

# EV Everywhere: Drive Electric Vermont PEV Case Study

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## ***DOE's Case Study Objective***

- **Provide an example of plug-in electric vehicle (PEV) support activities beyond urban clusters**
- **Demonstrate how small and medium-sized communities can increase PEV uptake and charging infrastructure deployment in their regions**
- **Small and midsize towns in the United States, with populations of 50,000 or less, are often ideal PEV communities due to their typically shorter driving distances**



**Study conducted by:  
Energetics, Vermont Energy Investment  
Corporation and Idaho National Laboratory**



## ***Drive Electric Vermont (DEV) Organization***

- **Formed in 2012 via a MOU between**
  - **State of Vermont Agency of Transportation**
  - **State of Vermont Agency of Natural Resources**
  - **State of Vermont Public Service Department**
  - **Vermont Energy Investment Corporation (VEIC) – (nonprofit)**

### ***DEV Goal***

- **Increased use of electric transportation through policy development, education and outreach, and infrastructure development**

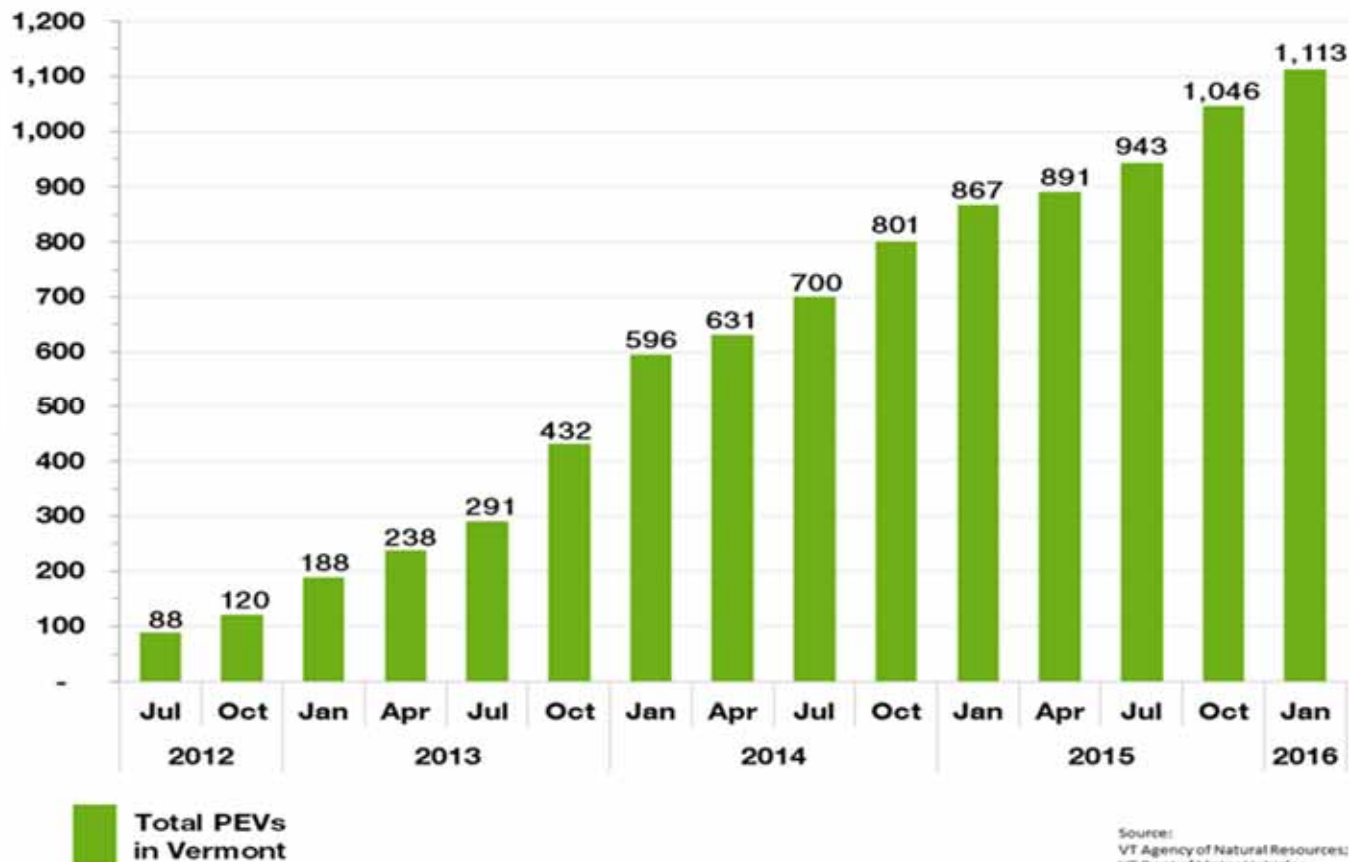
### ***DEV Defined Measures of Success***

- **Number of PEVs registered in the state**
- **Availability of workplace and public charging infrastructure**
- **Number of people aware of PEV options and considering them for vehicle purchases**
- **State and local policy support (e.g., building codes)**

## Did DEV Obtain Their Goal?

- Total PEV monthly registration growth 12.6 X in 42 months

VERMONT PEV REGISTRATIONS



## PEV Registrations In High PEV Penetration Areas

- Registrations not as high as some warm weather metro areas - **BUT**
- PEV (battery electric vehicle (BEV) & plug-in hybrid electric vehicle (PHEV)) registrations as percentage of all 2014 registered vehicles

	PHEV	BEV	Total PEV	% BEV of PEV	% of All 2014 Registered Vehicles		
					PHEV	AEV	PEV
Vermont	176	55	231	24	0.45	0.14	<b>0.59</b>
New Hampshire	115	61	176	65	0.14	0.08	<b>0.22</b>
Atlanta Metro	621	6,711	7,332	92	0.19	2.03	<b>2.22</b>
Los Angeles Metro	16,559	9,489	26,048	36	1.52	0.87	<b>2.38</b>
Portland Metro	544	979	1,523	64	0.48	0.87	<b>1.35</b>
San Diego Metro	1,840	2,185	4,025	54	1.05	1.25	<b>2.30</b>
Austin Metro	272	409	681	60	0.22	0.33	<b>0.54</b>

