

U.S. Department of Energy's Vehicle Technologies Office

EV Project: Overview of Vehicle and Charging Profiles

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**US DOE / US Drive All Tech Teams Meeting
Troy, Michigan
December 2013**

INL/MIS-13-30770

This presentation does not contain any proprietary or sensitive information

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EV Project Data Collection

- **EV Project: 8,113 Leafs, Volts and Smarts, 12,065 EVSE and DCFC, reporting 3.5 million charge events, 103 million test miles. 1 million miles every 6 days**
 - **Data continues to be provided by vehicle manufacturers and infrastructure providers**
 - **11,000 NDAs and Data Use Agreements**
- **All projects, 122 million test miles accumulated on 11,600 electric drive vehicles and 16,300 EVSE and DCFC**

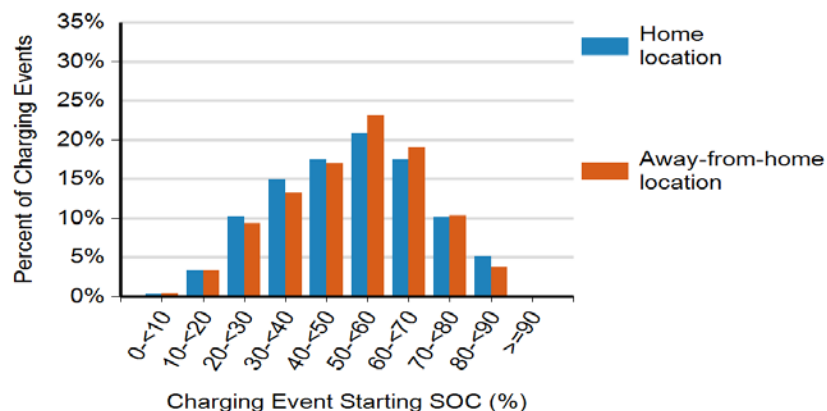
EV Project Vehicle Use Data

	<u>Leafs</u>	<u>Volts</u>
• Average (Ave) trip distance	7.1 mi	8.3 mi
• Ave distance per day	29.5 mi	41.0 mi
• Ave # trips between charges	3.8	3.3
• Ave miles between charges	26.7 mi	27.6 mi
• Ave # charging events per day	1.1	1.5

