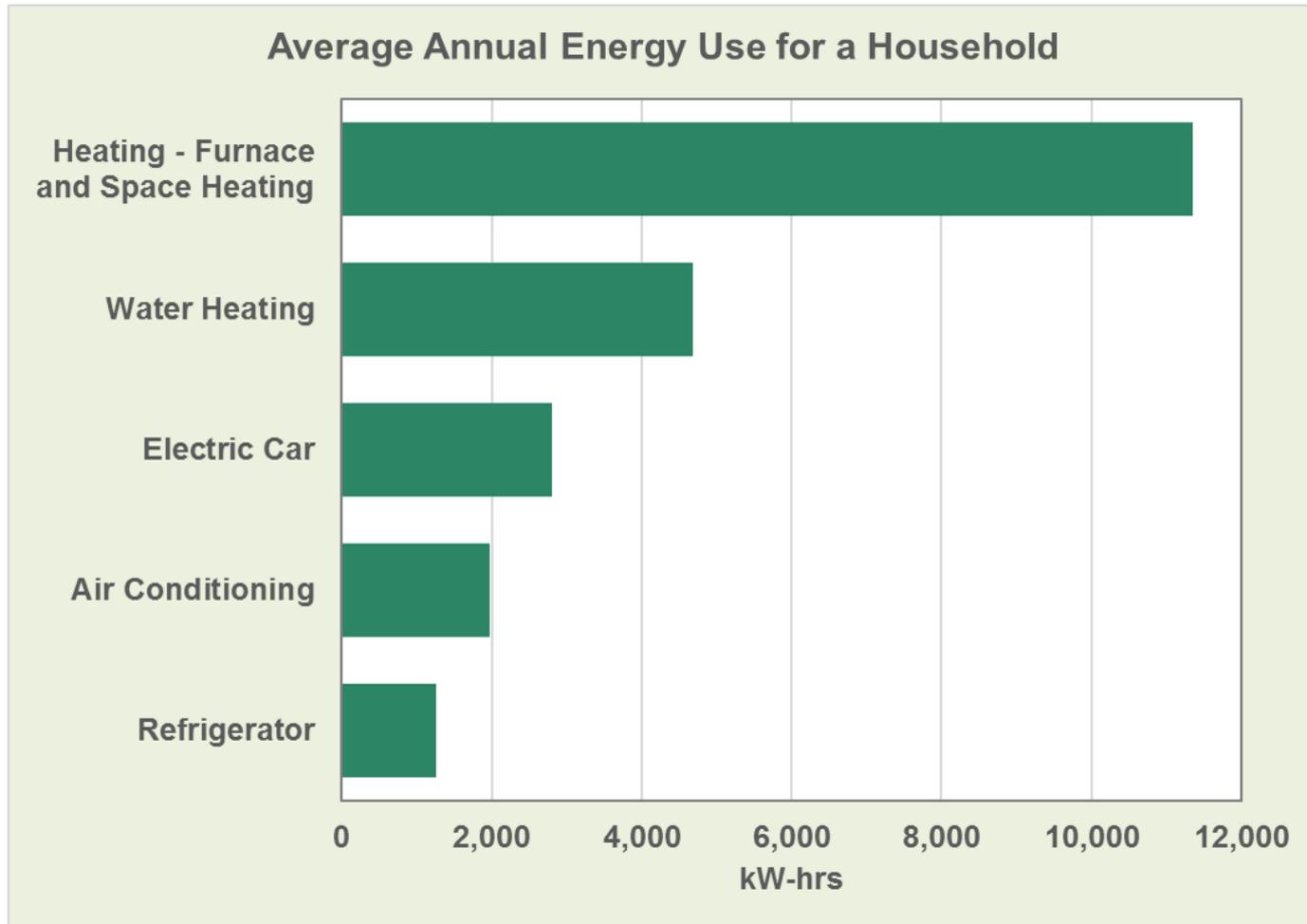
70+ miles / hr



# Home EV Charging Power Draw



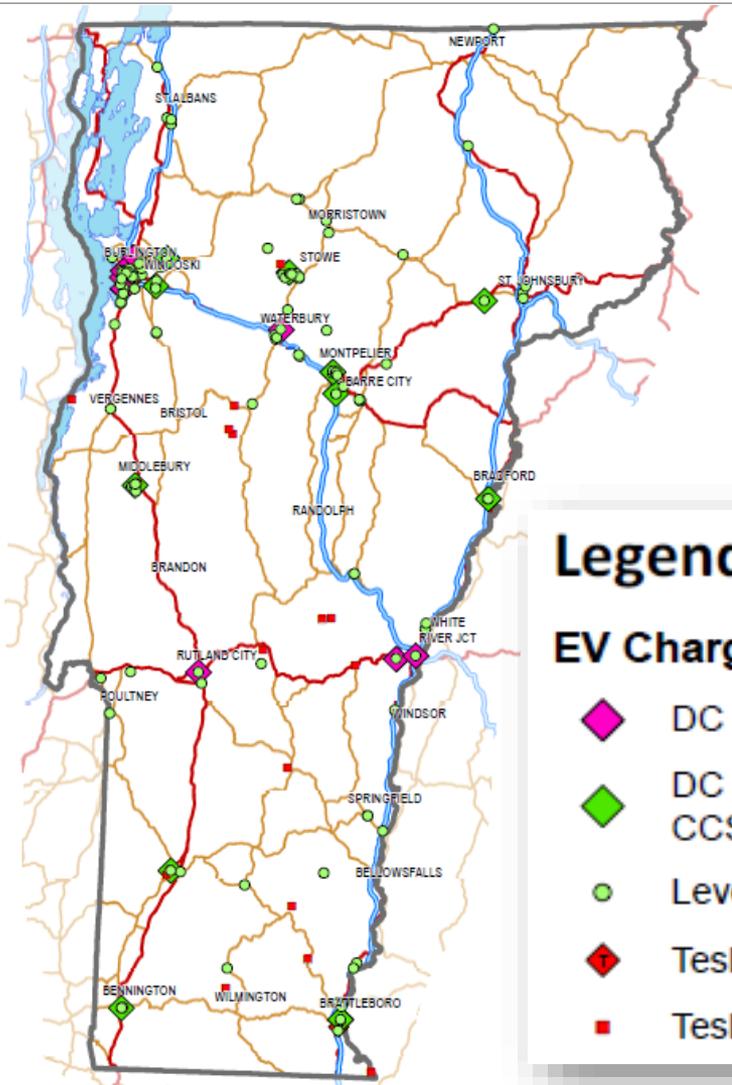
# Home EV Charging Energy Use



# DC Fast Charging Plugs



# EV Public Charging Availability



May 2018

