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Electric Vehicles: Their Promise, Challenge and Future Role in Vermont

VECAN | December 1, 2012

Karen Glitman | *VEIC*

Vehicle Efficiency

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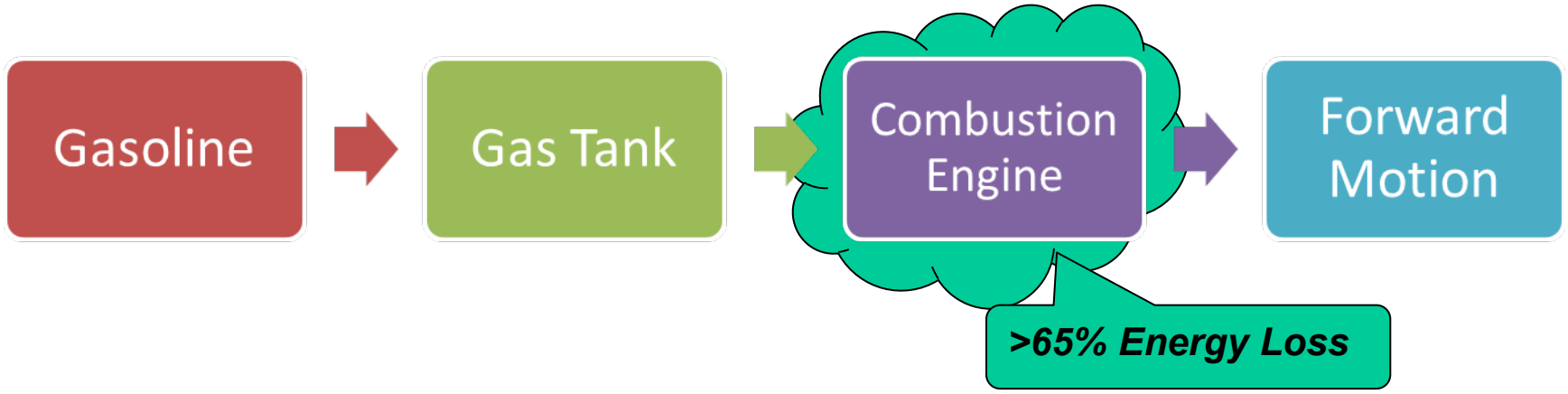
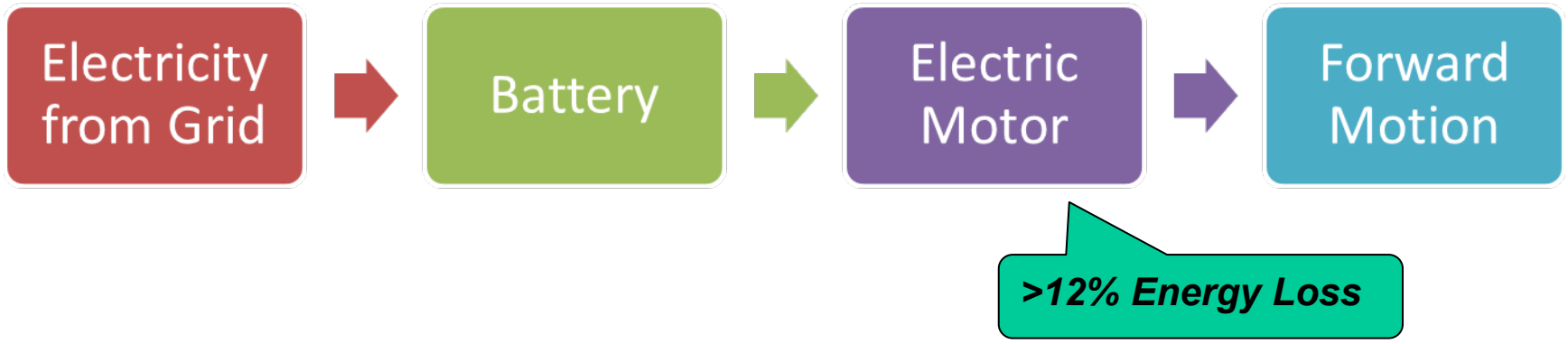
Internal Combustion Vehicle Efficiency



