

Building an Electric Vehicle Charging Station Network



Source: Audi

A Case Study – County of Sonoma

David Worthington
Fleet Manager

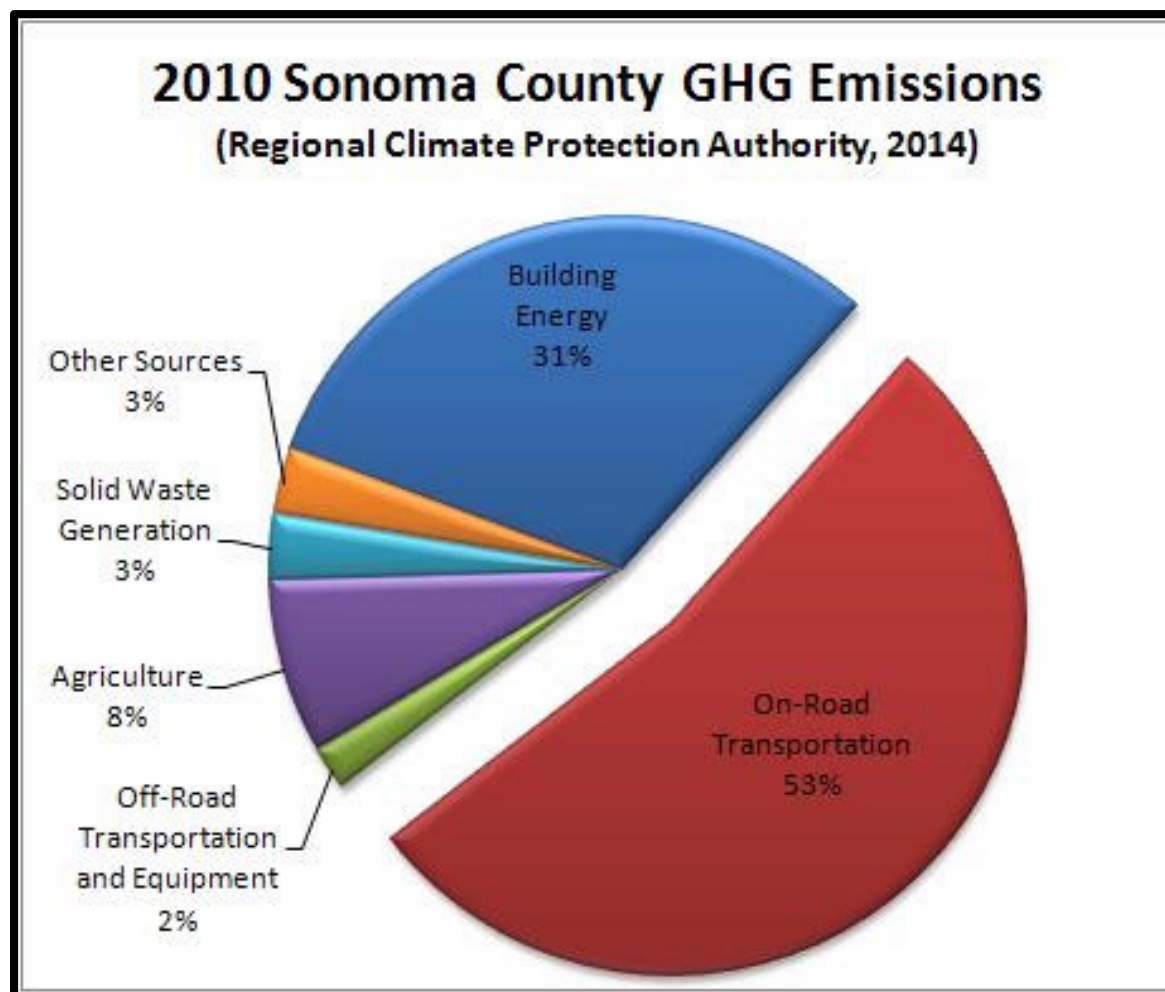
Green Fleets Roundtable
Oakland, CA – October 22, 2014



Topics of Discussion

- EV Infrastructure Experience
- Vehicle Designs
- Electric Vehicle Supply Equipment (EVSE)
- Site Location Choices
- Site Design
- Costs
- Maintenance and Repairs