- About 165 Public Locations
  - 24 with DC Fast Charging

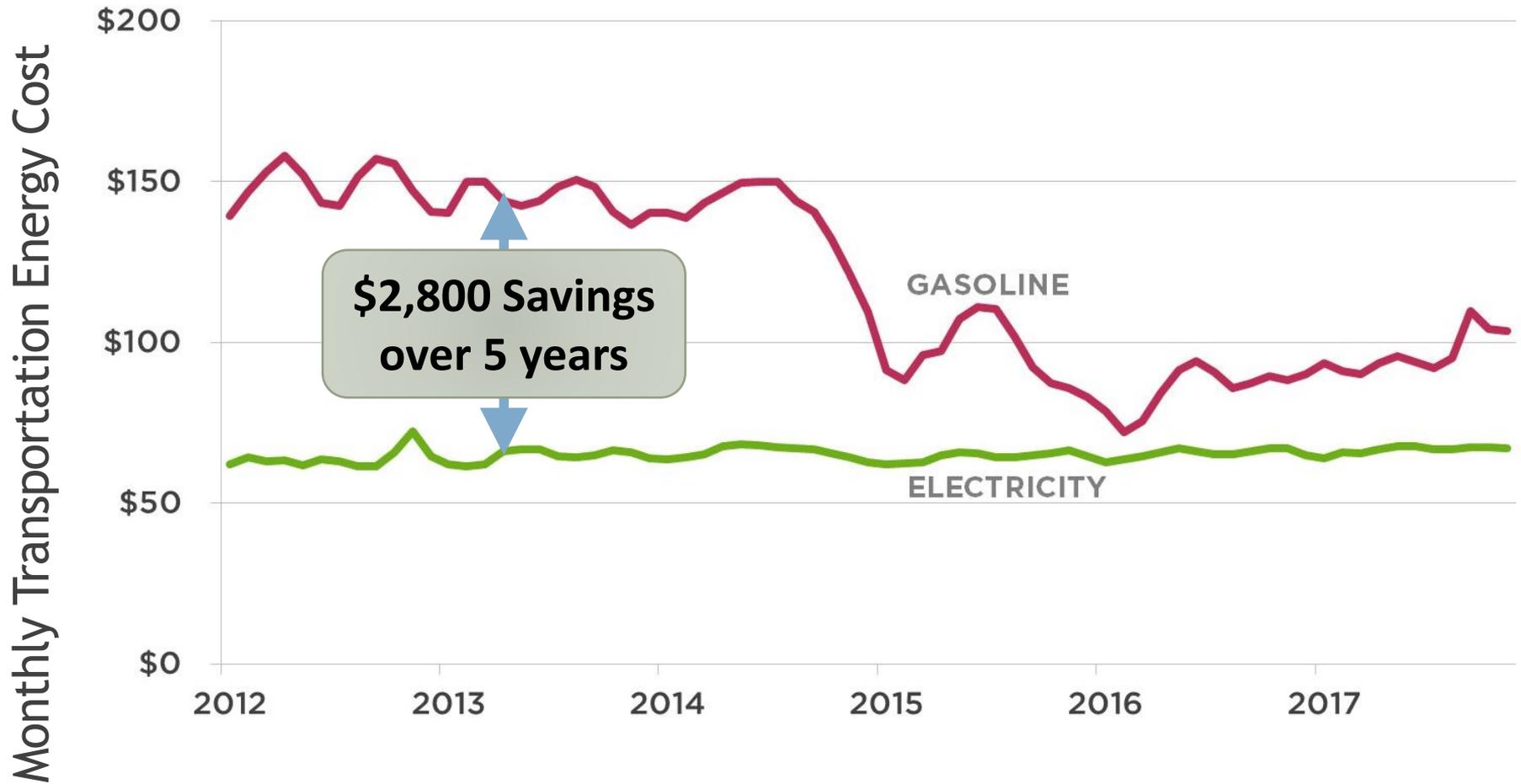
## Legend

### EV Charging Locations

- ◆ DC - CHAdeMO only (9)
- ◆ DC - CHAdeMO & SAE CCS (11)
- Level 1 or 2 (122)
- ◆ Tesla Supercharger (3)
- Tesla Level 2 (21)

*Potential VW diesel mitigation funding for EV charging starting in summer 2018*

# Monthly Cost Comparison



Source: US Energy Information Administration and VEIC  
Assumptions: 25 mpg gasoline vehicle; 3 mile per kWh EV; 1,000 miles per month