Electric Vehicle Efficiency



Types of Electric Vehicles

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- **Hybrid Vehicles – Do Not Plug-In**

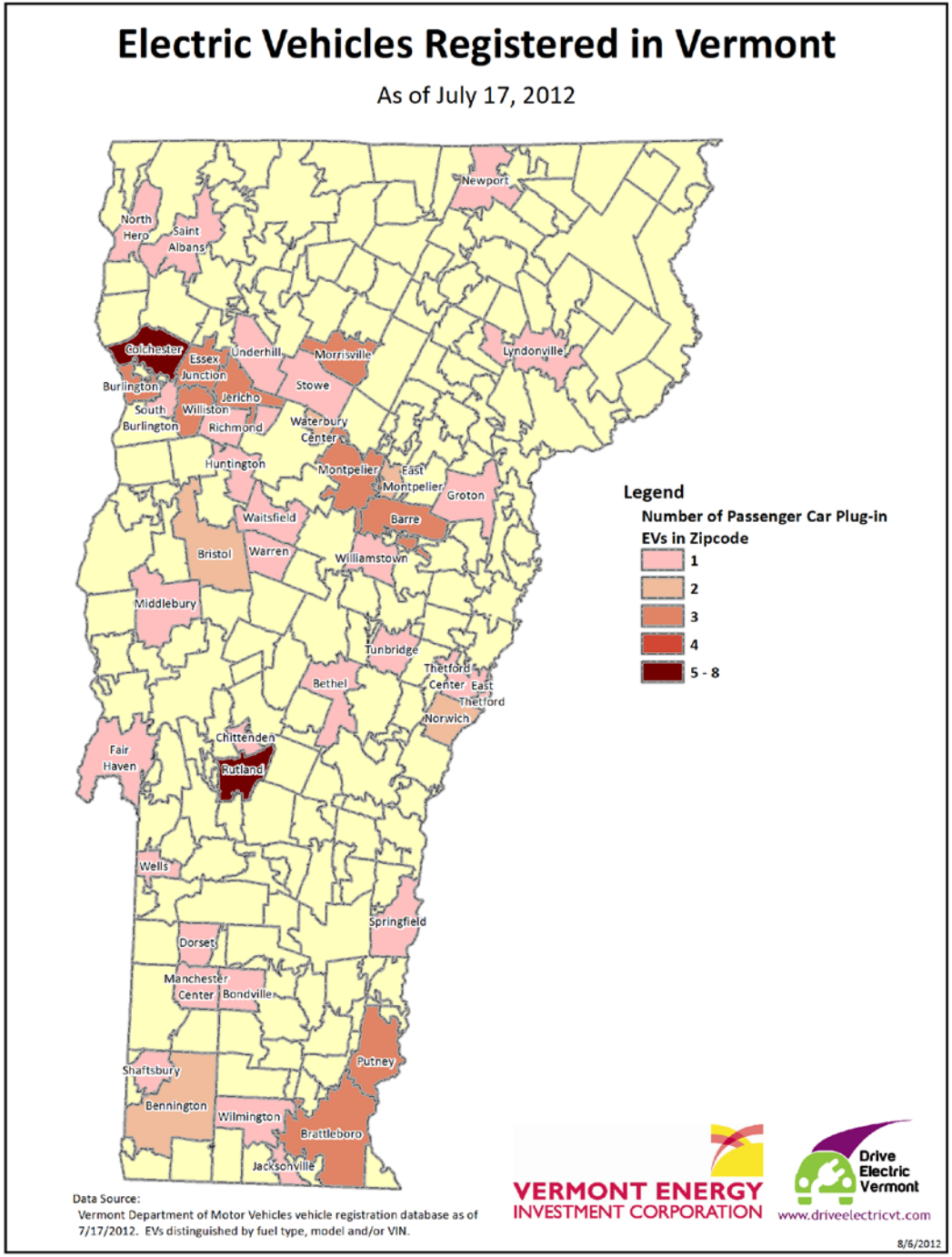
  Powers the vehicle using the engine, electric motor, or both. Electric motor uses energy stored in batteries and is charged by the engine and through regenerative breaking.

- **Plug-in Hybrid Vehicles**

  Both an internal combustion engine and electric motor that recharges from the electric grid and allows the vehicle to drive on electricity alone.

