Building an Electric Vehicle Charging Station Network

A Case Study – County of Sonoma

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Green Fleets Roundtable
Oakland, CA – October 22, 2014
Topics of Discussion

- EV Infrastructure Experience
- Vehicle Designs
- Electric Vehicle Supply Equipment (EVSE)
- Site Location Choices
- Site Design
- Costs
- Maintenance and Repairs
Transportation is a Major Source of GHG emissions
EV Infrastructure Experience

• First Set of Charging Stations Installed in 2008

• Charging Stations Installed to Date
  – 74 Charging Ports
  – 37 Stations
    • 17 Fleet Use Only
    • 20 Public
    • 16 Different Site Locations
    • 8 Different Cities and Towns

• Future Installations to be Completed by End of 2015
  – 38 Charging Ports
  – 19 Stations
    • 12 Fleet Use Only
    • 9 Public
    • 11 Different Site Locations
    • 2 New Cities
County Owned Charge Ports
Publicly Available Charge Port Locations as of Today
County Owned Charging Ports
Energy Supplied Over Time
Vehicle Designs

No Standard for Charge Point Location on Vehicle Bodies
Electric Vehicle Supply Equipment

Do You Need Vehicle Use Data?

“Dumb” Chargers

“Smart” Chargers
## EVSE Costs

<table>
<thead>
<tr>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 2</th>
<th>Level 2</th>
<th>DC Fast Charger</th>
<th>DC Fast Charger</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.jpg" alt="Level 1" /></td>
<td><img src="image2.jpg" alt="Level 2" /></td>
<td><img src="image3.jpg" alt="Level 2" /></td>
<td><img src="image4.jpg" alt="Level 2" /></td>
<td><img src="image5.jpg" alt="DC Fast Charger" /></td>
<td><img src="image6.jpg" alt="DC Fast Charger" /></td>
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<tr>
<td>$30</td>
<td>$450 30amps</td>
<td>$1,000 30amps</td>
<td>$3,900 30amps</td>
<td>$19,000 125amps</td>
<td>$40,000 550amps</td>
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Site Location Choices

- Public or Fleet Use?
- Location Needs Assessment
- Voltage Availability
- Accessibility
- Infrastructure Costs
- Vehicle Designs
Site Location Choices Cont...

<table>
<thead>
<tr>
<th>Public</th>
<th>Fleet Use Only</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Accessibility</td>
<td>• Data Tracking</td>
</tr>
<tr>
<td>• Fee Structure</td>
<td>• Driver Training</td>
</tr>
<tr>
<td>• Hours of Operation</td>
<td>• Sophistication of Equipment</td>
</tr>
<tr>
<td>• Ease of Use</td>
<td>• Restricting Public Access</td>
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<td>• Vandalism</td>
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<td>• Customer Service</td>
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</table>
Fleet Use Only
Typically Less Expensive on a Per Station Cost Average

Publicly Accessible
Site Design

- Will the cord reach the vehicle?
- Wall Mount versus Bollard Mount?
- Cellular Coverage or Hard Wired for Data Transmission?
An Installation in 2009
Lessons Learned
Same Site in 2013
Public Accessibility Challenges

Is it a Fueling Station or a Parking Space?

Federal -- American with Disabilities Act (ADA)

State – Building Codes

Local – Permitting
Infrastructure Costs

Average Charging Station Site Infrastructure Installation Costs
Does Not Include EVSE Costs. 13 Sites, 36 Stations, and 72 Ports
Infrastructure Costs Cont...

Total Charging Station Site Infrastructure Installation Costs
Does Not Include EVSE Costs

Number of Charging Stations Installed At Each Site
Infrastructure Costs Vary Greatly

Low Cost Installation
High Cost of Installation
300 Feet of Trenching....
…..Through Two Parking Lots
Maintenance and Repairs

Curling and Uncurling Electrical Cords Every Day Results in Wiring Failures and An Unexpected Maintenance Item to Budget For
Maintenance and Repairs Cont...

Has the Circuit Breaker Been Turned Off for Facility Maintenance and Forgot to be Flipped Back On......?
Help? You Are Not Alone in Figuring It Out

California Office of Planning and Research Electric Vehicle Infrastructure Guidelines
http://opr.ca.gov/docs/PEV_Access_Guidelines.pdf

Plug-In Electric Vehicle Collaborative
http://www.pevcollaborative.org

Bay Area Climate Collaborative
http://www.baclimate.org
Questions?

There is a fine line between the “cutting edge and the bleeding edge.”

Sharing information can help minimize the bleeding.
Contact Information

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