# Renewably Powered EVs

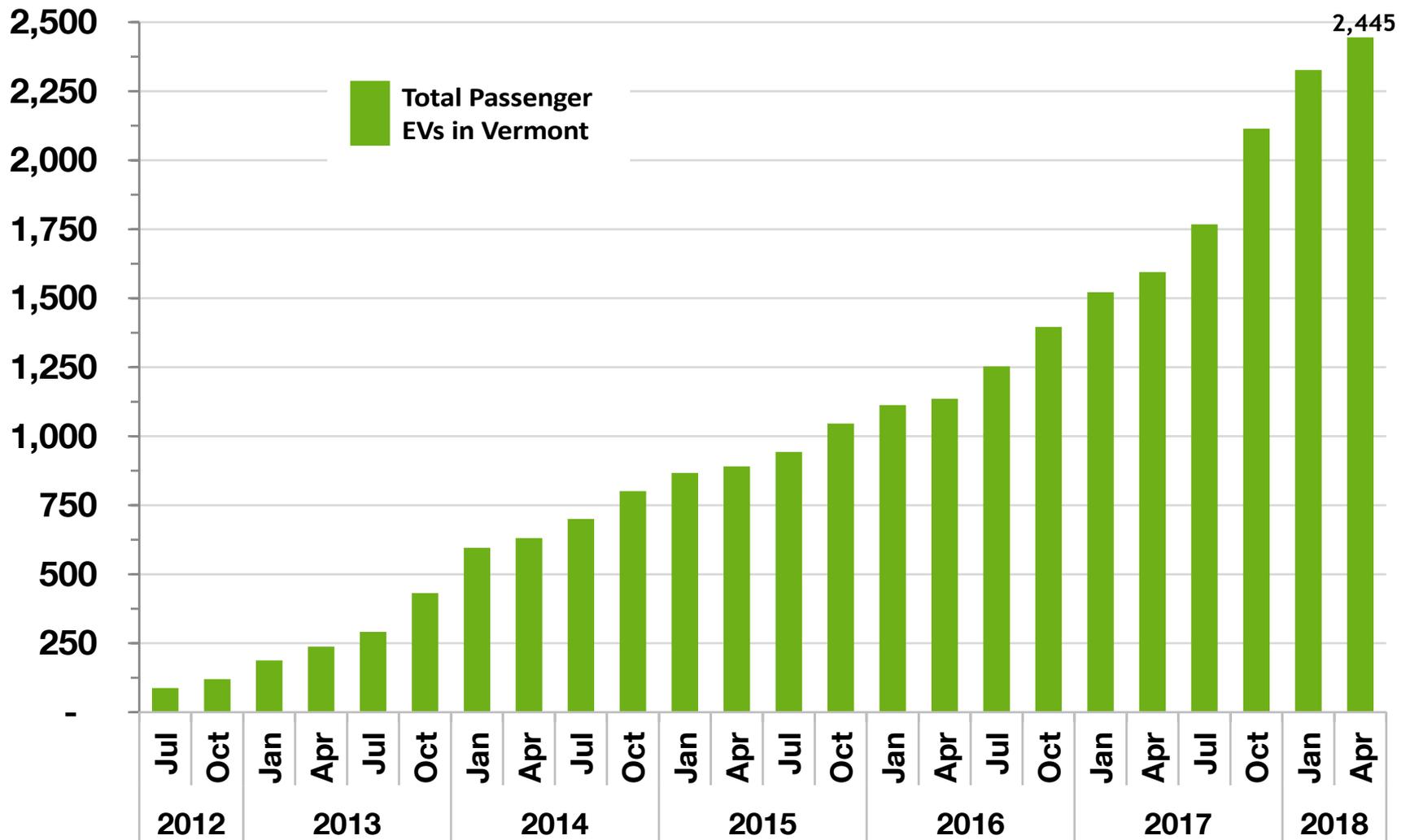
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Power your next  
adventure with solar.