- **All Electric Vehicles**

  No gasoline.



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Electric Vehicle Registration Tracking

OEM goals and offerings

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OEM	Current Electric Offerings	Soon to be released	Manufacturer Sales Targets
BMW	ActiveE Fleet	i3, i8	
Coda	Coda Electric (AEV)		N/A (all electric)
Fiat		500 (2013)	
Fisker	Karma (PHEV)		N/A (all electric)
Chrysler	Smart ED	Town & Country minivan (test fleet out now)	
Ford	Focus E (AEV)	Fusion, Energi, C-Max Hybrid,	10-25% of 2020 sales electric
GM	Chevy Volt (PHEV)		10% of 2020 sales electric, hybrid
Mercedes		B class E cell	
Mitsubishi	i-MiEV (AEV)		20% electric and hybrid by 2020
Nissan	Leaf (AEV)		10% of 2020 sales electric
Tesla	Roadster, Model S (AEV)		N/A (all electric)
Toyota	Prius Plug-In		20-30% of 2020 sales electric and hybrid

Charging levels

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Level 1 Charging

Level 1 Charging - Standard House Outlet

Level 2 charging

DC Fast Charging

Blink DC Fast Charge Station
photo by ECOtality

Inductive charging

More than 1.5 million charge stations by 2017

—Pike Research

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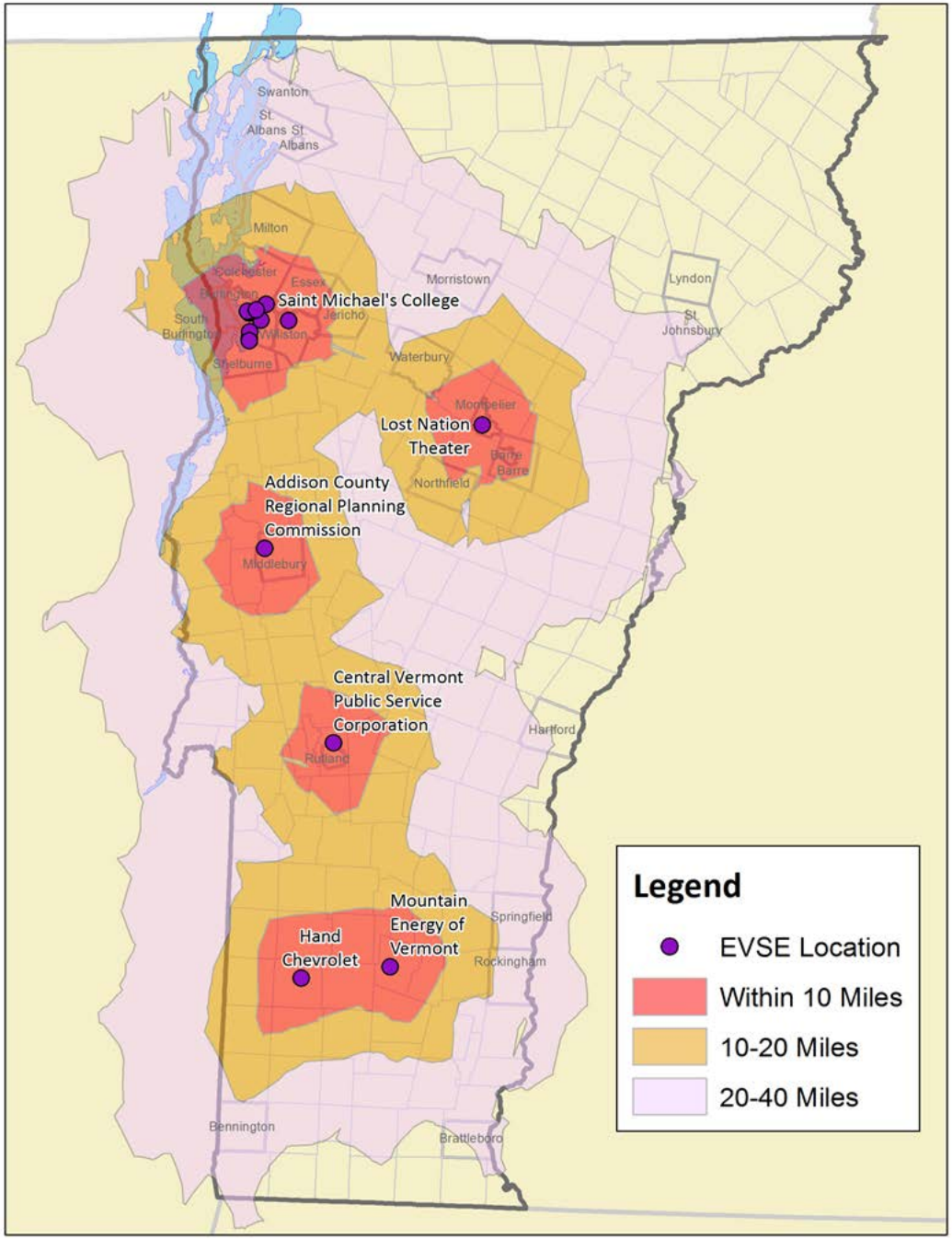
Electric Vehicle Supply Equipment Inventory