Data from Argonne National Laboratory

# PEV Registrations In Cold Weather Areas

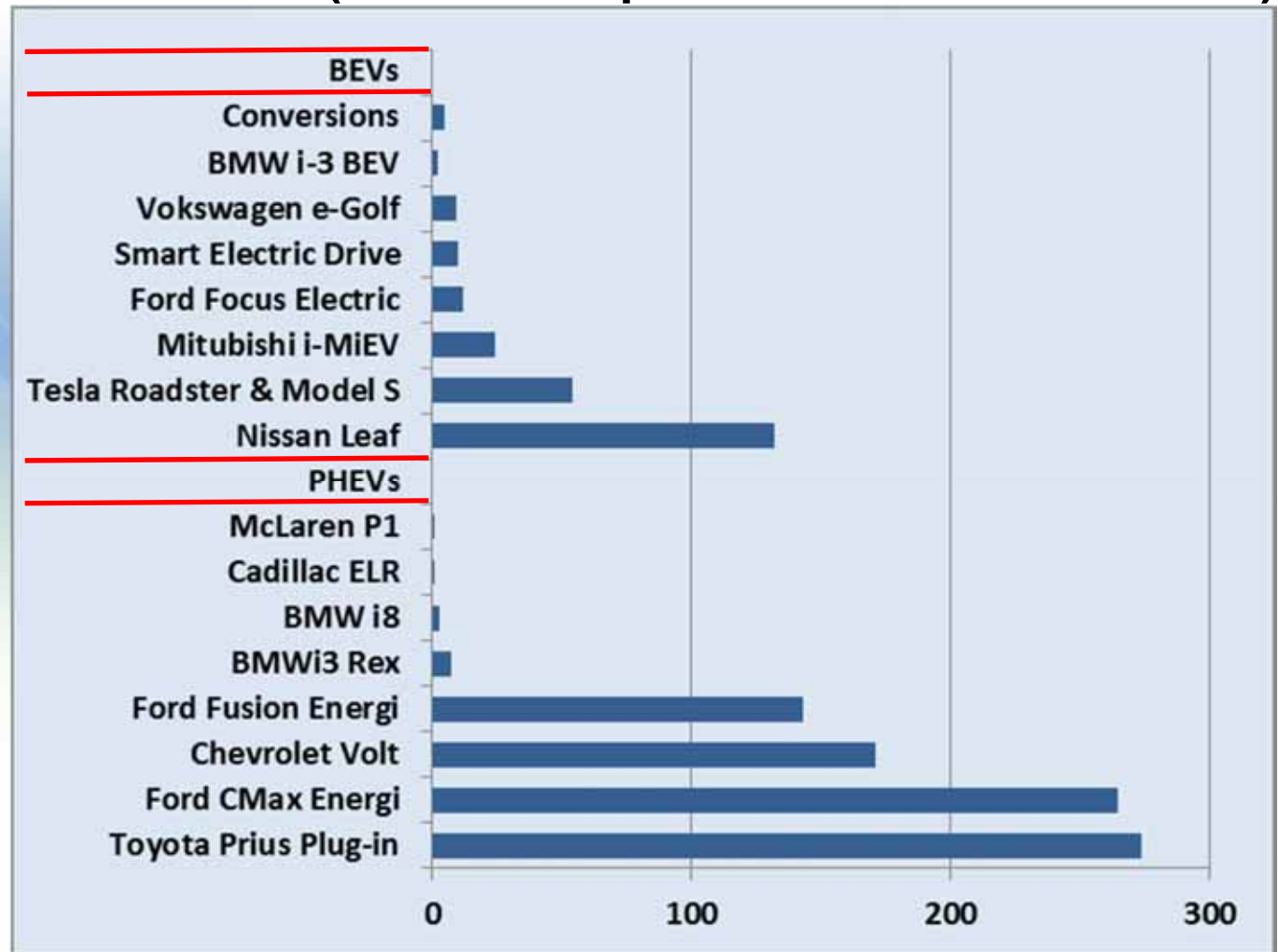
PEV Share and Mix in Cities with Greater than 5% Peak Frigid January Temperature			
	% PEVs of All Registrations	% BEVs of PEVs	Peak Frigid %
<b>Vermont*</b>	<b>0.59%</b>	23.8%	40%
Detroit	0.59%	6.7%	17%
Spokane	0.48%	50.0%	13%
Philadelphia	0.34%	36.3%	7%
Boston	0.30%	45.3%	7%
Indianapolis	0.30%	44.3%	19%
Chicago	0.28%	47.2%	24%
Cincinnati	0.26%	36.3%	11%
Dayton	0.25%	24.4%	13%
Minneapolis	0.24%	35.3%	47%
Columbus	0.23%	33.8%	11%
Bloomington IL	0.19%	57.1%	20%
Springfield IL	0.19%	25.0%	20%
Cleveland	0.14%	24.2%	10%
Jackson MI	0.14%	21.1%	24%
Pittsburgh	0.14%	37.6%	16%
South Bend	0.14%	37.6%	20%

\*Burlington peak frigid %.

Data from Argonne National Laboratory

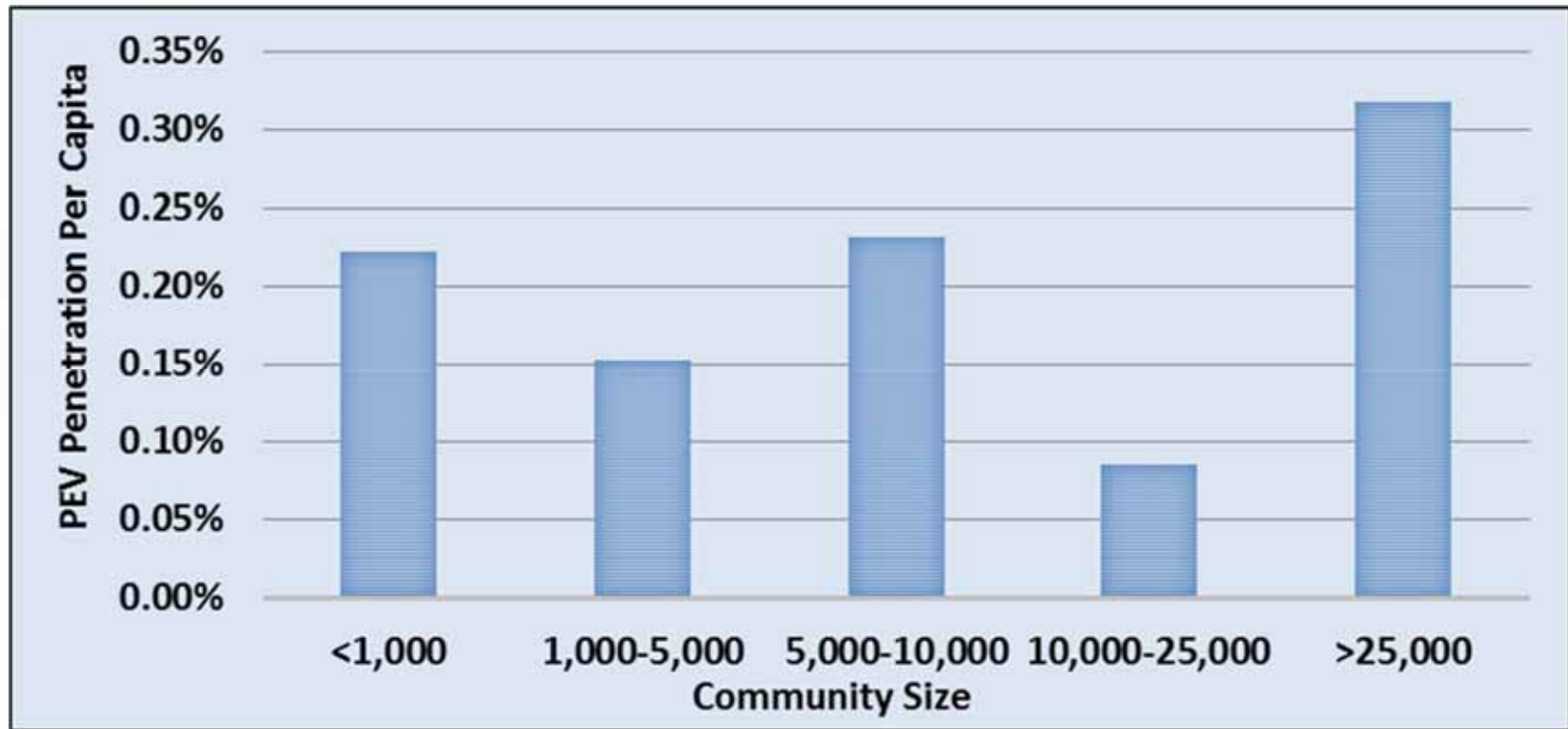
## ***BEV And PHEV Models Registered In Vermont***

