Level 2 EVSE and DC Fast Charger Use by Plug-in Electric Vehicles – NGA/EDTA 2014

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National Governor's Association Workshop on Advanced Technology Vehicles – EDTA Conference

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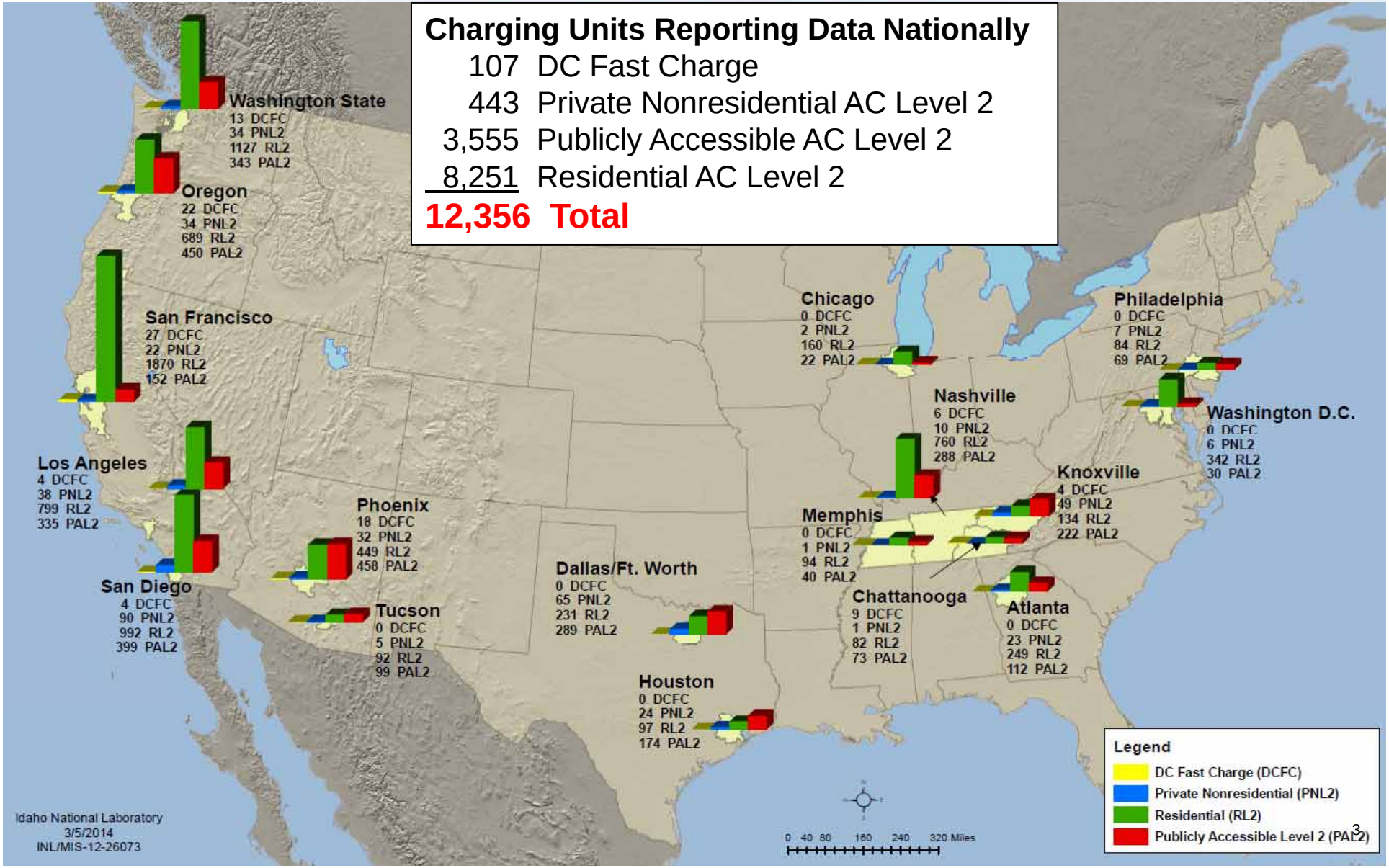
www.inl.gov