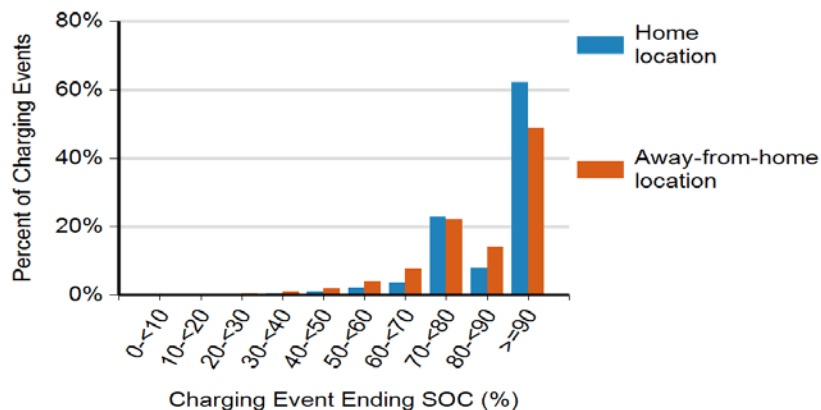
Leaf & Volt SOC Charging Profiles

Leafs

Battery State of Charge (SOC)
at the Start of Charging Events

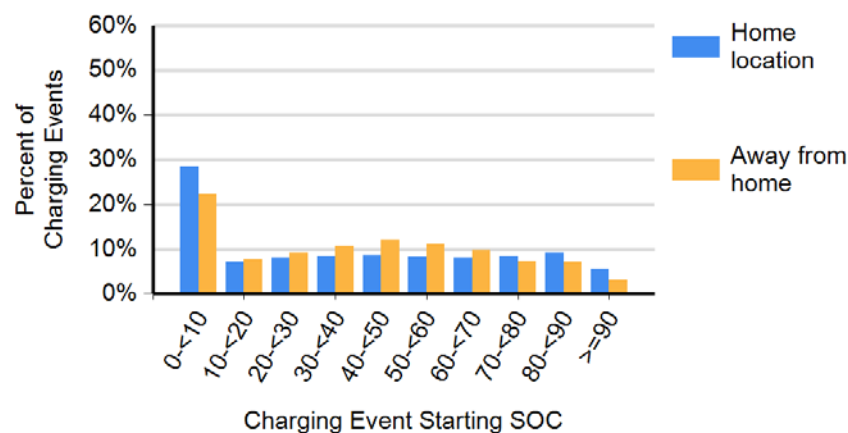


Battery State of Charge (SOC)
at the End of Charging Events

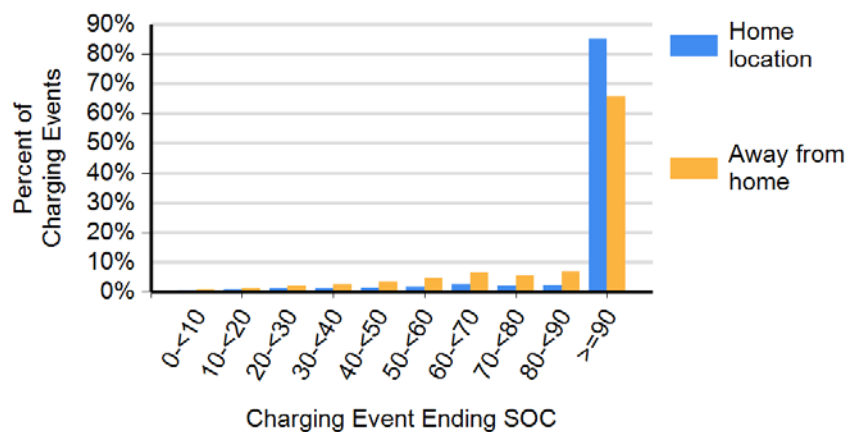


Volts

Battery State of Charge (SOC)
at the Start of Charging Events



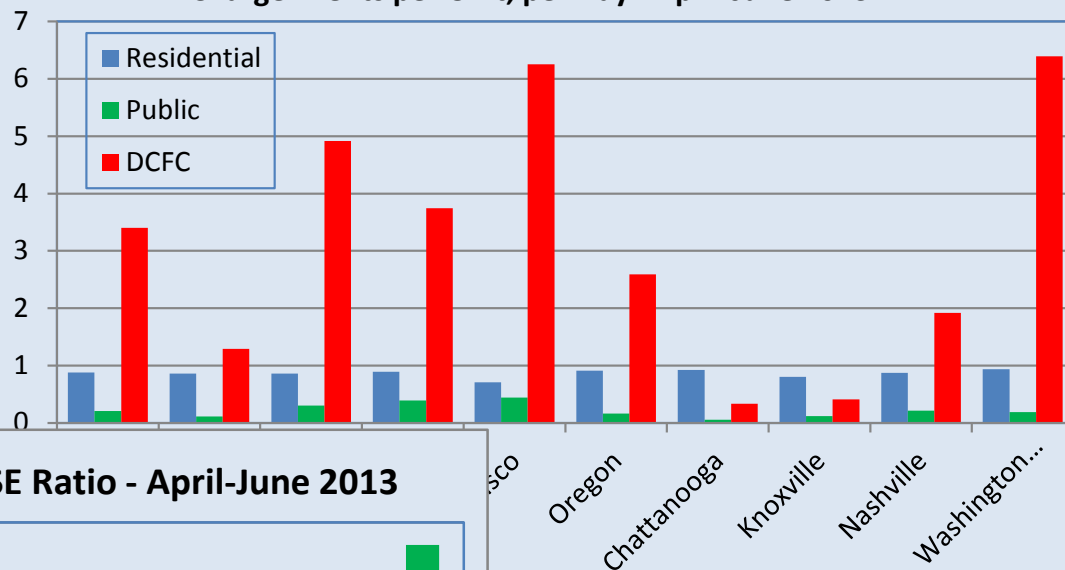
Battery State of Charge (SOC)
at the End of Charging Events