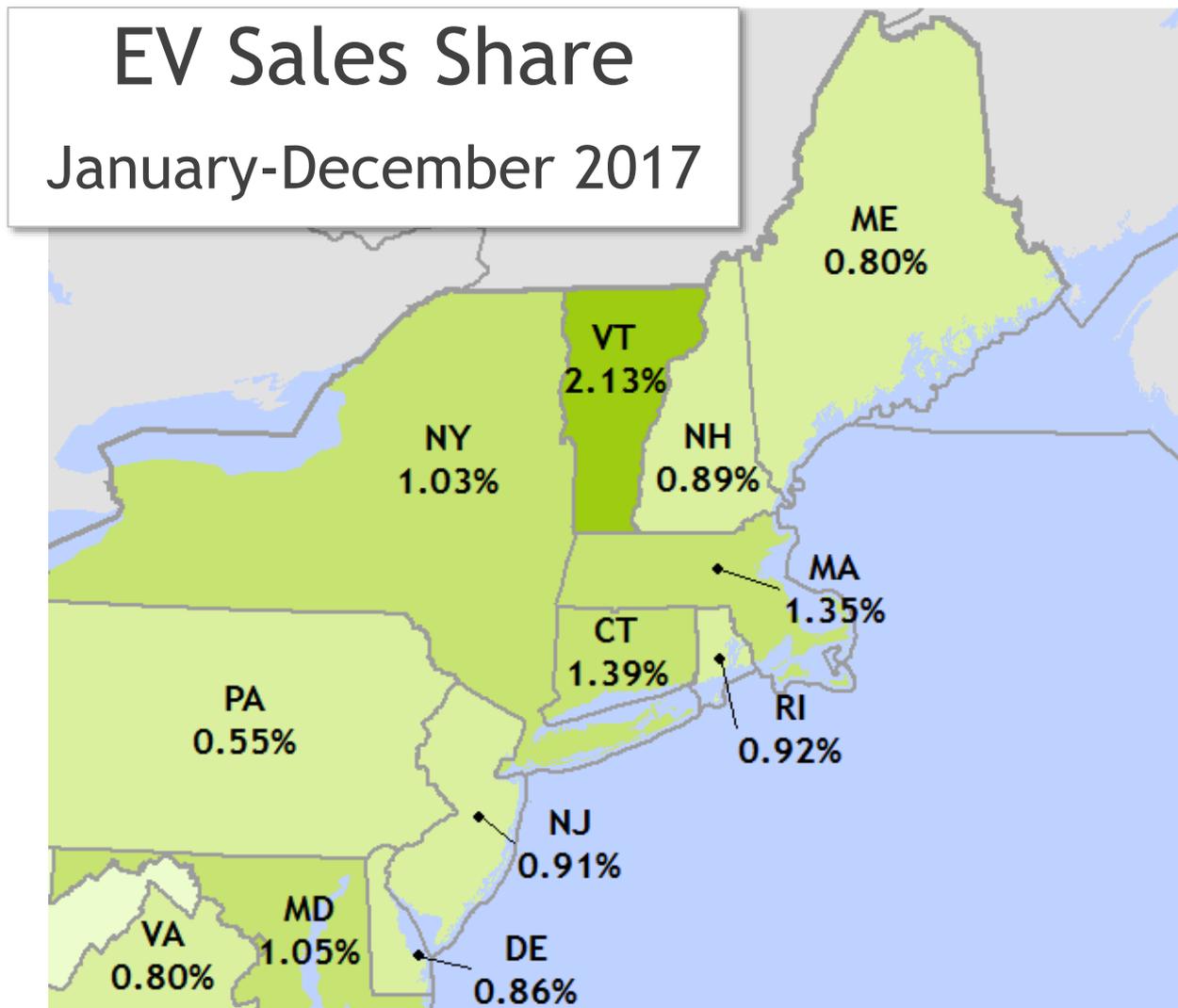


- About 3 miles per kWh
- <http://www.driveelectricvt.com/solar>

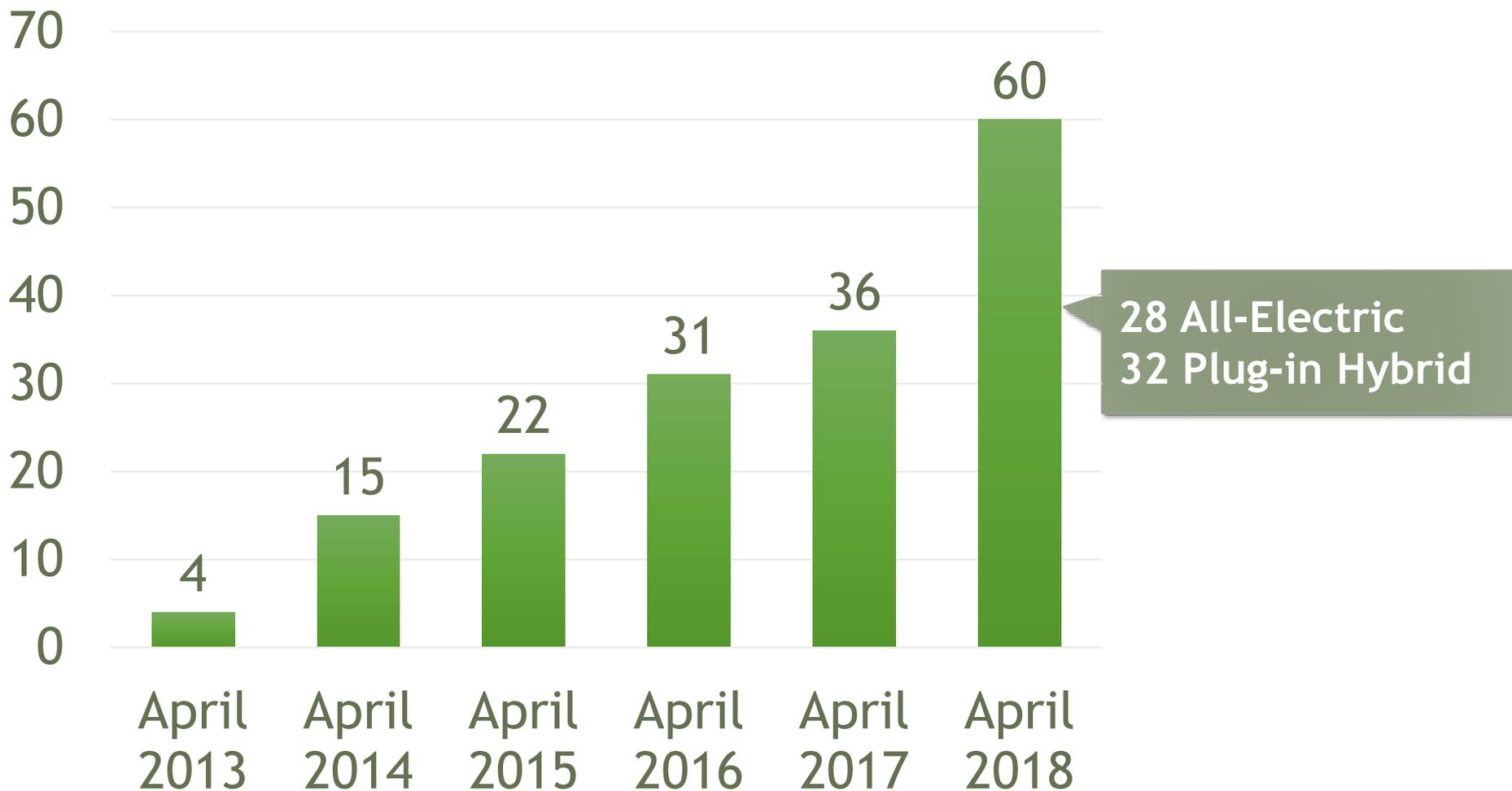
# Vermont EV Registrations



# Regional EV Market Trends



# Charlotte EV Registrations



# Purchase Incentives

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## 1. Federal Tax Credit

- a. Up to \$7,500, based on battery size
- b. Begins to sunset when manufacturer reaches 200,000 EV sales
- c. Claim on income taxes (unless leasing)
- d. Does not carry-over into future years

## 2. Employee Benefit Programs

# Electric Utility Incentives



**Burlington Electric Department** is offering customers a \$1,200 rebate on the purchase or lease of a new All-Electric Vehicle or \$600 on a Plug-in Hybrid Electric Vehicle priced below \$50,000. Moderate income customers are eligible for an additional \$600 incentive on an all-electric vehicle. This program is anticipated to be available through the 2018 calendar year and may be renewed or modified in future years. Customers may purchase a qualifying EV from any dealership in Vermont or beyond and are limited to one rebate per household or business.

Visit [BED's Electric Vehicle program resources](#) for more information on these incentives.

BED has also partnered with local credit unions on low-interest financing options for electric vehicle purchases that rolls in their incentive. Learn more in this [Vermont Business Magazine article](#).