Idaho National Laboratory

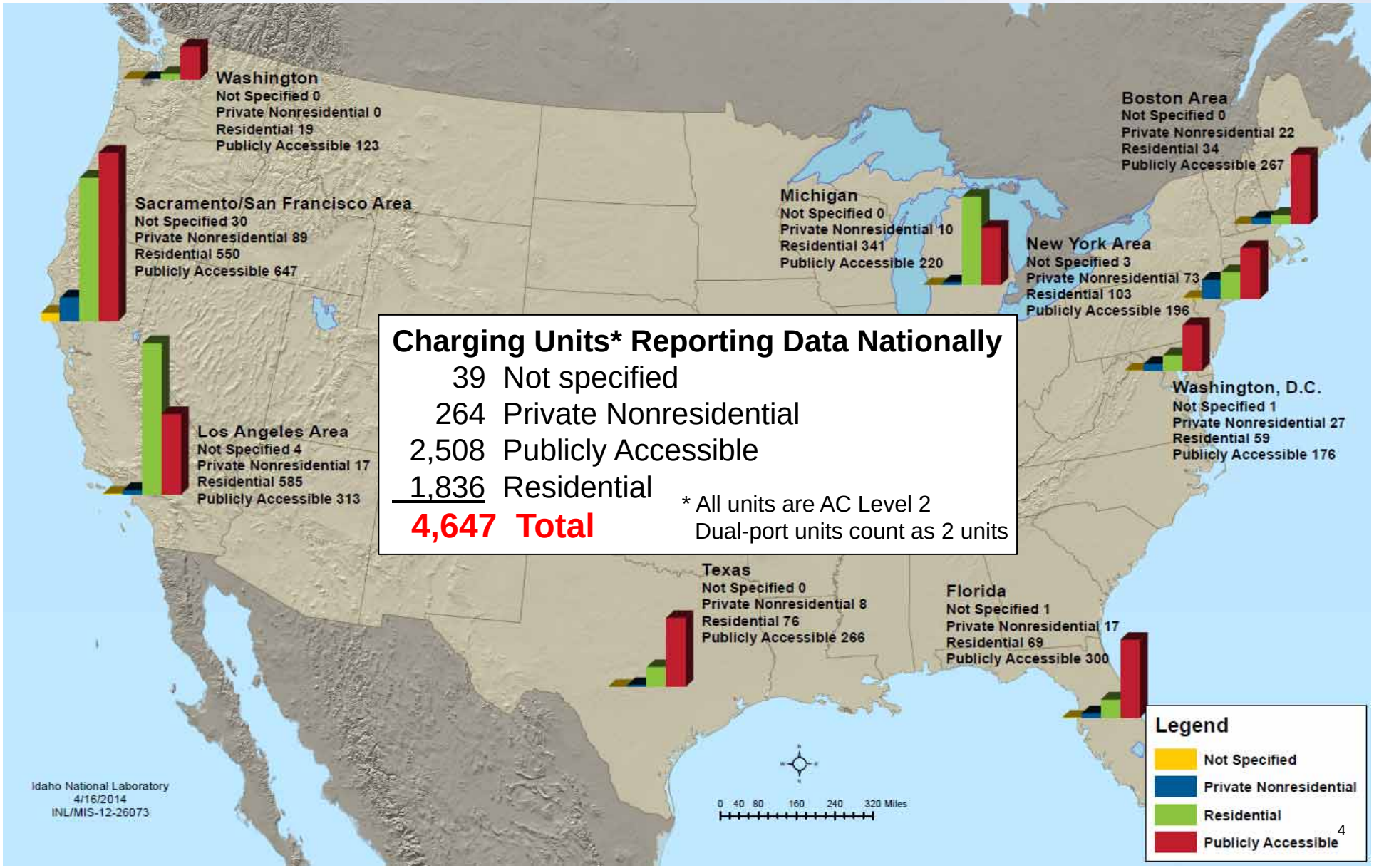
Idaho National Laboratory

- U.S. Department of Energy (DOE) laboratory
- 890 square mile site with 4,000 staff
- Support DOE's strategic goal:
  - Increase U.S. energy security and reduce the nation's dependence on foreign oil
- Multi-program DOE laboratory
  - Nuclear Energy
  - Fossil, Biomass, Wind, Geothermal and Hydropower Energy
  - Advanced Vehicles and Battery Development
  - Homeland Security and Cyber Security

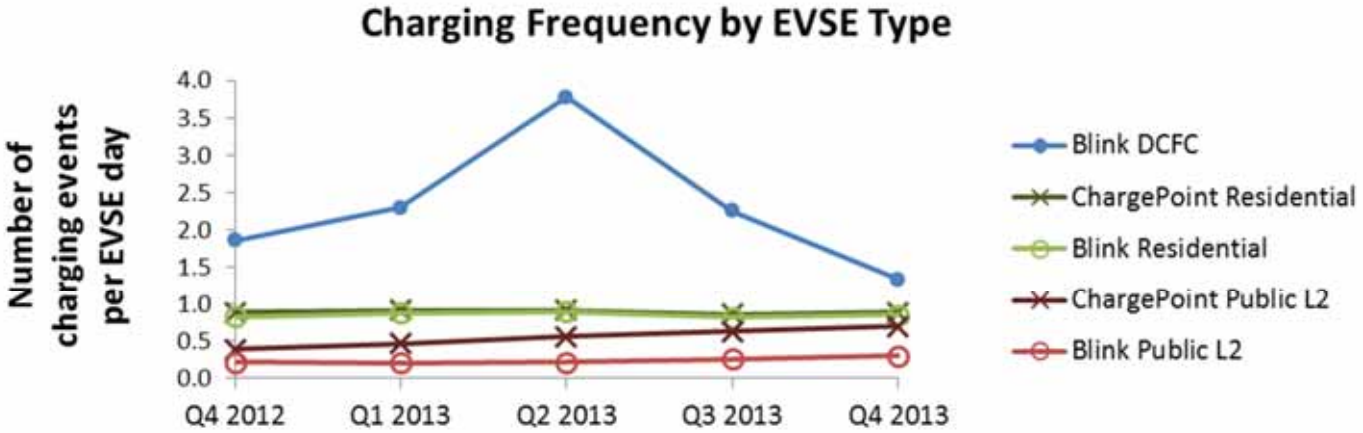
EV Project (Blink) Infrastructure Deployment