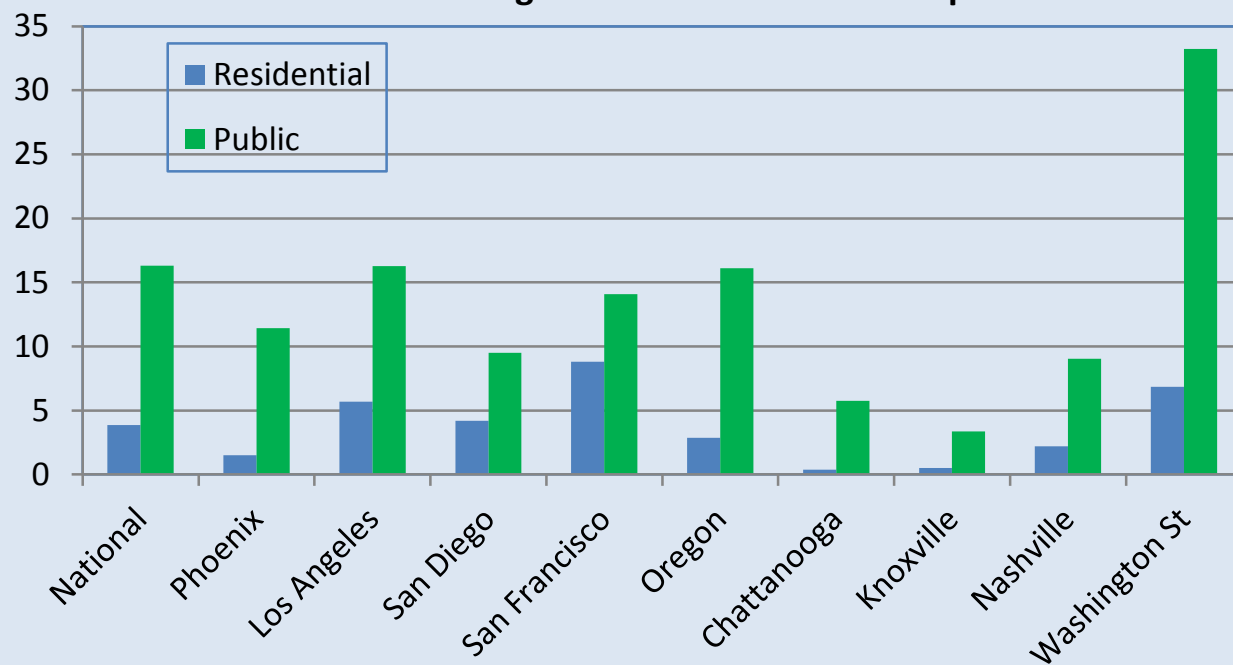
Infrastructure Use

- Per unit charging events for Residential and Public Level 2 and DCFC

Charge Events per Unit, per Day - April-June 2013

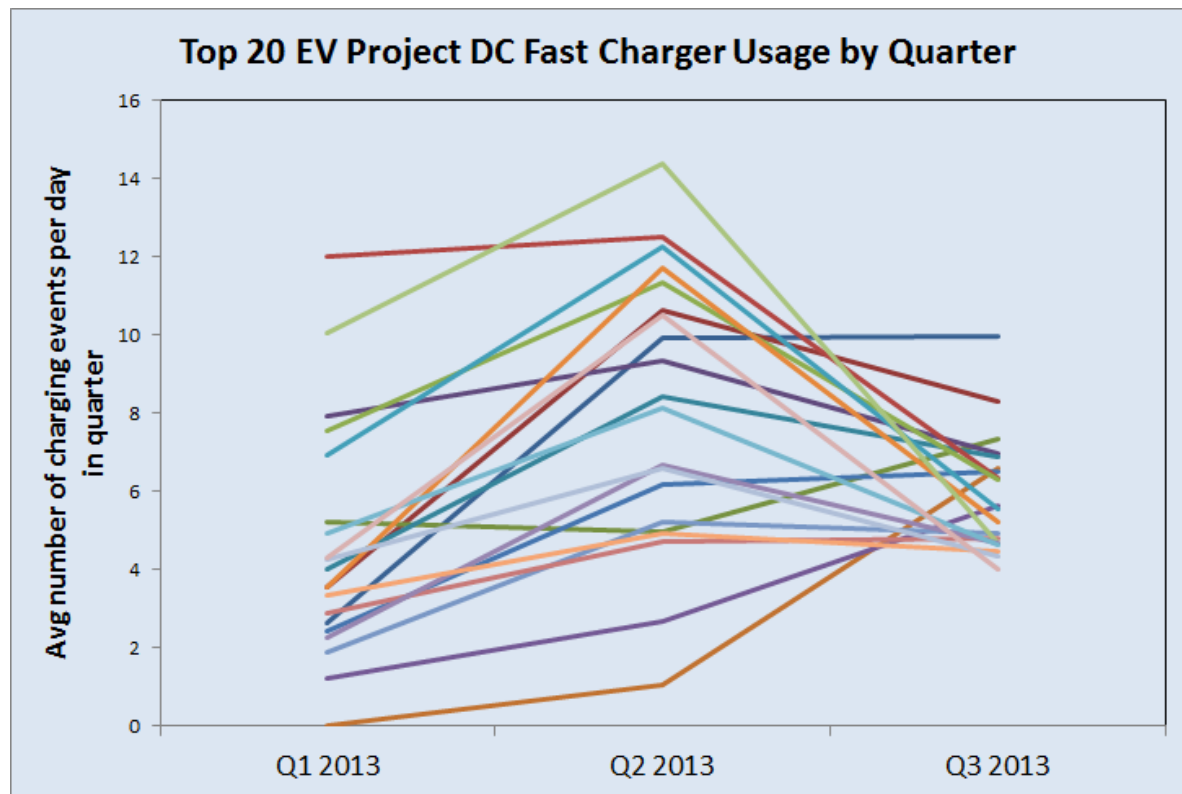


Individual Unit DCFC Charge Events to EVSE Ratio - April-June 2013



DCFC Revenue Model Impacts

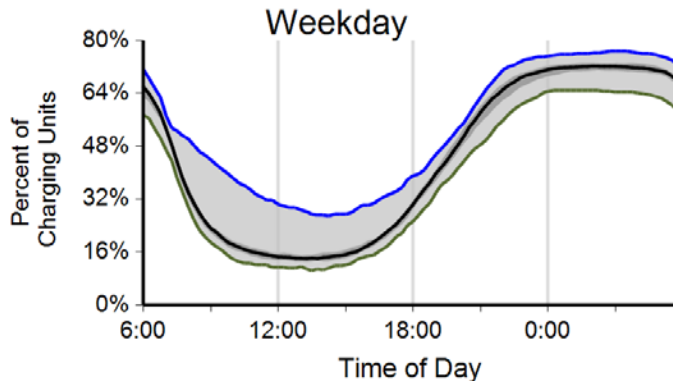
- 3rd Quarter revenue model introduction impacted DCFC use at least initially
- Public Level 2 EVSE had one time impacts
- 3.8 average charge events per day per DCFC
- 19.5 minutes average time connected
- 19.5 minutes average time drawing energy
- 8.3 kWh average energy consumed per charge



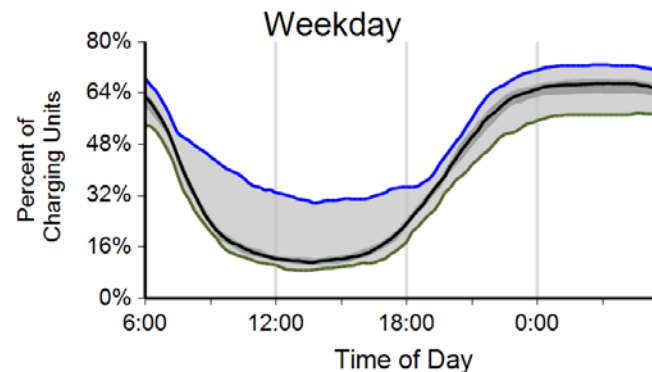
Residential Level 2 EVSE Connect Profiles