Total locations: 15

As of September 15, 2012

EVSE Examples

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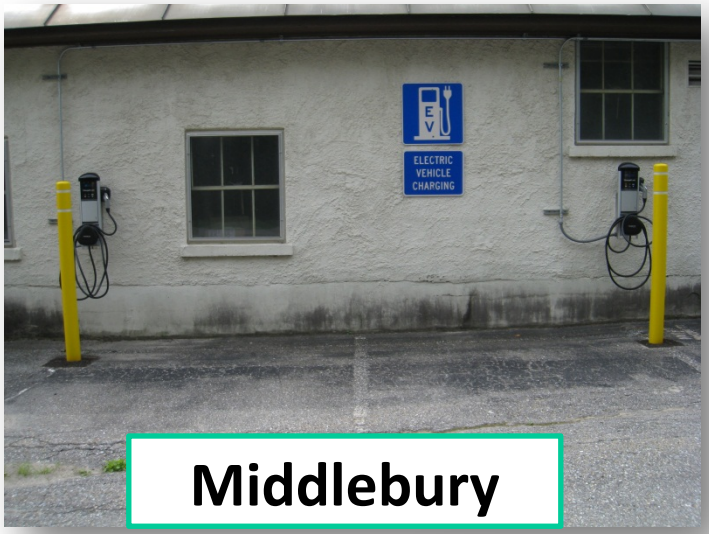

Middlebury

S Burlington

Montpelier

Expect Exponential Growth of EVs

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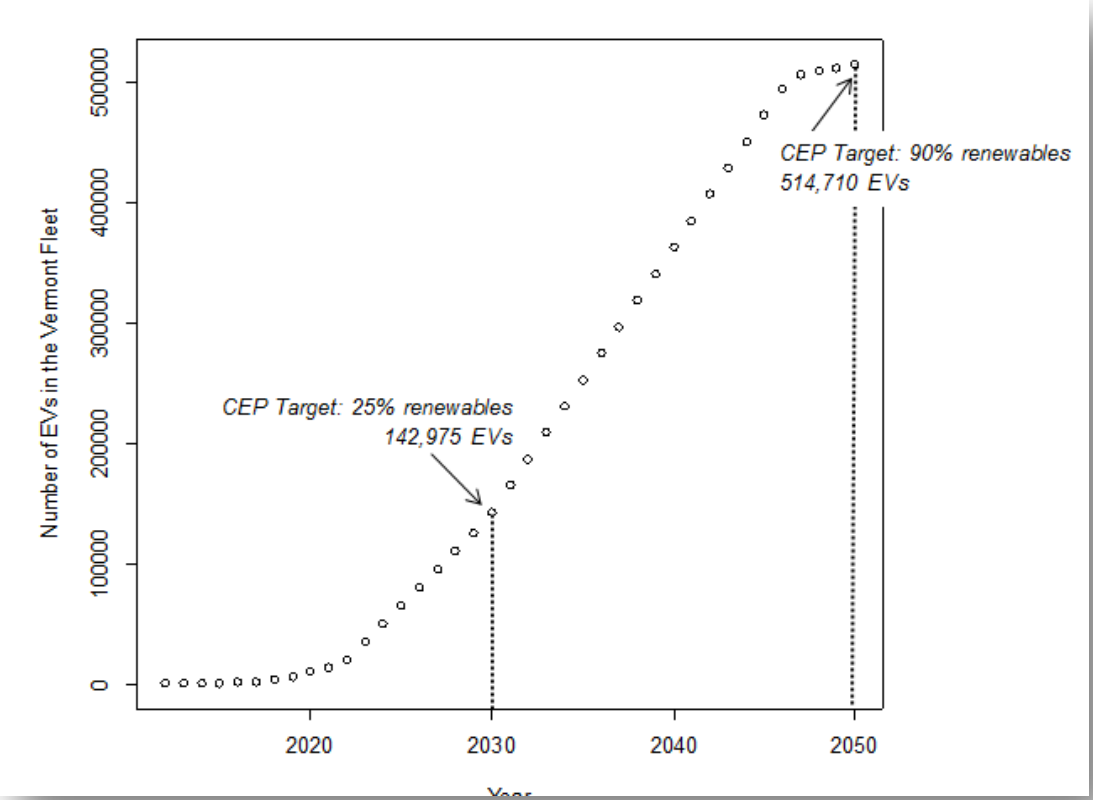
VERMONT
Public Service Department