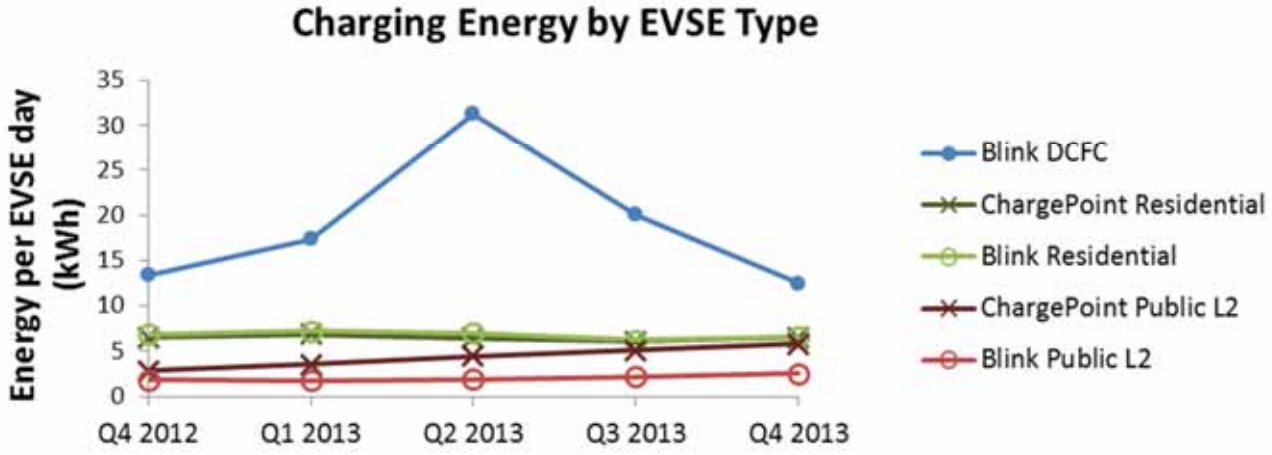


ChargePoint Infrastructure Deployment



Usage Frequency of Residential & Public Level 2 EVSE and DC Fast Chargers



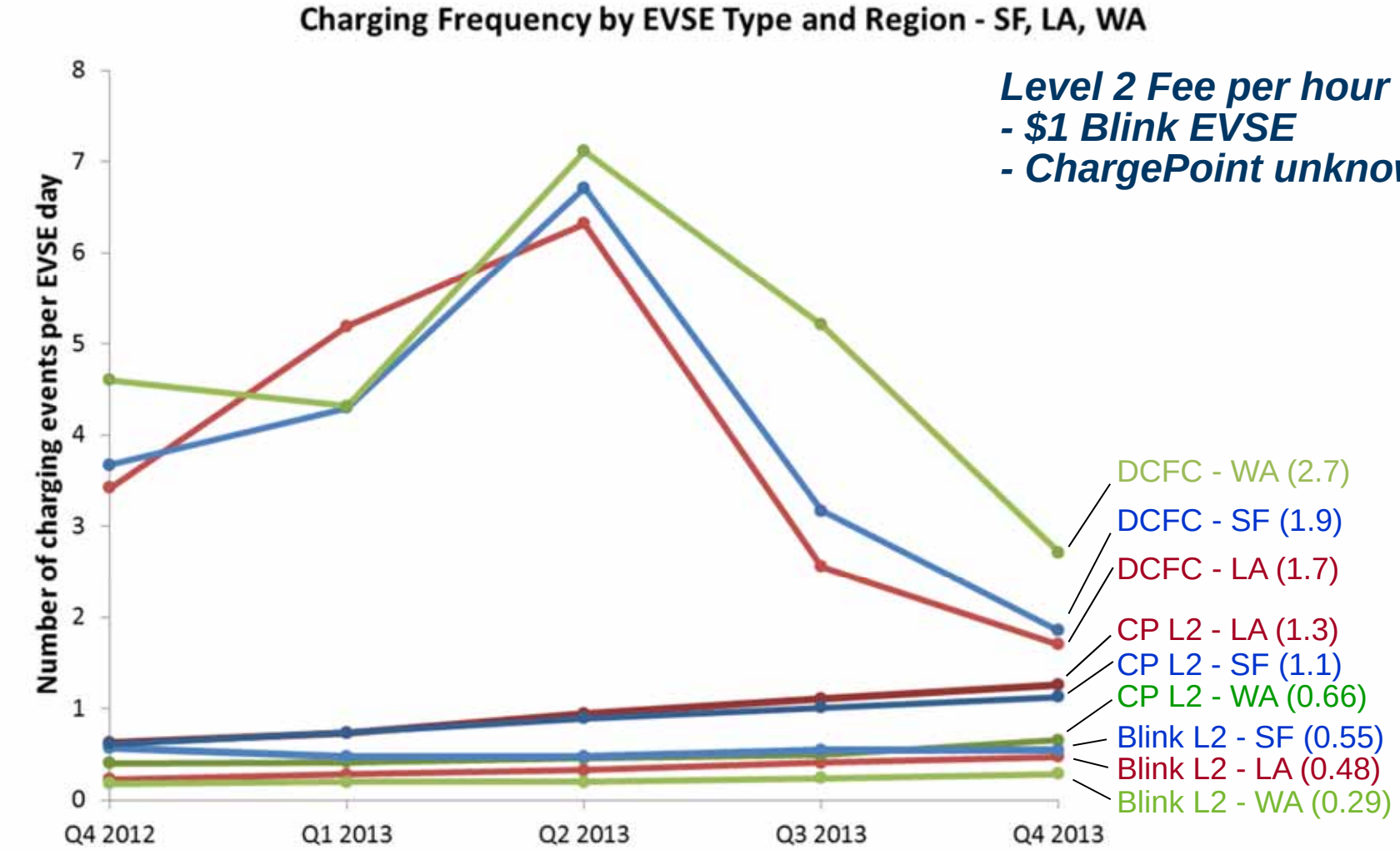


EVSE = Electric Vehicle Supply Equipment. L2 = SAE's AC Level 2 EVSE (208 – 220 Volts) definition. DCFC = DC Fast Charger