**Green Mountain Power** offers customers free Level 2 (240 Volt) charging equipment with a *new* electric vehicle purchase. Existing electric car owners can obtain Level 2 equipment from GMP for a \$9.99 monthly fee. Customers with GMP charging equipment can also take advantage of a special rate offering unlimited electric car charging during off-peak hours for \$29.99/month. Visit their [in-home charging page](#) for more details.

GMP is also offering a \$600 electric car purchase incentive for low-to-moderate income households. Interested customers are encouraged to visit GMP's [EV rebate page](#) for additional details.



**Vermont Electric Coop** is offering **customers** a \$500 bill credit for the purchase of a new or used all-electric vehicle or \$250 for a plug-in hybrid vehicle. Customers leasing an all-electric car are eligible for up \$100 in bill credit for each year of the lease or \$50 for each year of the lease for plug-in hybrid vehicles.

Visit their [Energy Transformation Program](#) resources for more information.



**Vermont Public Power Supply Authority** has an electric car rebate program for customers of the following municipal electric utilities: **Barton Village, Village of Enosburg Falls, Hardwick Electric Department, Village of Jacksonville, Ludlow Electric Light Department, Lyndonville Electric Department, Morrisville Water and Light Department, Northfield Electric Department, Village of Orleans, and Swanton Village.**

The rebate amount is \$800 for the purchase or lease of a new all-electric vehicle or \$400 for a plug-in hybrid vehicle. Low income customers are eligible for an additional \$200 incentive.

VPPSA's [electric car rebate form](#) has more information on redeeming this offer.