- As of January 2016, there were a total of 248 registered BEVs and 865 registered PHEVs in Vermont (Vermont Department of Motor Vehicles)



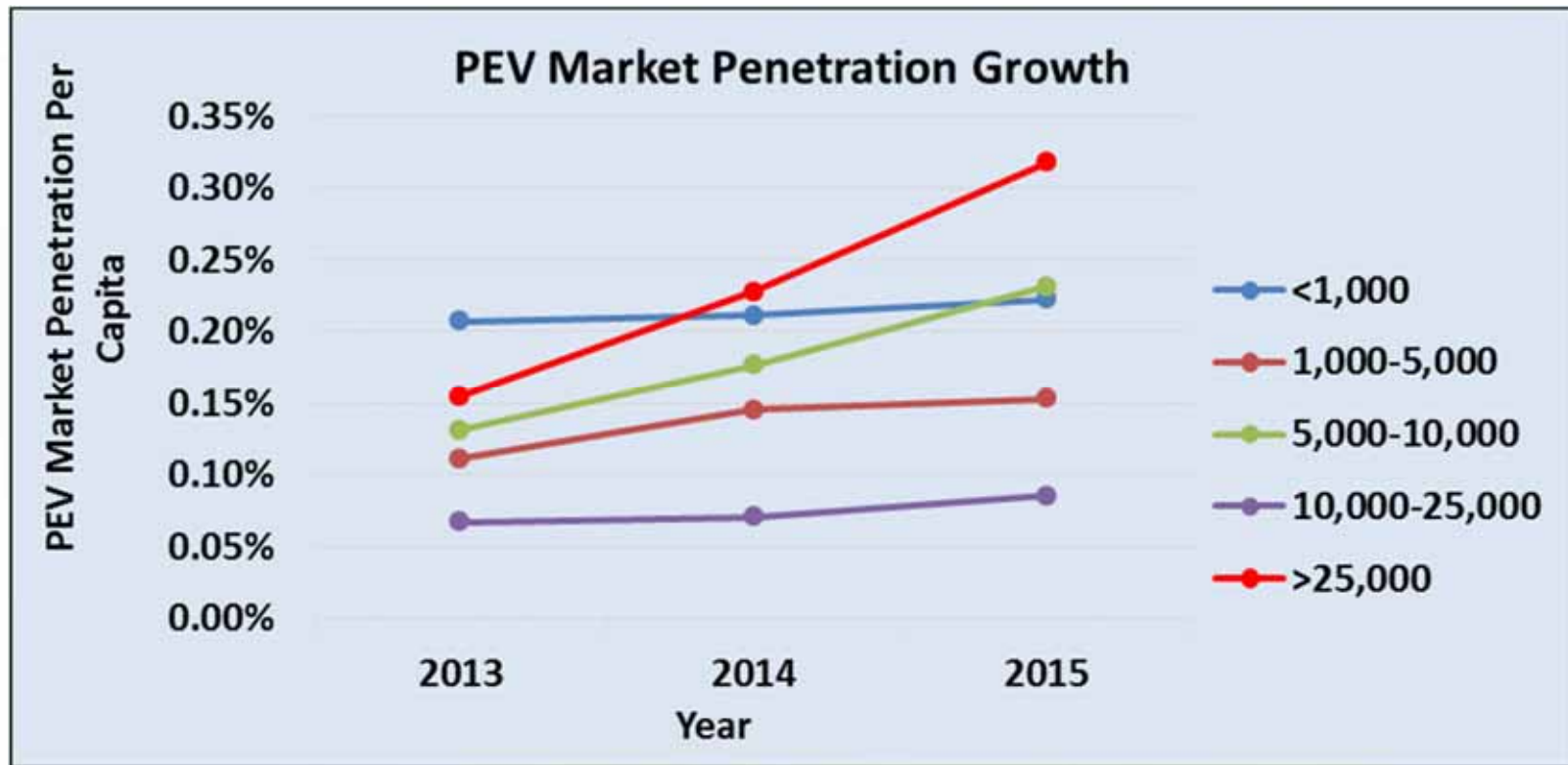
- PHEVs 2.5 X's more popular than BEVs

# PEV Ownership By Community Size



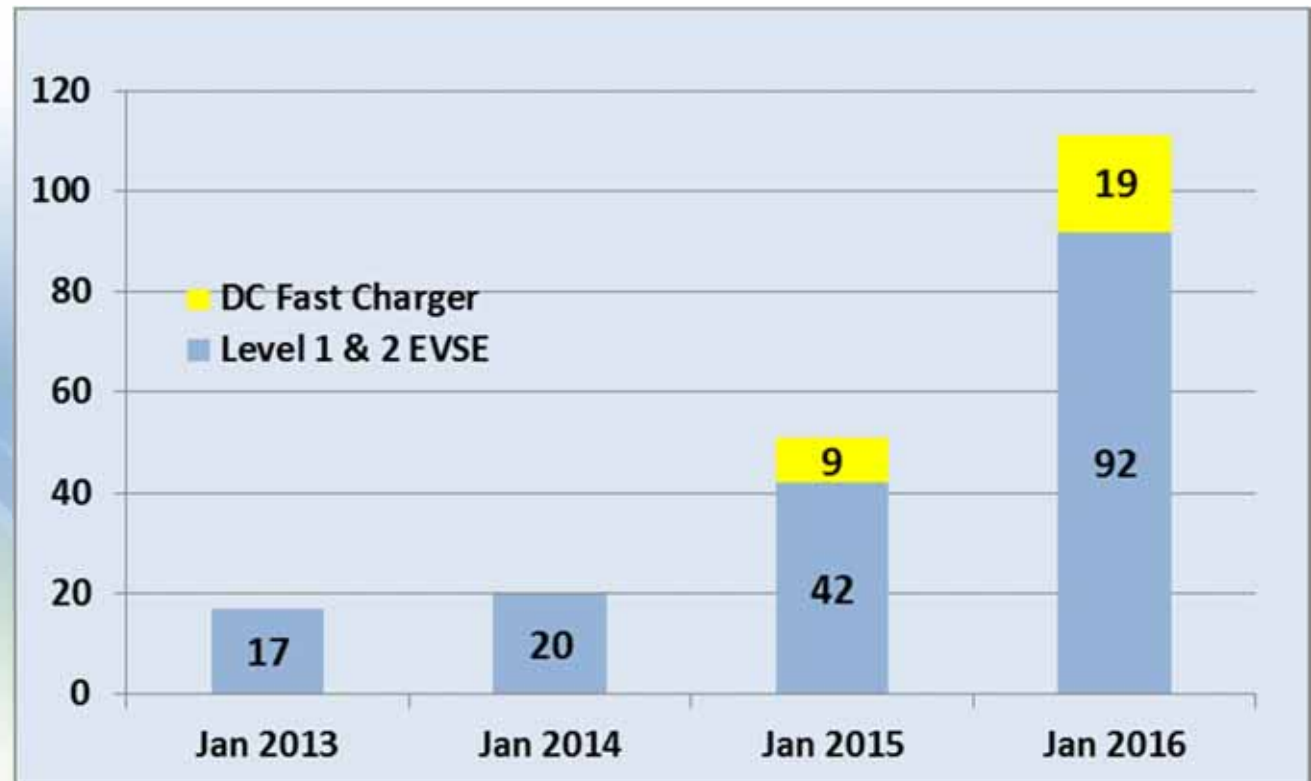