- Weekday EVSE 2nd Quarter 2013
- San Diego and San Francisco, with residential L2 TOU rates, are similar to other regional EVSE connect profiles

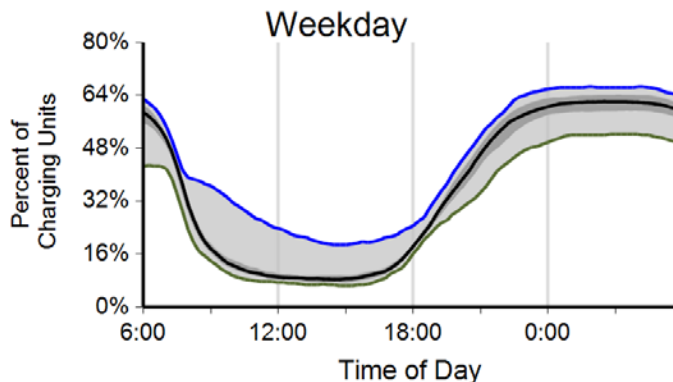
San Diego



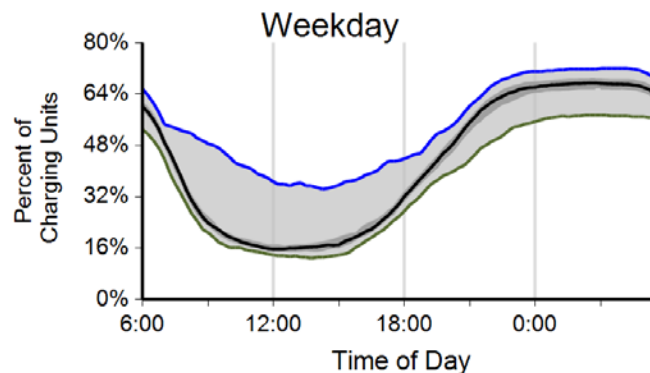
Los Angeles



San Francisco

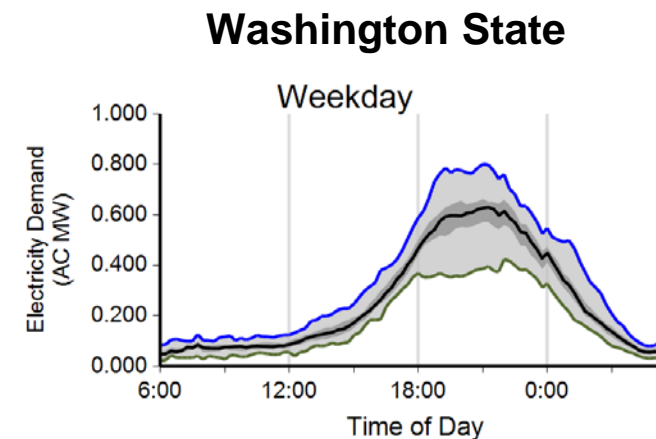
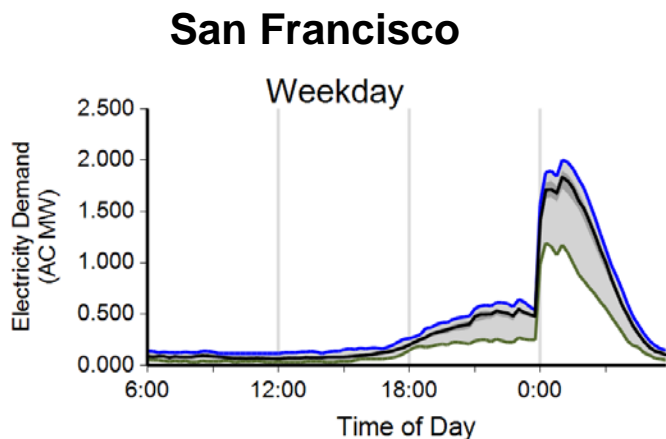
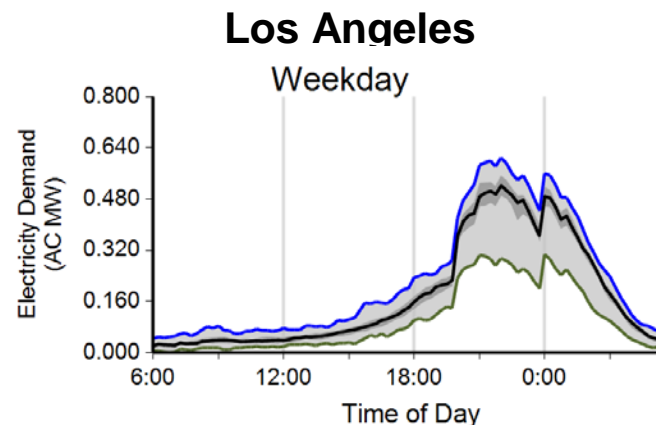
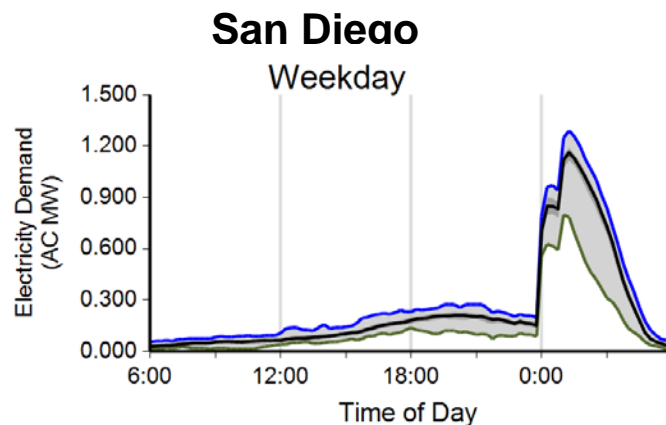


Washington State



Residential Level 2 EVSE Demand Profiles

- Residential Level 2 Weekday EVSE 2nd Quarter 2013
- TOU kWh rates in San Diego and San Francisco clearly impact when vehicle charging start times are set



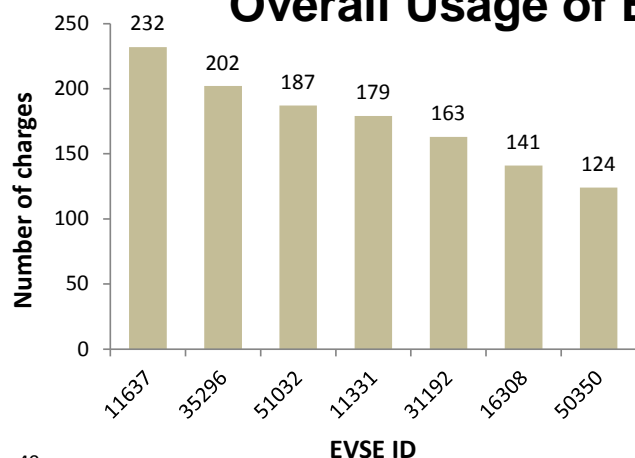
Infrastructure Costs

- **DCFC installation costs range from \$8,500 to \$48,000 (99 units), with a \$21,000 average**
- **Commercially sited Level 2 EVSE average between \$3,500 and \$4,500 in installation costs**
 - **Tennessee and Arizona have average installation costs of \$2,000 to \$2,500**
- **Residential sited Level 2 EVSE have maximum installation cost of \$8,429, average cost of \$1,414, and minimum cost of \$250**
- **Multiple units at one location drive down the per average installation cost**
- **Costs are significantly driven by poor siting requests**
 - **Example: mayor may want EVSE by front door of city hall, but electric service is located at back of building**