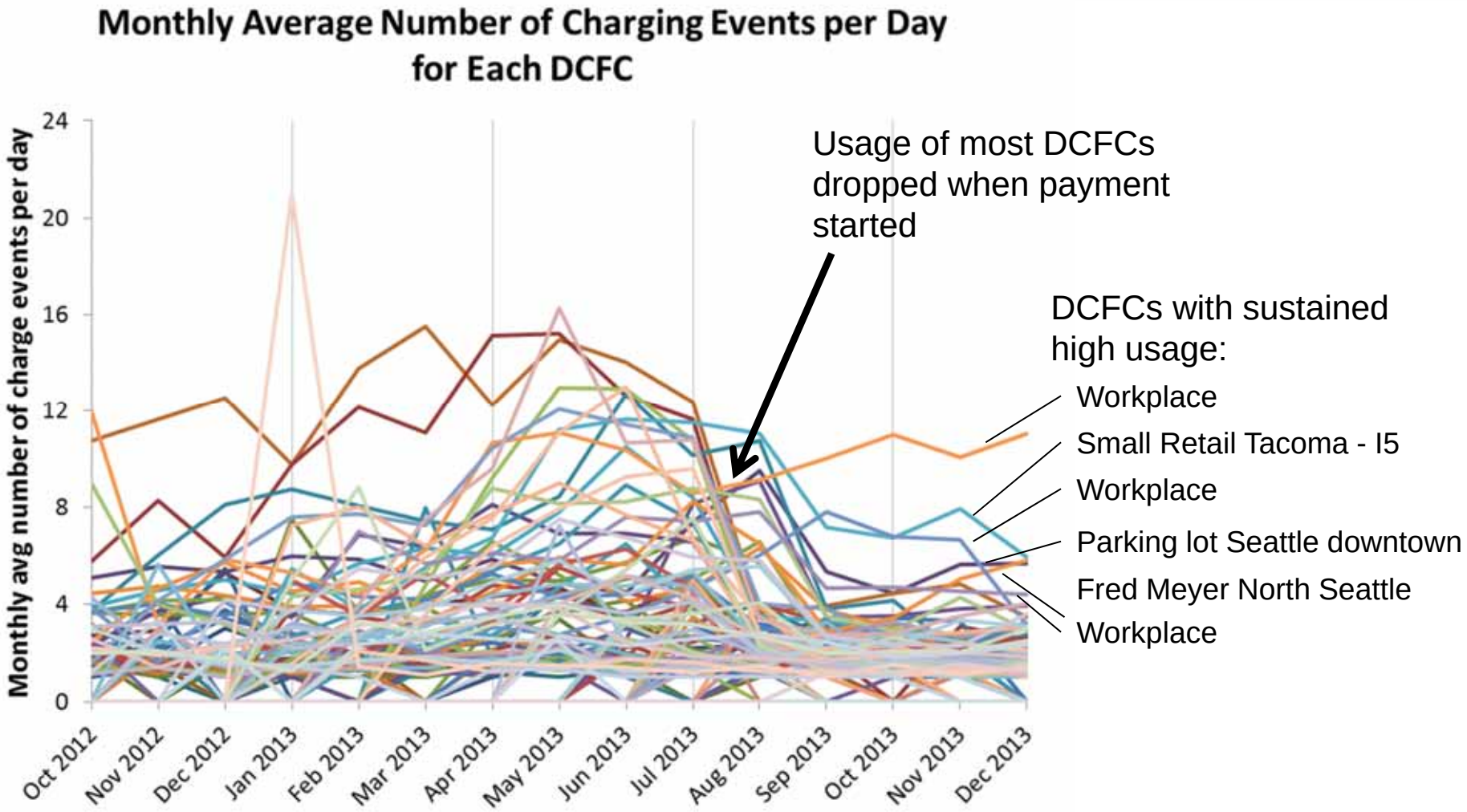
Blink DC Fast Chargers - Fee Impacts

DCFC Fee per Session
- $5 Blink members
- $8 non-Blink members