# PEV Market Penetration Growth By Community Size



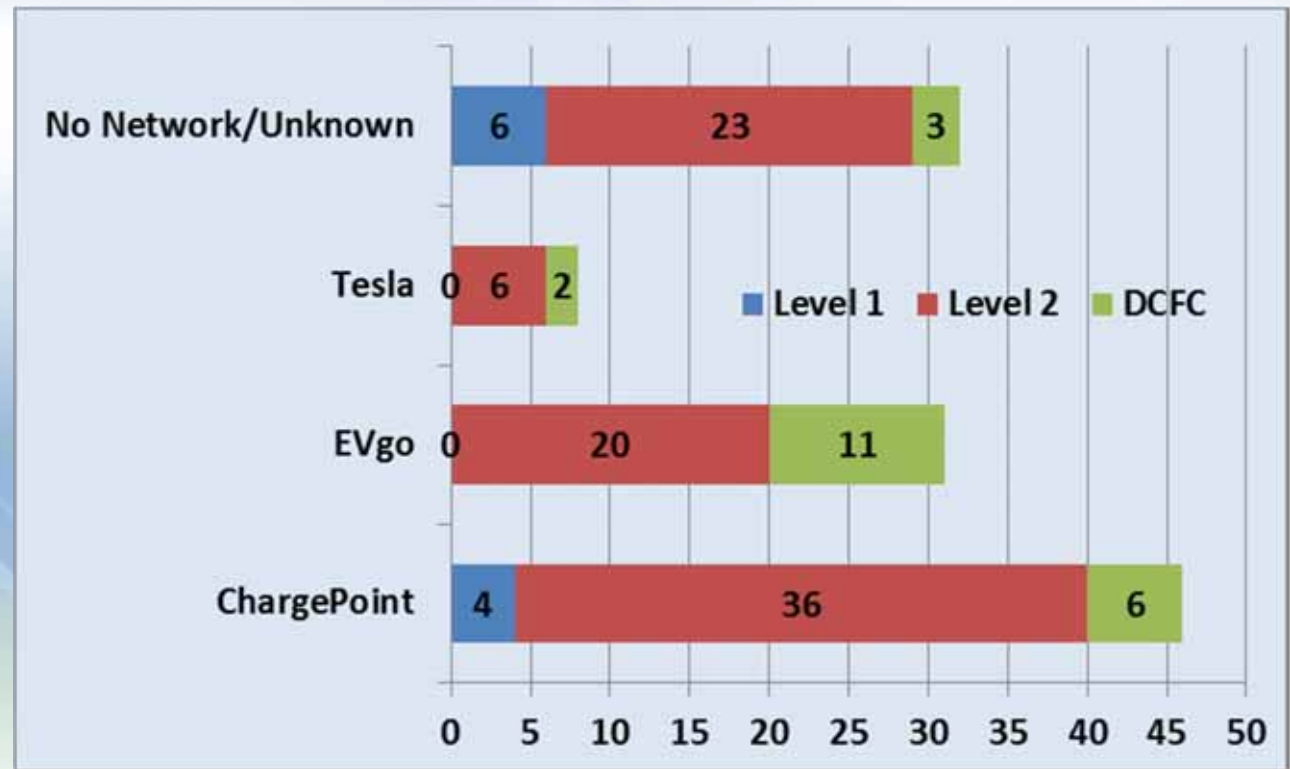
# Charging Infrastructure Increases

- EVSE and DCFC Public Units Deployed in Vermont



ChargePoint Level 2 EVSE in Stowe