# Lease vs Buy

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## 1. Lease Benefits

- a. Over half of EVs leased
- b. Tax credit included in lease, offering good deals
- c. Rapid technology advancement
- d. Less worry over battery and other components since vehicle will be under warranty

## 2. Purchase Benefits

- a. Lowest total cost of ownership
- b. No mileage limitations like leasing
- c. Some manufacturers may not offer EV leases

# New vs Used

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## 1. New

- a. Tax credit available
- b. New vehicles generally have more range and better performance in Vermont conditions
- c. Less worry over battery and other components since vehicle will be under warranty

## 2. Used

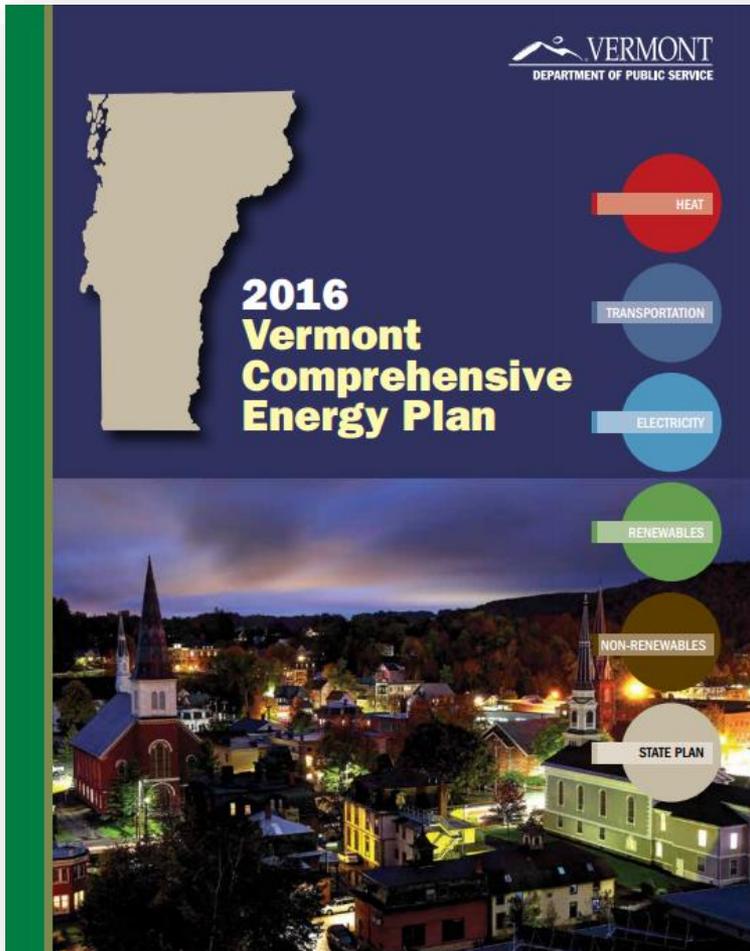
- a. Growing availability, now about 15% of Vermont EV market
- b. Lowest total cost of ownership
- c. No federal tax credit

# Shopping Tools

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1. Drive Electric Vermont website  
<http://www.driveelectricvt.com/>
2. TrueCar (pricing info)  
<http://truecar.com>
3. FuelEconomy.Gov  
<http://www.fueleconomy.gov/>
4. Automaker / EV websites and forums  
<http://www.greencarreports.com/>  
<http://www.insideevs.com/>

# 2016 Comprehensive Energy Plan



\$1.5 billion in annual gasoline and diesel fuel purchases

## Transportation Goals

- 20% reduction in transportation energy use by 2025
- 10% renewable transportation by 2025

90% Renewable by 2050 across all sectors

# Building Energy “Stretch Code”

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1. Required to meet Act 250
2. Updated residential stretch code effective Dec 2015

Multifamily developments of 10 or more dwelling units will require 4% of parking spaces to offer a socket capable of providing either a level 1 or level 2 charge within 5 feet of the centerline of the parking space.

3. Similar commercial stretch code requirements

# Potential Model Bylaw Language

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**Accessory Structure** - codifying EV charging under 100 Sq Ft as an accessory use may streamline permitting

**Parking** - spaces set aside for EV charging should be included in the calculation of minimum 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

*Comprehensive plan language also available*

# VW Settlement Opportunities

- Electric Buses
- Other Heavy Duty EVs
- EV Charging

Vermont Updates

<http://dec.vermont.gov/air-quality/vw>



# EV Events and Outreach

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- Front Porch Forum
- EV Demo Events
- Other?



# Summary

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- Growing EV options
- EVs are good for residents
- EVs are good for Vermont
- Much work to be done!