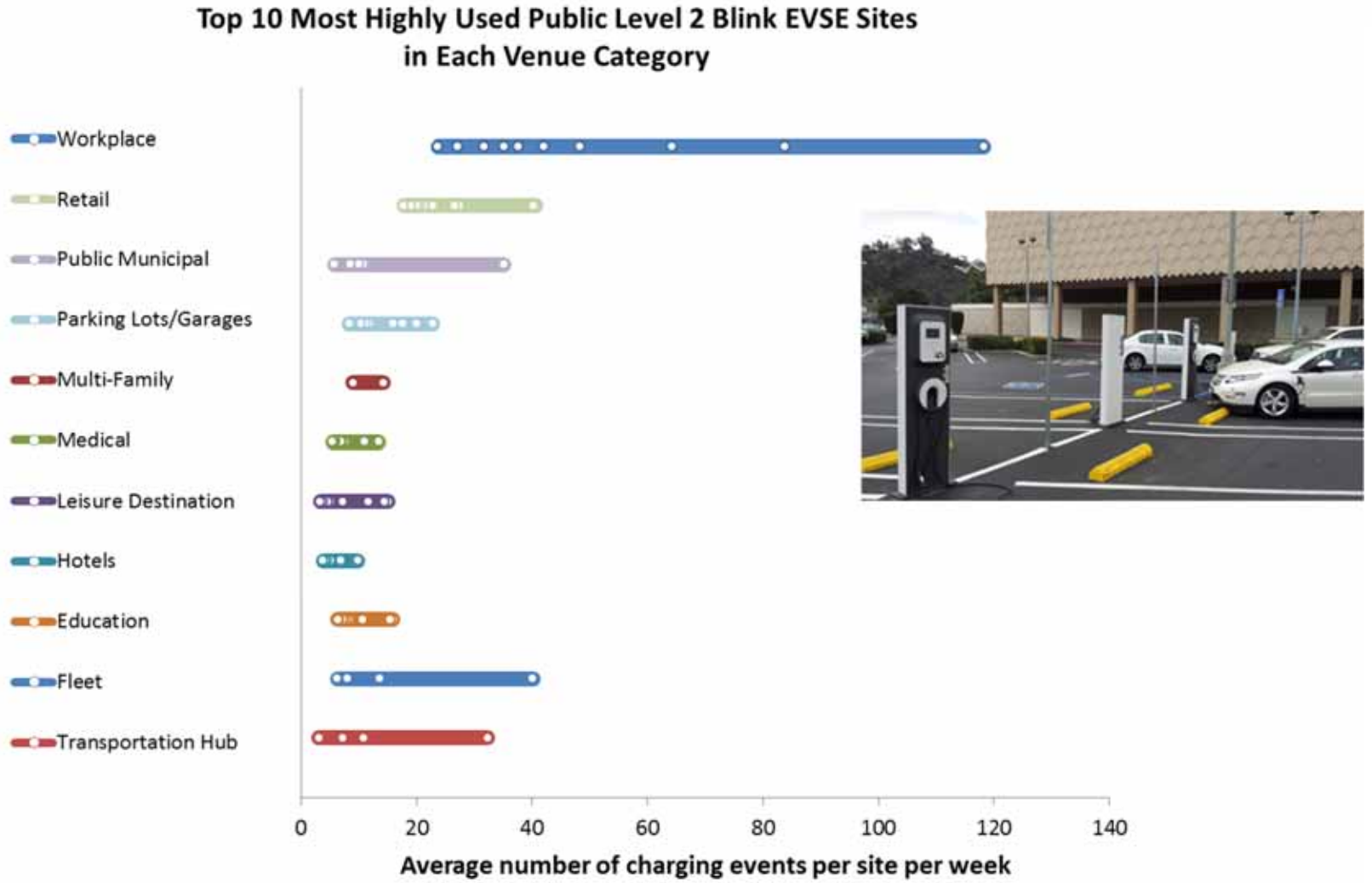
Average Usage Rate for Public Level 2 EVSE & DC Fast Chargers per Select Regions