# Public Infrastructure Type By Charging Network

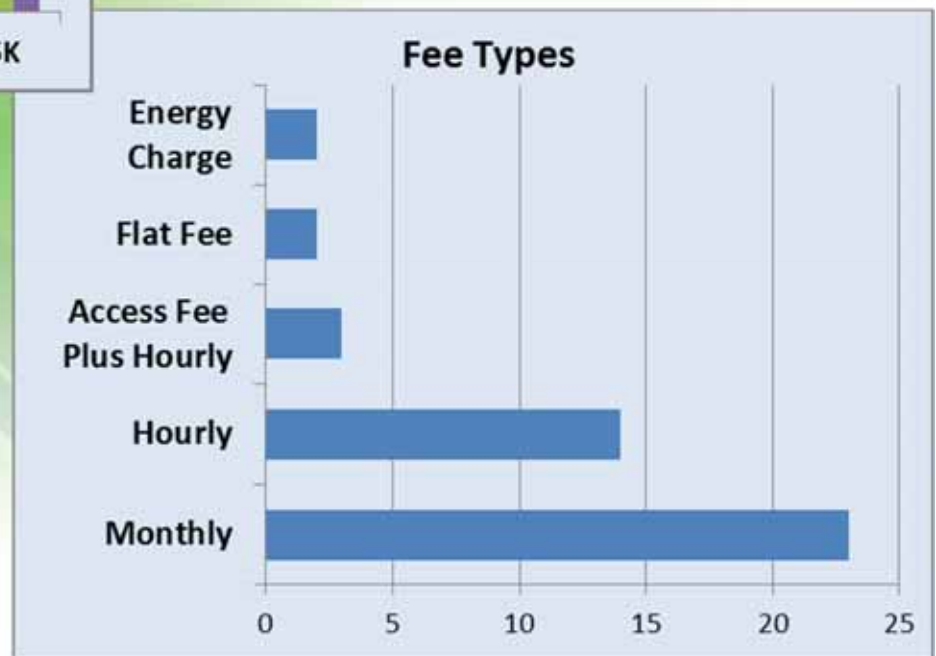
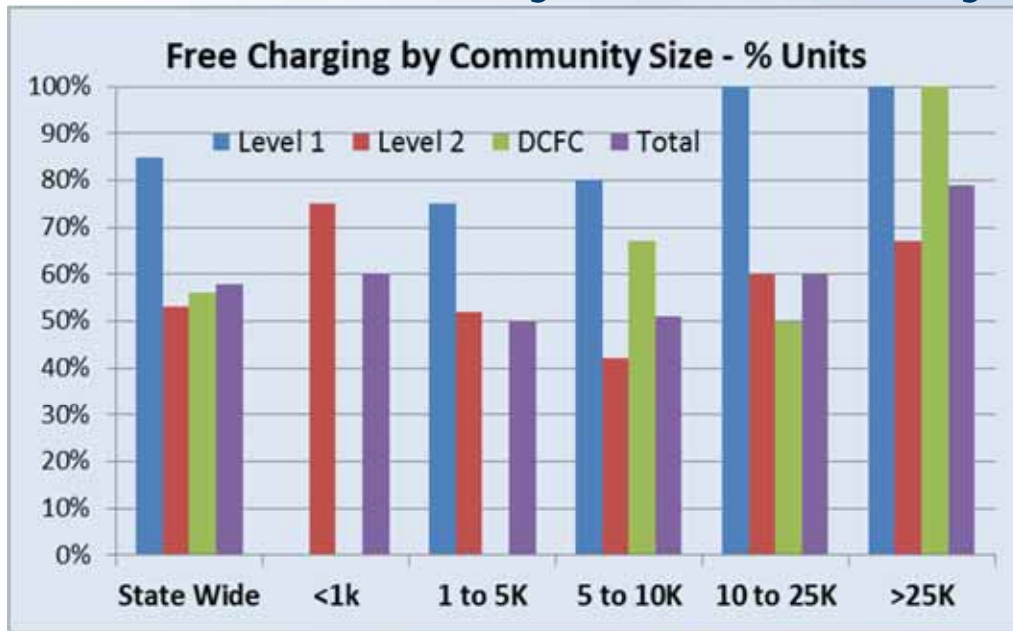


Data provided by:  
ChargePoint, Evgo and Green Mountain Power

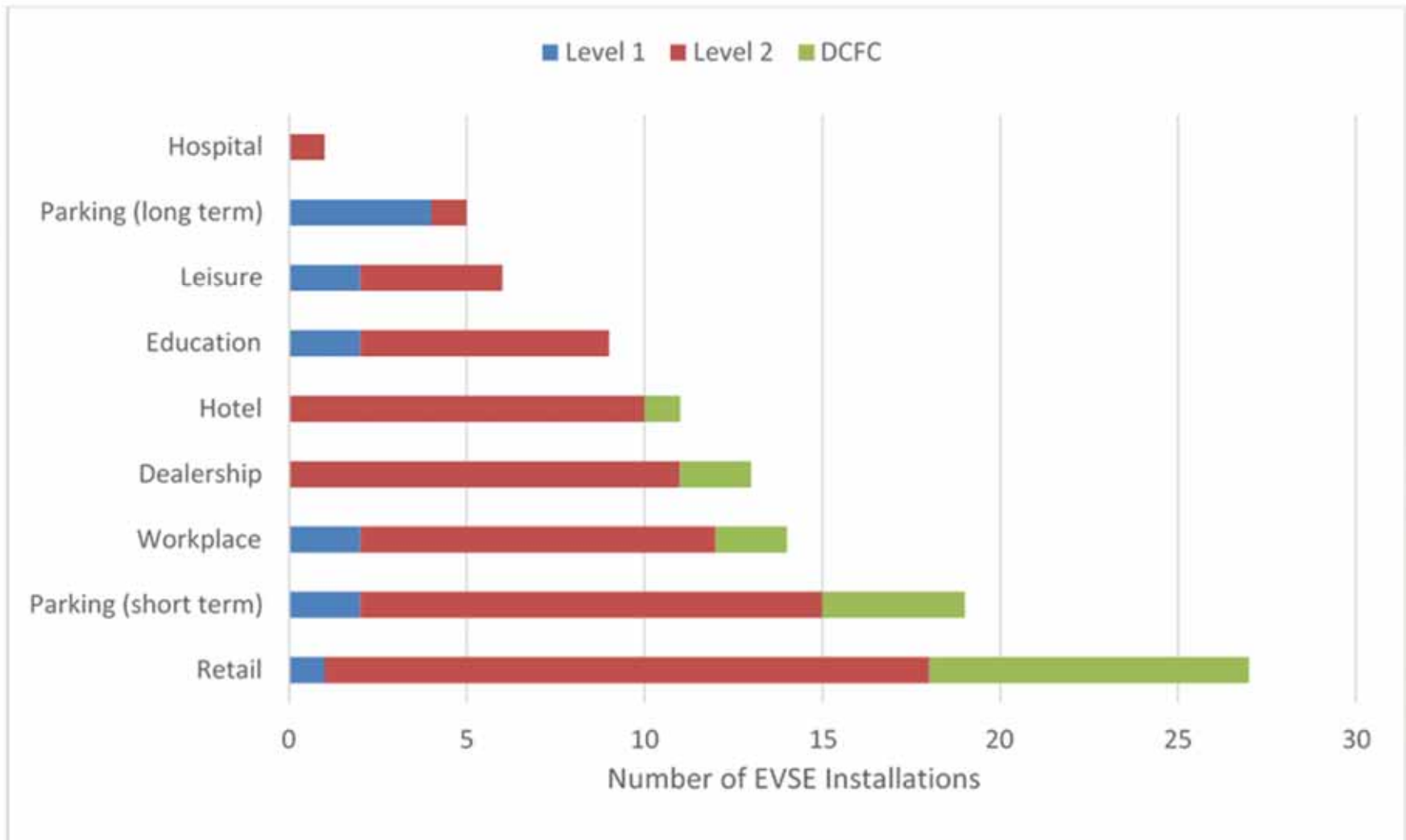
**Green Mountain Power Freedom Station in Williston**