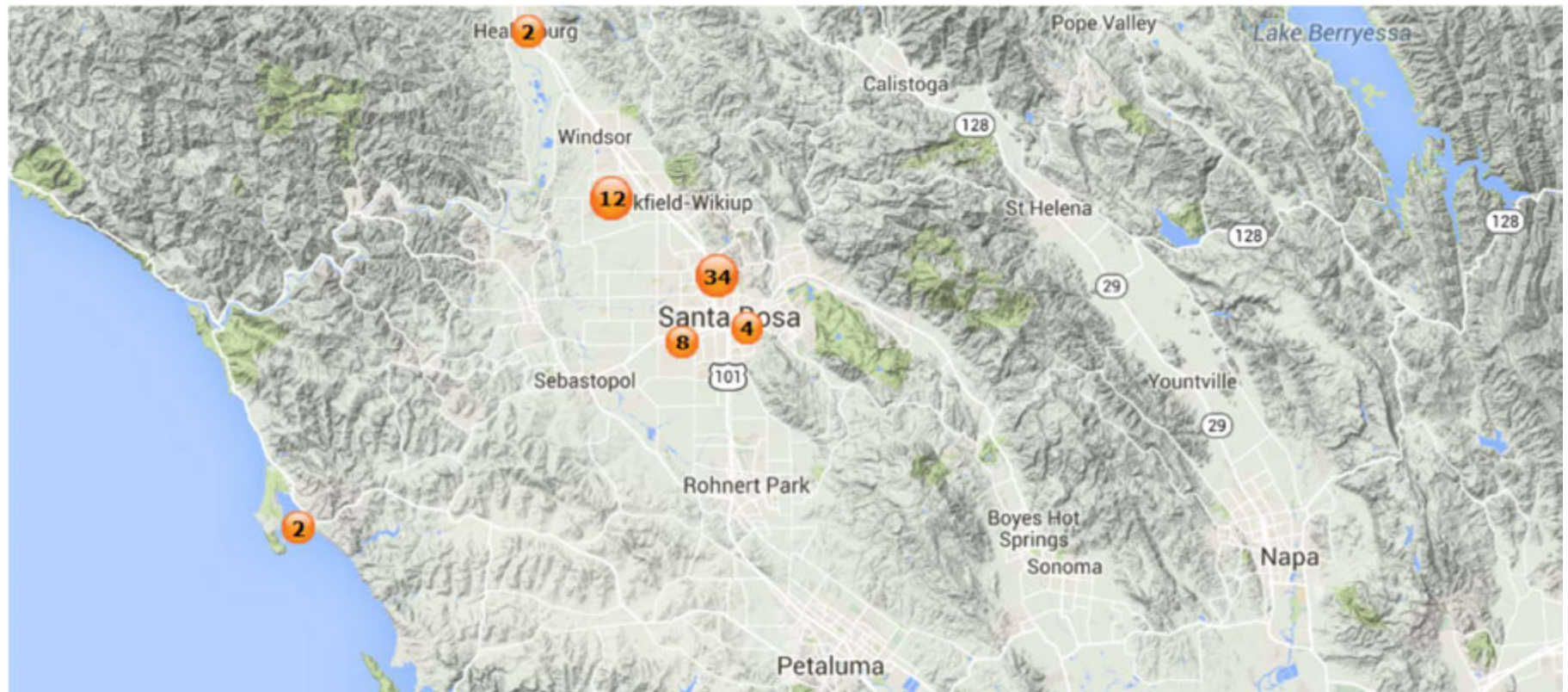
Transportation is a Major Source of GHG emissions