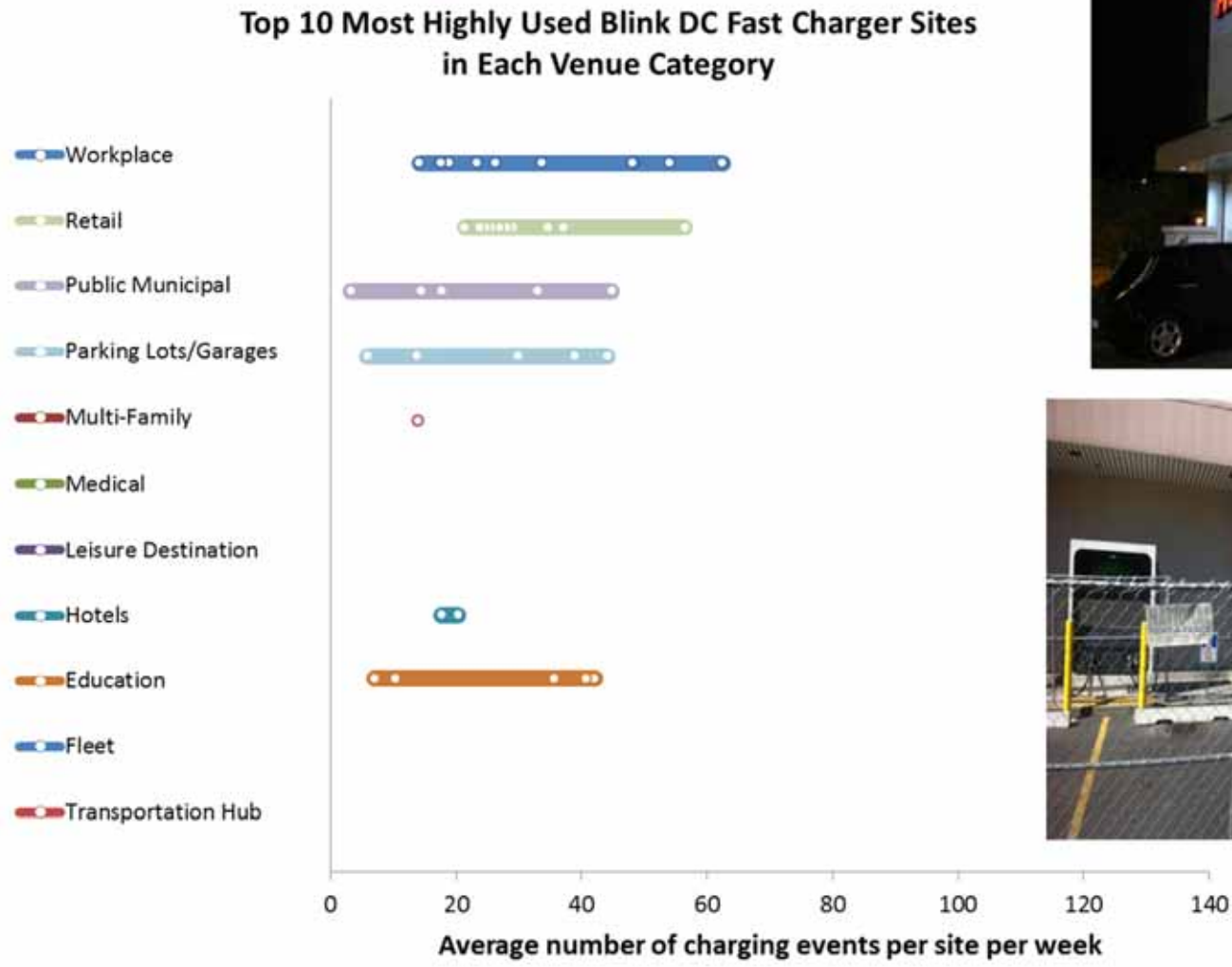
Usage Frequency of All DC Fast Chargers Nationally