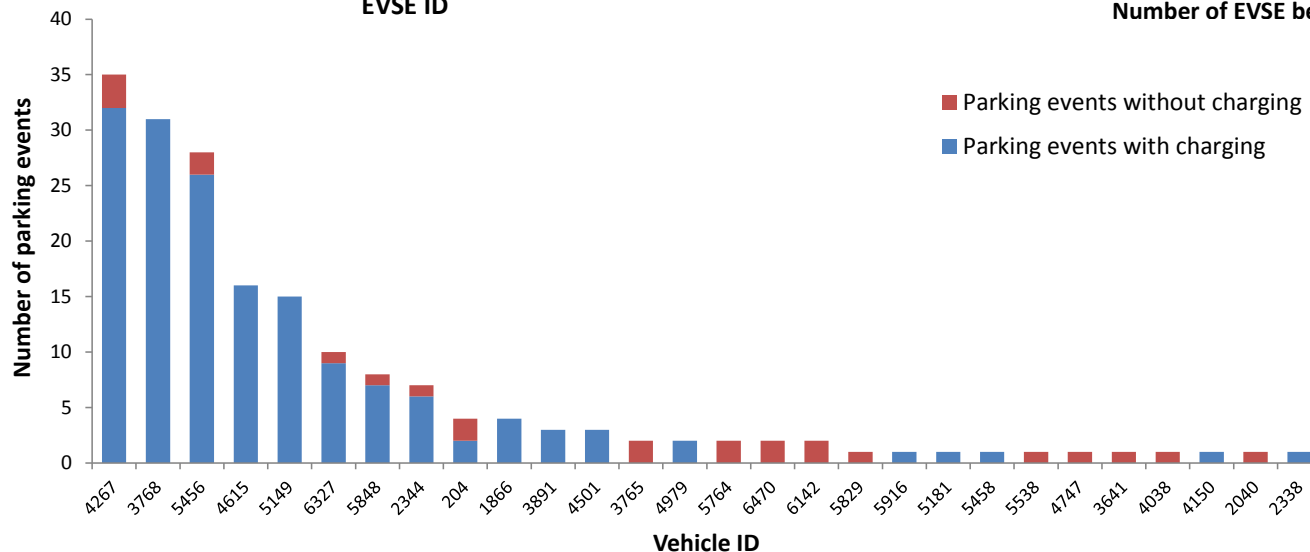
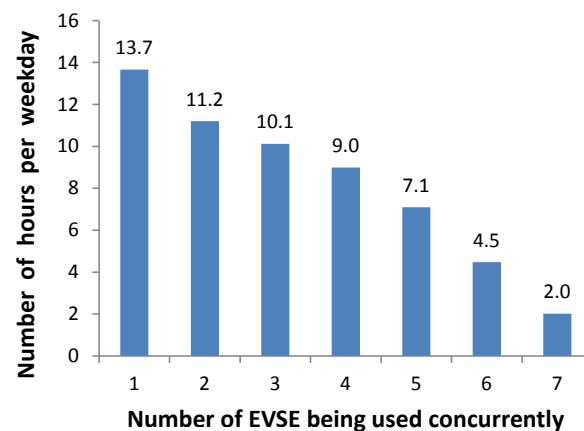
EVSE utilization at Worksites

- 47 additional EV Project work sites have been identified for analysis. Includes 197 EVSE and 1,571 vehicles

Overall Usage of EVSE



Concurrent Usage of EVSE



Other Grid Infrastructure Activities

- During FY 2013, 527 reports, fact sheets, white papers and technical papers related to electric drive vehicles or charging infrastructure were published

<http://avt.inl.gov>

- Lab & vehicle testing of Wireless Power Transfer systems
 - Supports SAE development of WPT test procedures
- Cyber security testing of 4 DOE OE funded Level 2 EVSE
- New York City electric taxi and infrastructure study
- Signing NDA for I-5 DCFC travel corridor study
- NYSERDA 580 EVSE L2 data collection
- Nissan Leaf DCFC Testing