# EVSE Fees By Community, Network & Structure



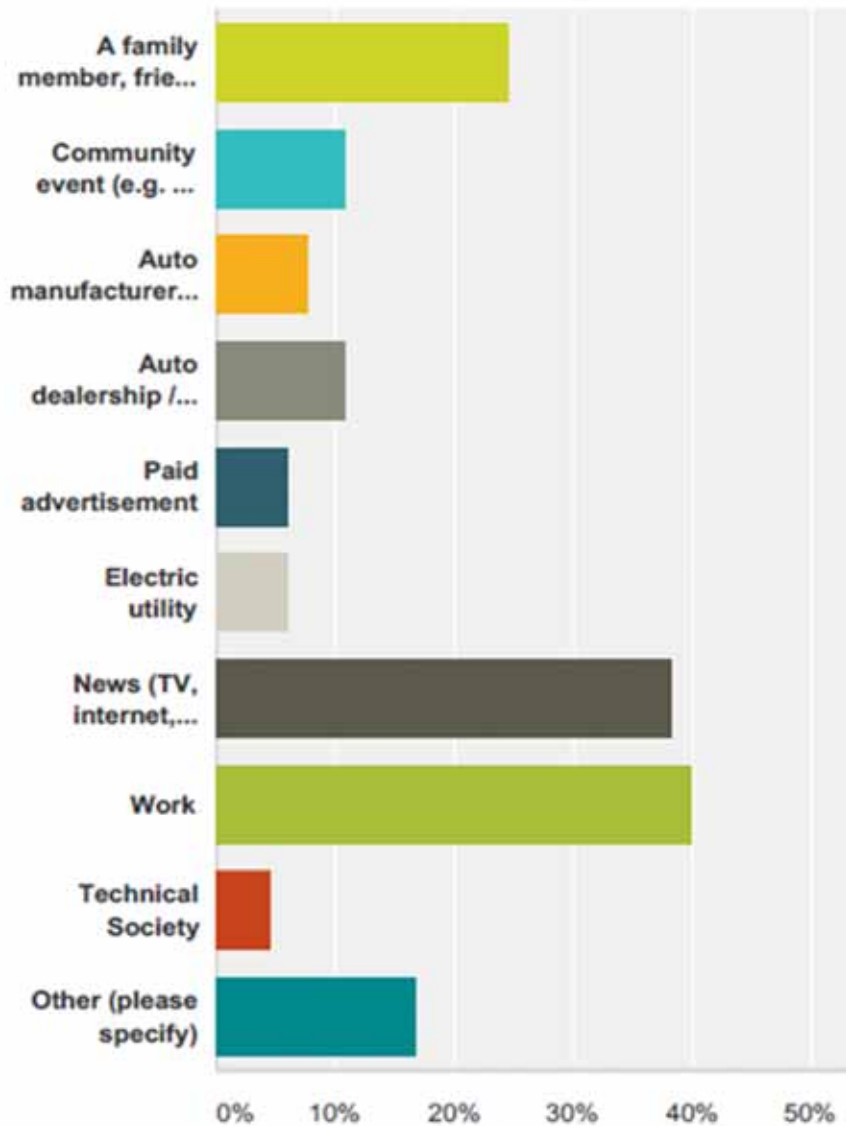
# Number Of EVSE Venues and Charging Locations



## ***DEV Program Research***

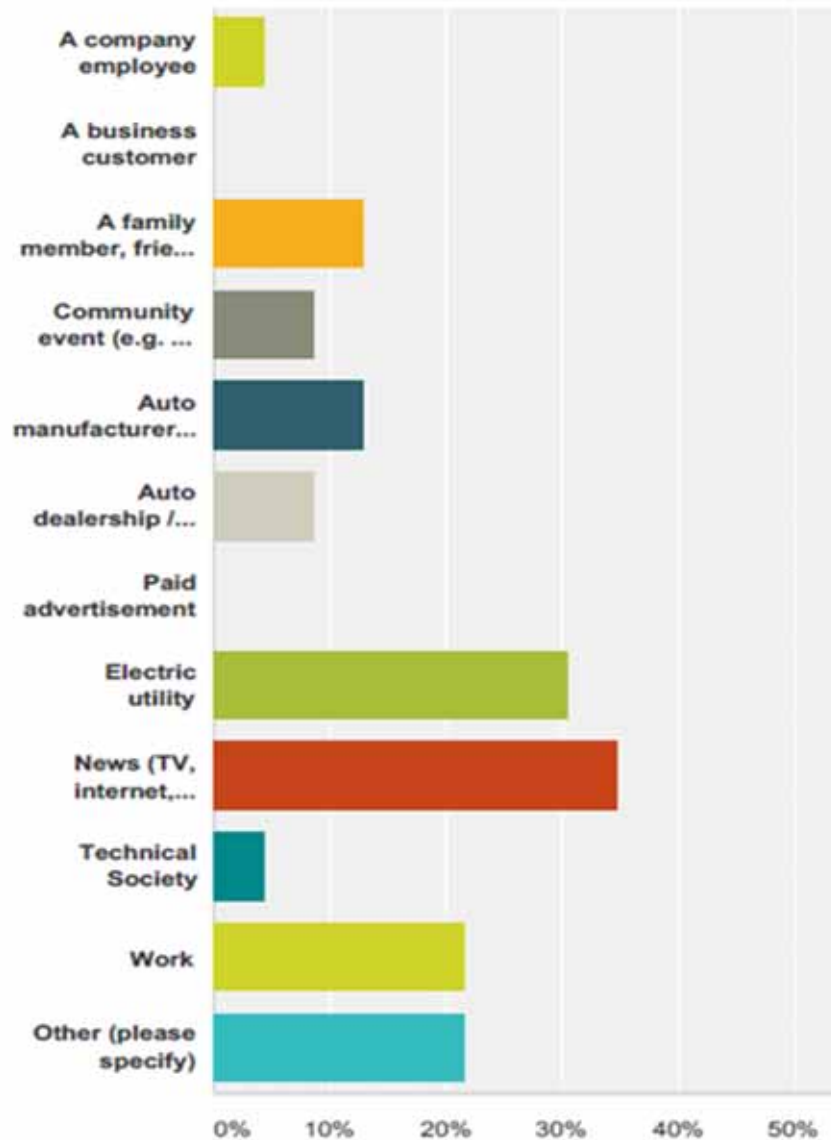
- **Vermont Energy Investment Corporation surveyed a number of areas, including :**
  - **Identified the primary awareness and interest mechanisms for PEVs**
  - **The critical factors that ultimately influence the purchase of PEVs and installation of charging infrastructure**
- **Opinions were asked of over 1,000 PEV owners / leasers / enthusiasts and over 80 EVSE site operators**
- **Responses received from 71 PEV owners / leasers / enthusiasts and 23 charging site operators**