Public Blink Level 2 EVSE Usage by Venue & Site – Sites May Have Multiple EVSE



Public Blink DC Fast Charger Usage by Venue & Site – One DCFC per site



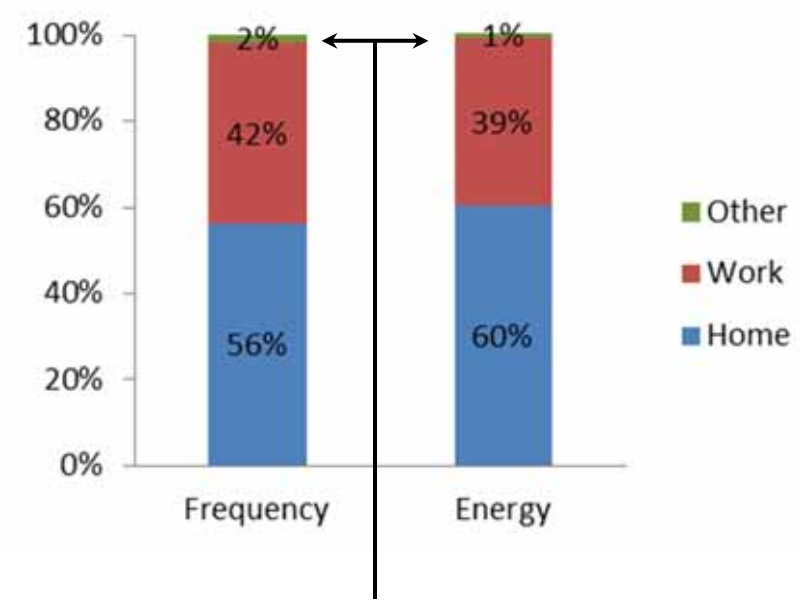
Fred Meyer in Seattle, WA

Photos from plugshare.com

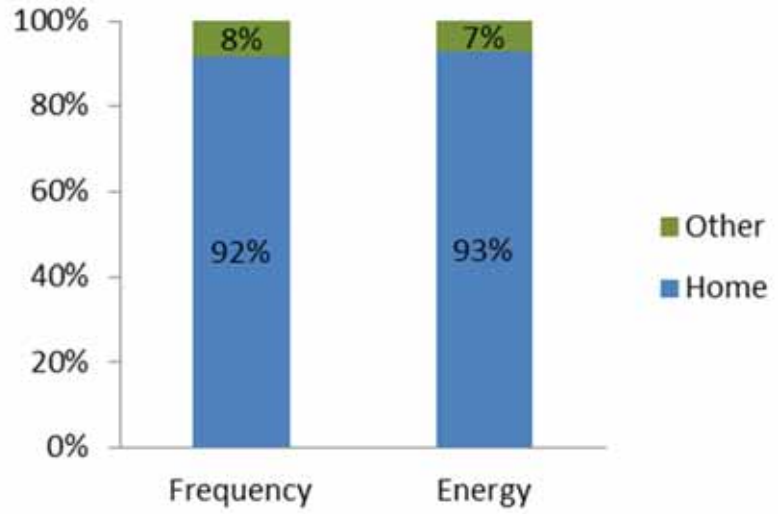
Charging Location Preference – Nissan Leaf

Group of Nissan Leafs with Access to Workplace Charging
2012 – 2013

Days When Vehicles Were Parked at Work



Days When Vehicles Were Not Parked at Work

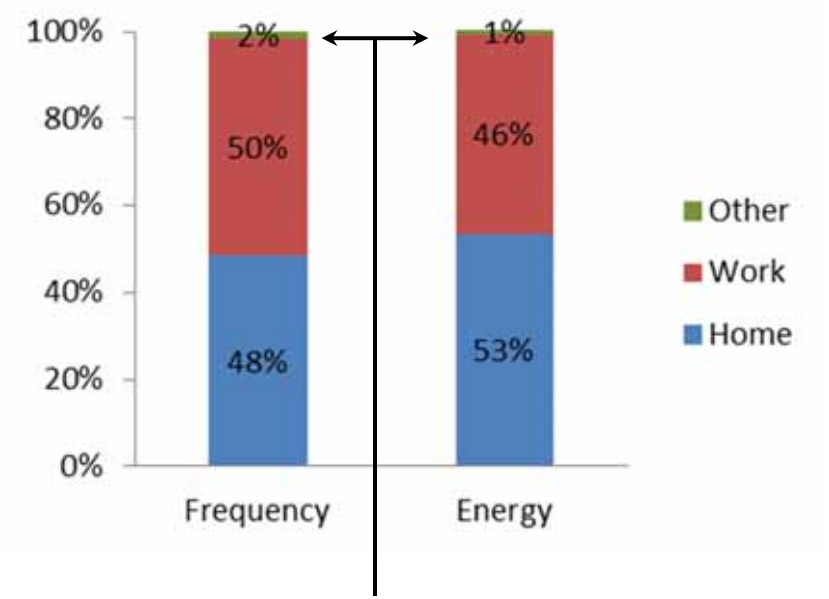


In aggregate, workplace vehicle drivers had little use for public infrastructure on days when they went to work

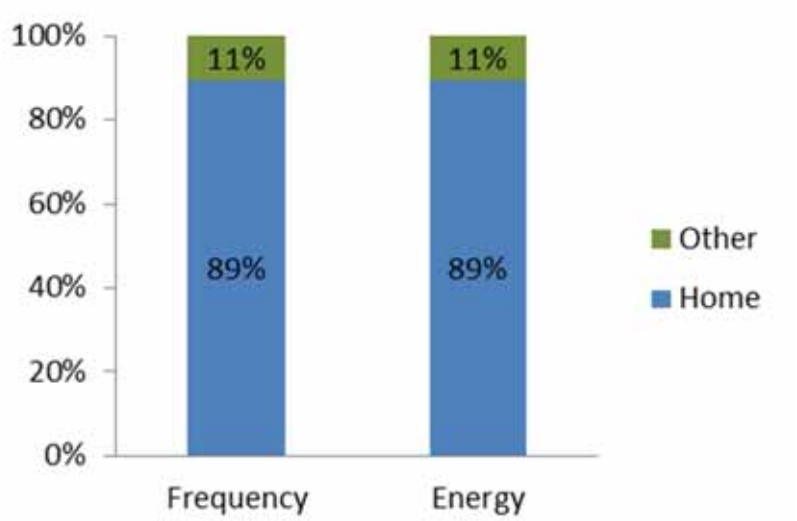
Charging Location Preference – Chevy Volt