One of many possible scenarios... Number of EVs needed to meet CEP goal



Year	
2012	90
2020	10,000
2030	142,975
2040	363,000
2050	514,710

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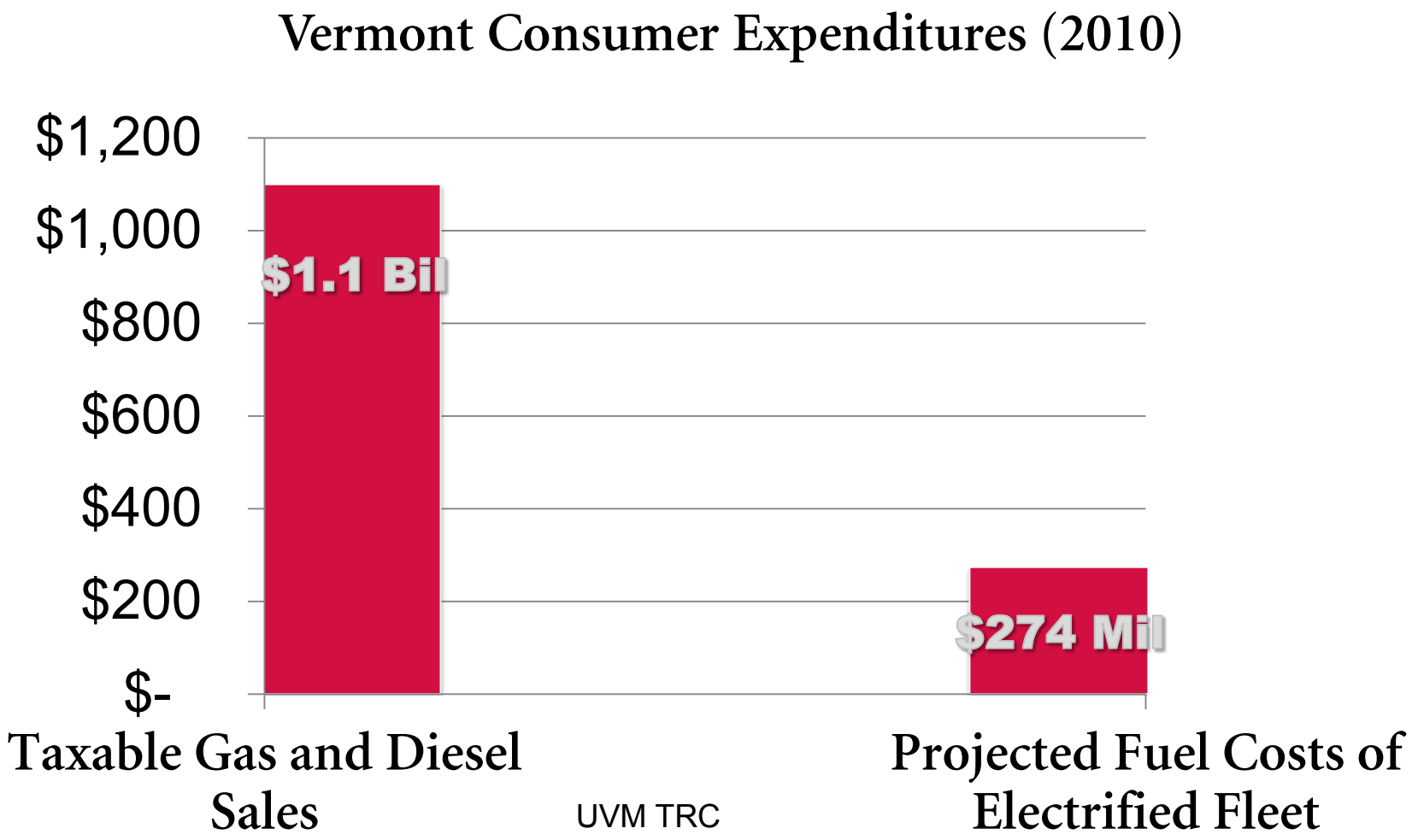
Energy Independence