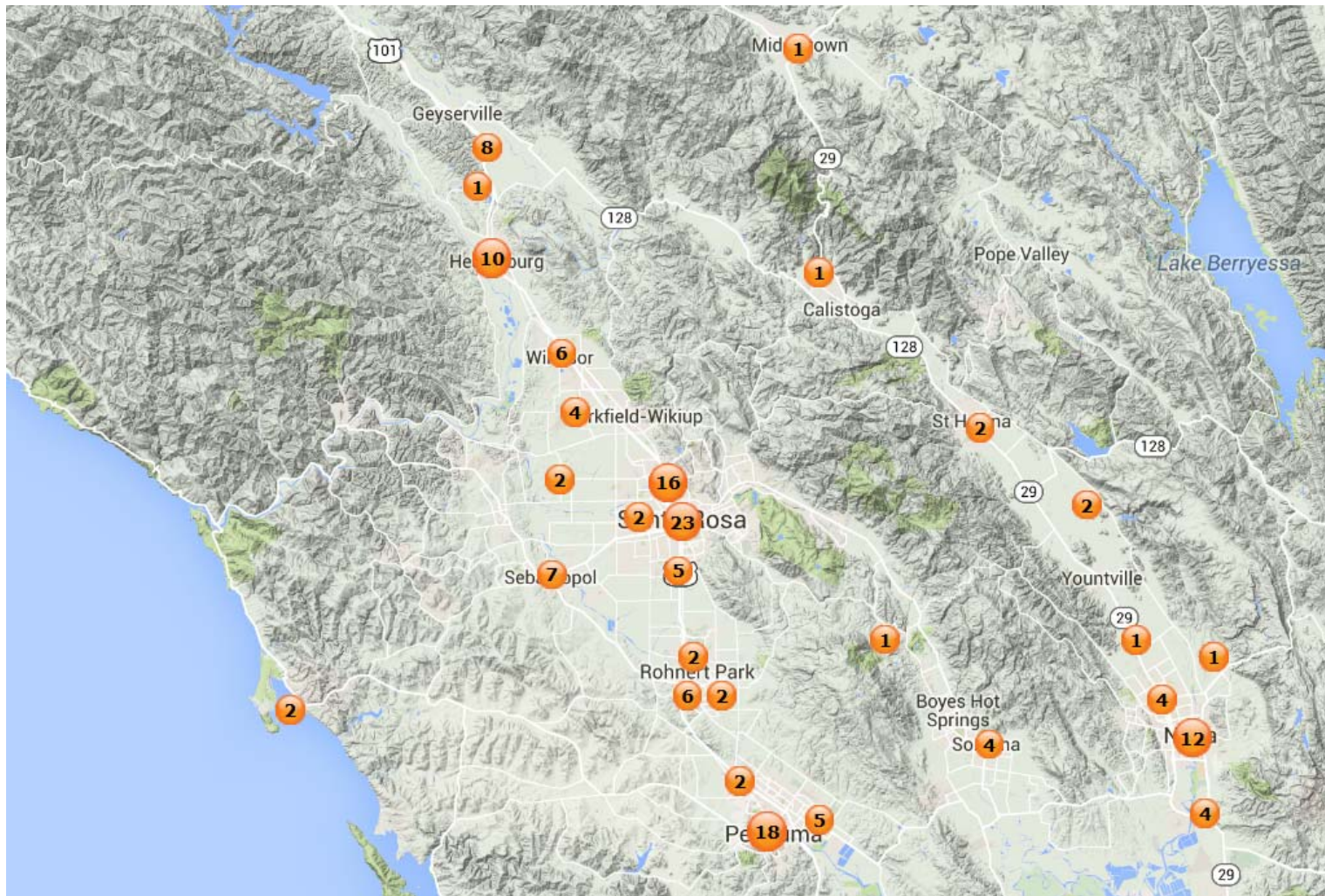
EV Infrastructure Experience

- **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**

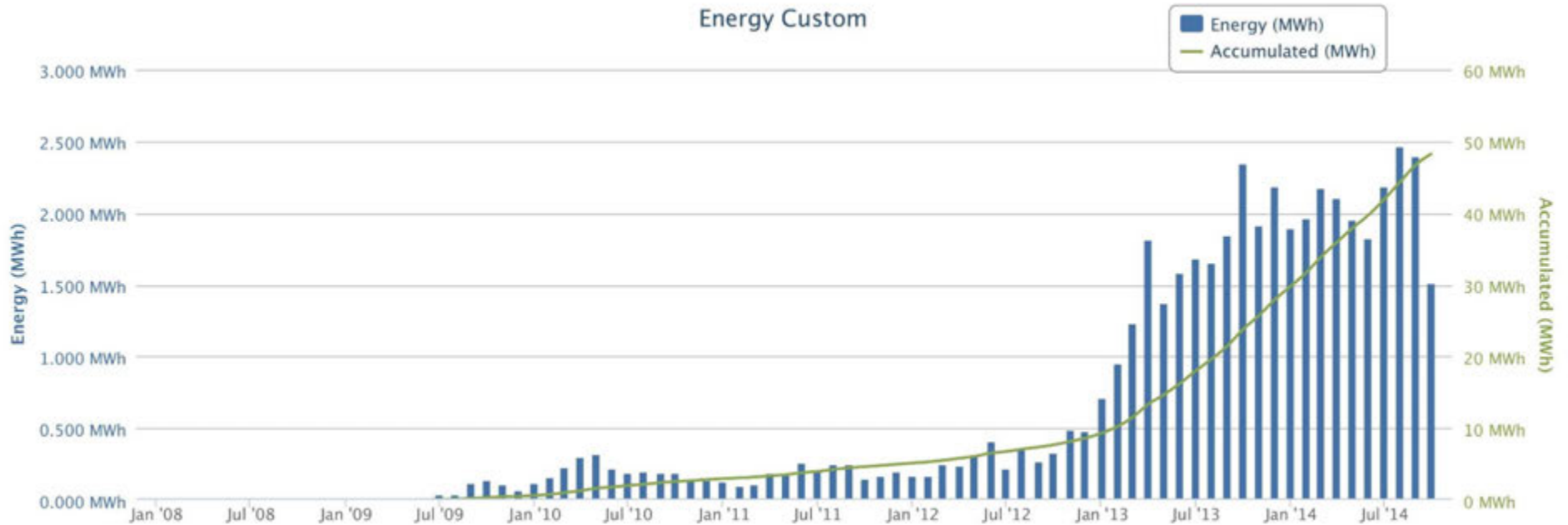
County Owned Charge Ports



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

Level 1



\$30

Level 2



\$450
30amps

Level 2



\$1,000
30amps

Level 2



\$3,900
30amps

DC Fast
Charger



\$19,000
125amps

DC Fast
Charger



\$40,000
550amps



Site Location Choices

- **Public or Fleet Use?**
- **Location Needs Assessment**
- **Voltage Availability**
- **Accessibility**
- **Infrastructure Costs**
- **Vehicle Designs**

Site Location Choices Cont...

Public

- Accessibility
- Fee Structure
- Hours of Operation
- Ease of Use
- Vandalism
- Customer Service

Fleet Use Only

- Data Tracking
- Driver Training
- Sophistication of Equipment
- Restricting Public Access



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)