Group of Chevrolet Volts with Access to Workplace Charging 2013 Only

Days When Vehicles Were Parked at Work



Days When Vehicles Were Not Parked at Work



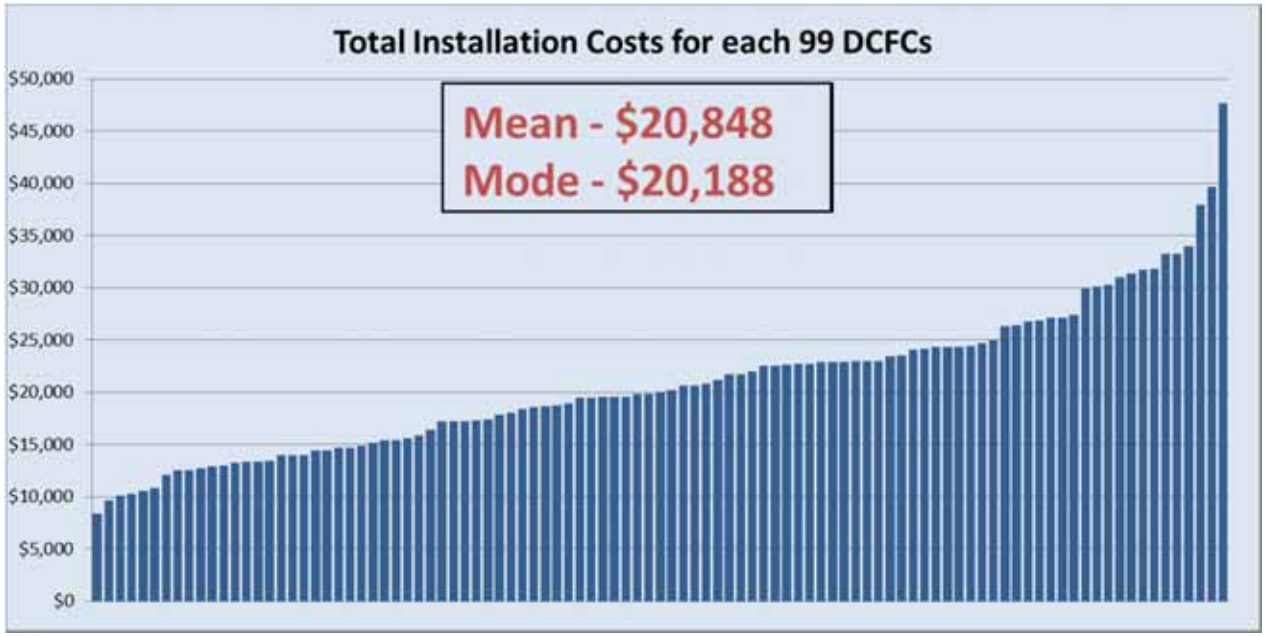
In aggregate, workplace vehicle drivers had little use for public infrastructure on days when they went to work

Commercial EVSE Level 2 Installation Costs

- **Nationally, commercially sited Level 2 EVSE averaged $4,000 for the installation costs. EVSE hardware cost excluded**
- **There is much variability by region and by installation**
- **Multiple EVSE at one site drive down per EVSE install cost**
- **Tennessee and Arizona have average installation costs of $2,000 to $2,500**
- **Costs driven by sitting requests**
  - **Example: mayor may want EVSE by front door of city hall, but electric service panel is located at the back of the building**

Region	Count of Permits	Average Permit Fee	Minimum Permit Fee	Maximum Permit Fee
Arizona	72	$228	$35	$542
Los Angeles	17	$195	$67	$650
San Diego	17	$361	$44	$821
Texas	47	$150	$37	$775
Tennessee	159	$71	$19	$216
Oregon	102	$112	$14	$291
Washington	33	$189	$57	$590

DC Fast Charger (DCFC) Infrastructure Installation & Demand Costs



Utility Demand Charges - Nissan Leaf		Cost/mo.
CA	Glendale Water and Power	$ 16.00
	Hercules Municipal Utility:	$ 377.00
	Los Angeles Department of Water and Power	$ 700.00
	Burbank Water and Power	$ 1,052.00
	San Diego Gas and Electric	$ 1,061.00
	Southern California Edison	$ 1,460.00
AZ	TRICO Electric Cooperative	$ 180.00
	The Salt River Project	$ 210.50
	Arizona Public Service	$ 483.75
OR	Pacificorp	$ 213.00
WA	Seattle City Light	$ 61.00

- **DCFC installation costs do not include DCFC hardware costs**
- **DCFC Demand Charges can have significant negative financial impacts**

Additional Information

- White papers currently being developed
  - Leaf L2 vs. DCFC usage
  - public charging venues
  - More from workplace charging case studies
  - EVSE installation costs
  - And more
- EV Project and ChargePoint America publications and general plug-in electric vehicle performance, visit
  - http://avt.inl.gov
- For addition charging infrastructure focused presentations
  - http://avt.inl.gov/pdf/EVProj/EVInfrastructureUsage.pdf
  - http://avt.inl.gov/pdf/EVProj/SAEHybridEVSympFeb2014.pdf

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