# Creating PEV Awareness Mechanisms



1. Work environment
2. News venues

# Creating EVSE Awareness Mechanisms



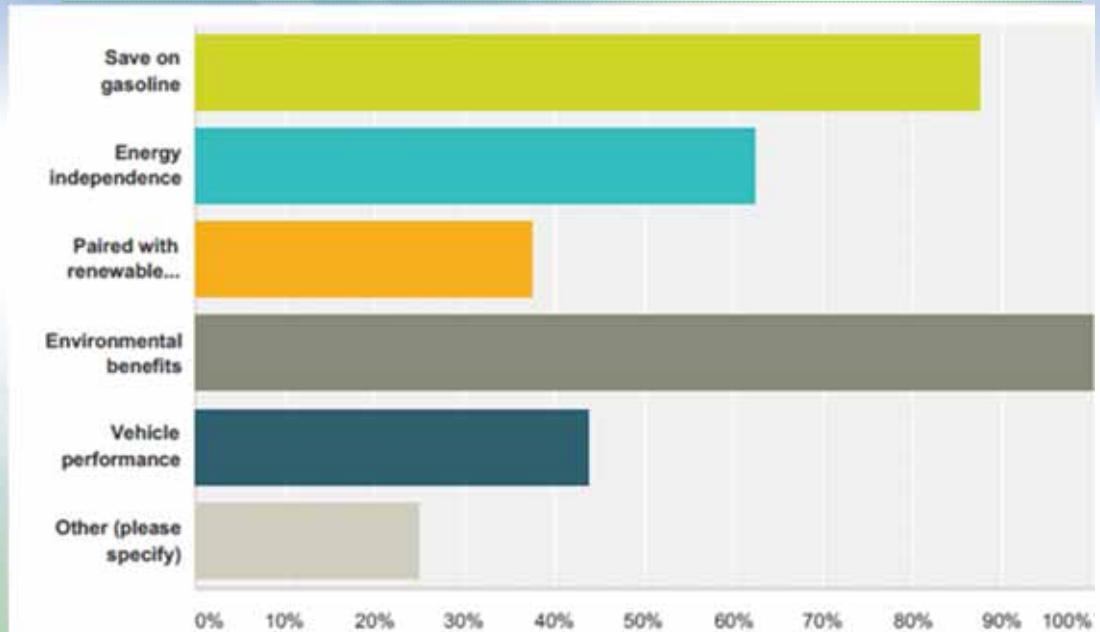
1. News venues
2. Electric utilities



# Why Purchase / Lease A PEV?

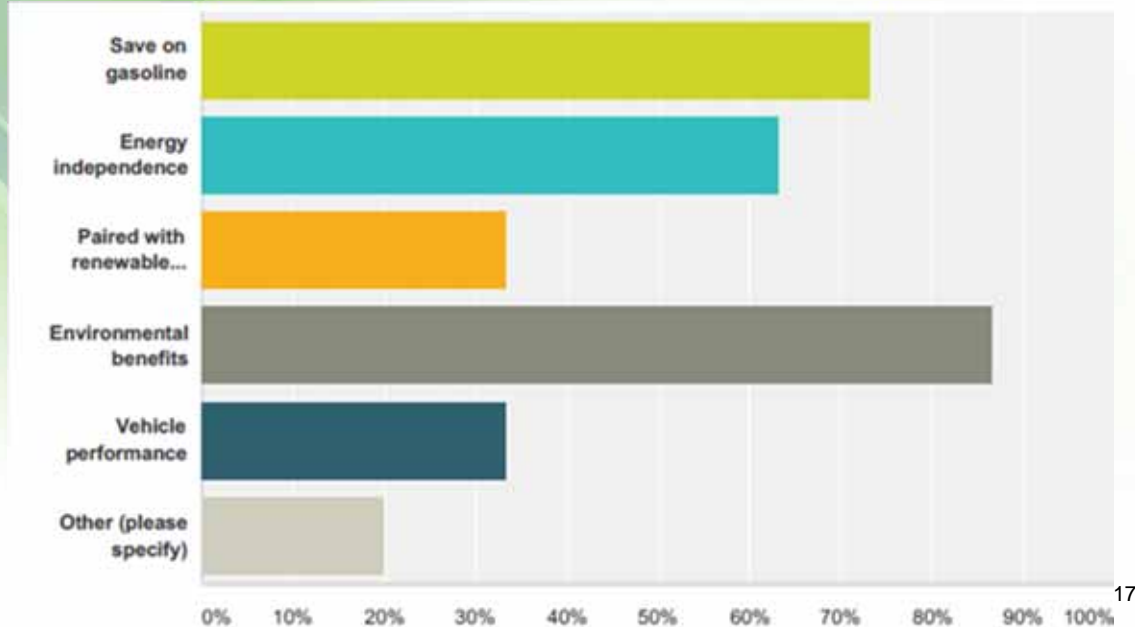
## Principal reasons to purchase a PEV

1. Environmental benefits
2. Save on gasoline
3. Energy independence



## Principal reasons to lease a PEV

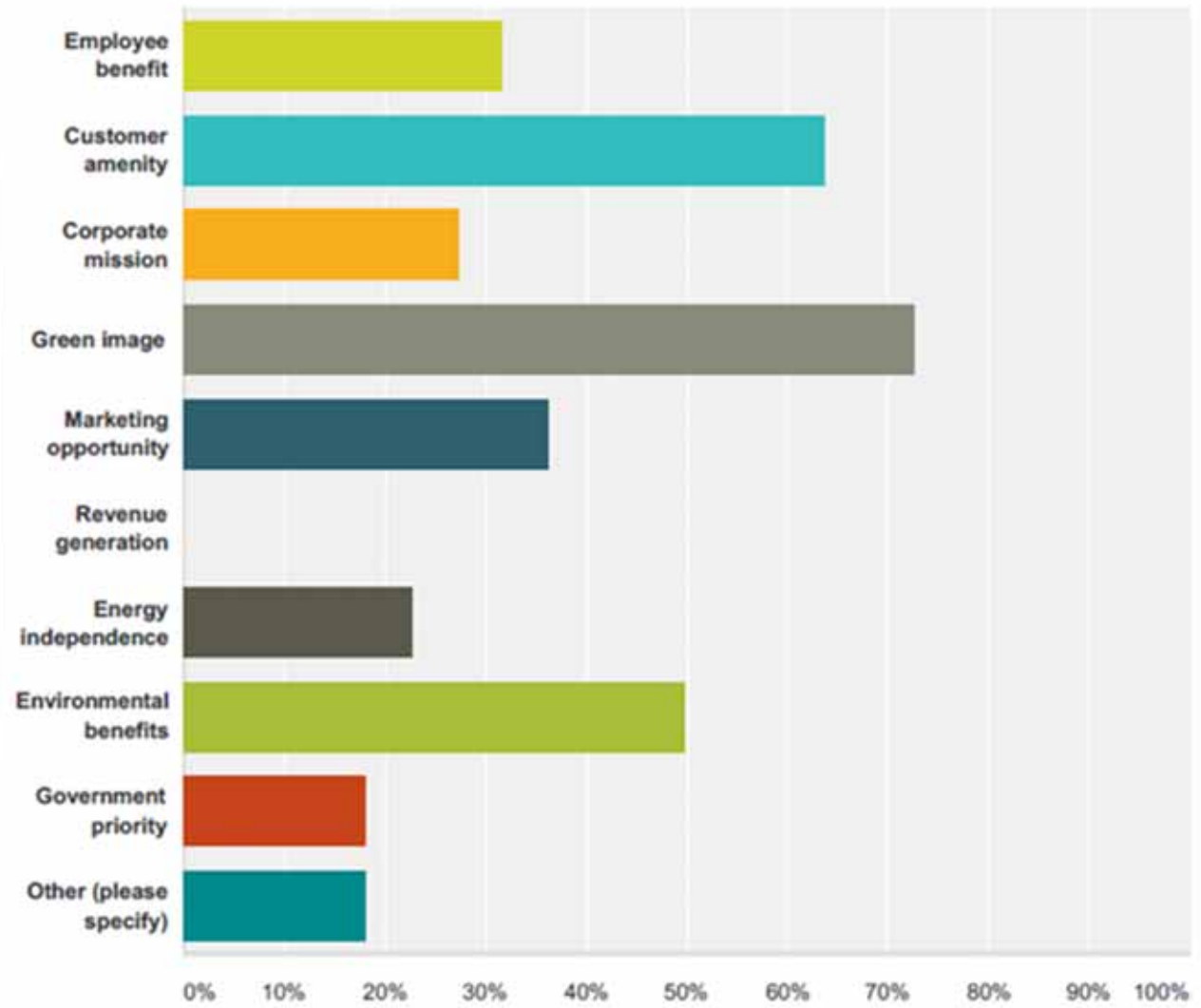
1. Environmental benefits
2. Save on gasoline
3. Energy independence



# Why Install EVSE?

## Critical factors for installing EVSE

1. Green image
2. Customer amenity
3. Environmental benefits



## ***Expanding PEV and EVSE Presence In Small To Mid-Size Communities***

- **State and Local Policy:**
  - **Initially focus on comprehensive regional plans**
    - **Lays the foundation for PEVs and why they should be supported at the state and local levels**
  - **Identify and target the support of high-level state officials**
- **Central Hub and Point of Contact:**
  - **Establish an umbrella organization over all PEV-related activities**
    - **Serves as single point-of-contact for technical support and information**
- **Early and Broad Stakeholder Involvement:**
  - **Multiple stakeholders must be targeted and involved from the beginning of a PEV program to maximize**
    - **Support, participation and ownership**
    - **Maximizes breadth of communication distribution channels**

## ***Expanding PEV and EVSE Presence: cont'd***

- **Establish Tracking Mechanisms:**
  - Establish robust measures for tracking PEV sales and EVSE installations to gauge progress and encourage enthusiasm
- **Auto Dealers:**
  - Work with to ensure PEV and charging infrastructure awareness
  - Partner as much as possible to support their PEV sales, including development of innovative incentive programs
- **EVSE Charging Infrastructure:**
  - Develop PEV charging infrastructure