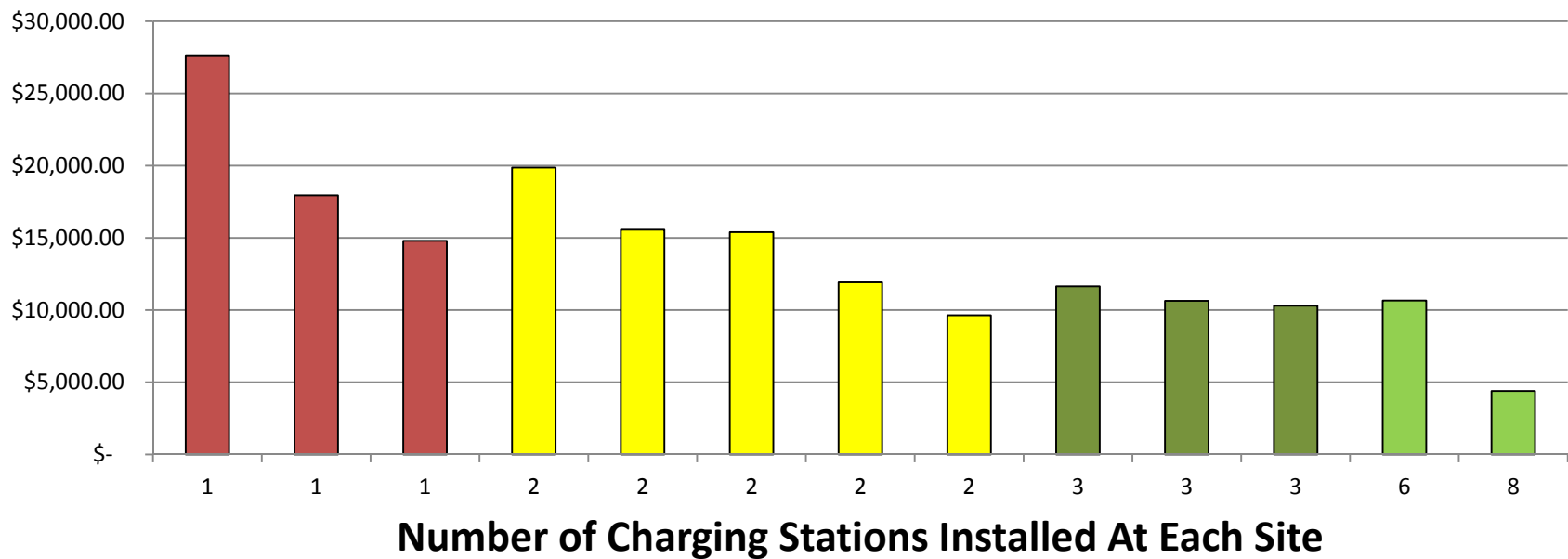
State – Building Codes



Local – Permitting

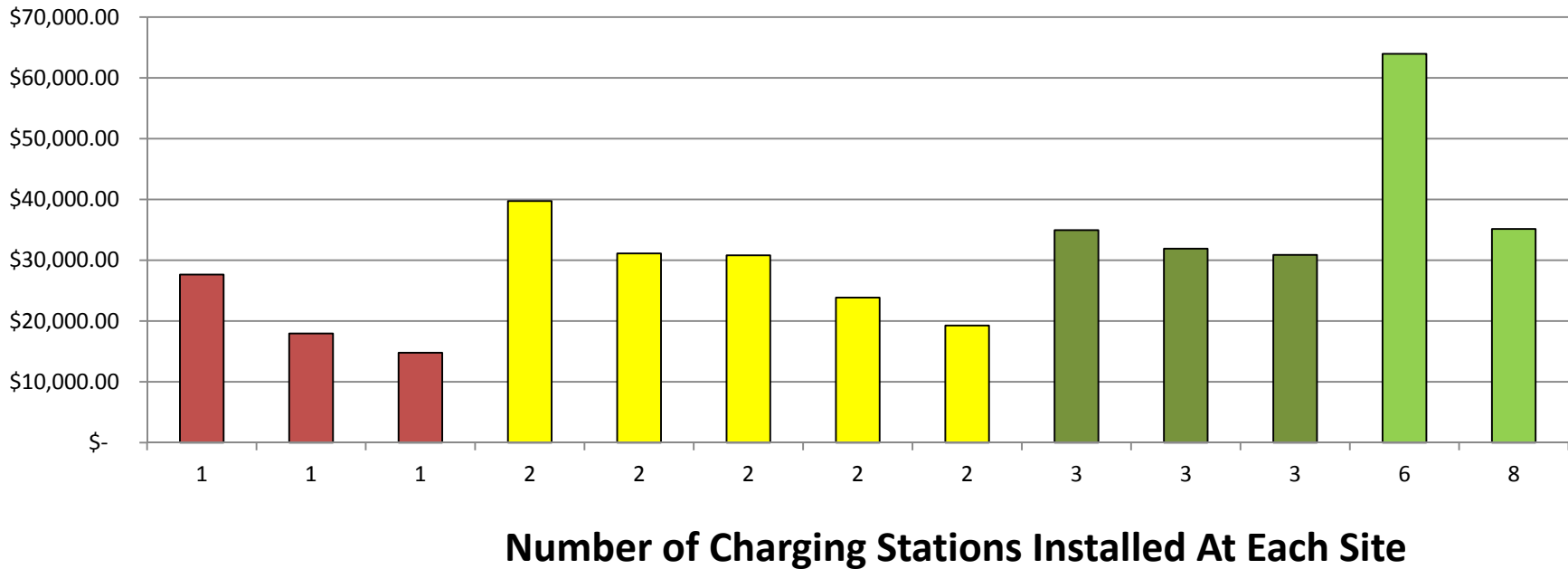
Infrastructure Costs

**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**



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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