UVM TRC

Online Community Building

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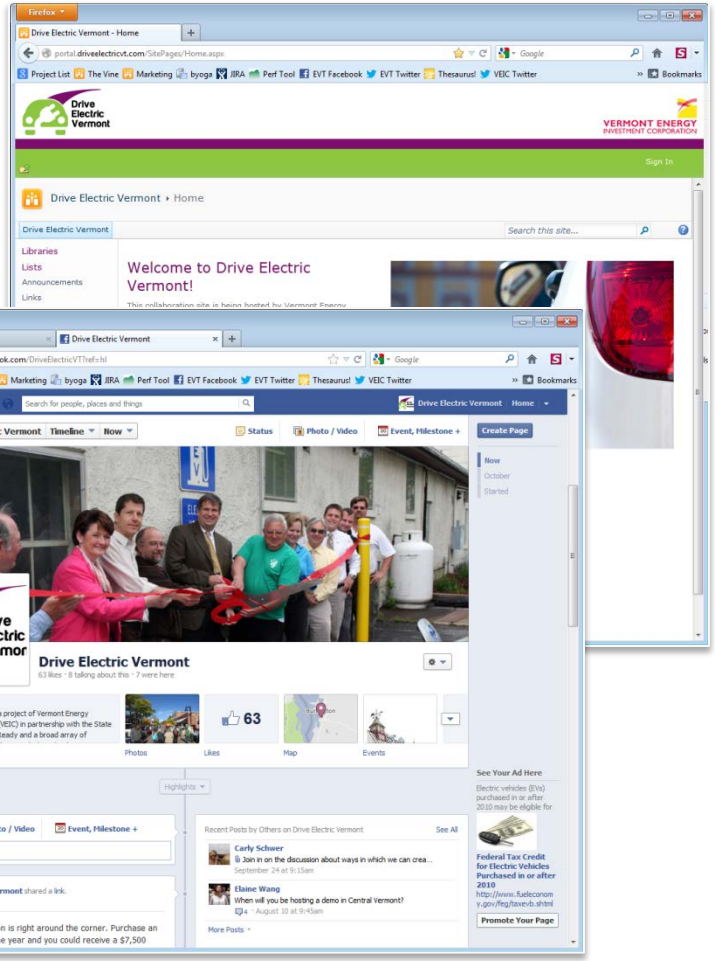

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My Nissan LEAF*

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The Details

- Live in Jericho – work in Burlington, 34 mile roundtrip commute
- Using a Level 1 charger (dedicated, GFI plug, outside)
- 2012 Nissan LEAF SV (lower trip model – no back-up camera, solar panel, level 3 charge port or fog lights)
- $1000 down
- 39 months lease
- $294/month
- Waiting for Rate 17
- Solar panels on roof – net metered.

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Car Wings statistics

- 3038 miles - Distance Traveled
- 3.9 Average Energy Economy miles/kWh
- 790 Electricity Consumption kWh
- 93.8 Travel Time hrs
- 1964 CO2 Tailpipe Emission Reduction* lbs
- **$440 saved August 20-November 18**
- **96 miles longest one day travel**