  - It may initially require government and/or utility ratepayer support given the current low profitability potential
- **Incentives: (Dollars are always nice)**
  - Aggressively pursue incentives and grants through a variety of sources (e.g., state, utilities, settlement funds, and foundations) to support the purchase of PEVs and installation of EVSE

## ***Expanding PEV and EVSE Presence: cont'd***

- **Outreach and Education:**
  - Develop website information, social media, advertising, and events
  - Maximize leveraging of existing events (e.g., National Drive Electric Week) to reduce logistical costs
- **Clean Cities and EV Everywhere:**
  - Coordinate with and leverage the resources of state/local Clean Cities Coalitions and EV Everywhere in order to:
    - Augment technical assistance, stakeholder identification and participation, consumer education and outreach
    - Take advantage of incentives with a strong focus on workplace charging
- **Cultural and Climatic Factors:**
  - Be cognizant of state and local cultural and climatic factors that may positively or negatively impact acceptance of PEVs and establishment of recharging infrastructure

## ***DEV Program Future Plans in 2016***

- **A new round of consumer/dealer incentives (Dollars are always nice)**
  - **Greater quantities and at higher incentive levels, to be distributed on an as-needed basis to support more rapid use of available funds**
- **Continuation of the marketing campaign**
  - **Placing greater emphasis on search engine optimization techniques to drive “organic” visits to the DEV website**
- **Utilization of a consumer survey to develop new campaign themes and measure the effectiveness of the distribution channels**





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Idaho National Laboratory

For publications and general PEV and charging infrastructure information, visit <http://avt.inl.gov>